

**FY2013**

**SIERRA ARMY DEPOT**  
**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 (AOC), and proposes a comprehensive, installation-wide approach, along with the costs and schedules associated with conducting investigations and taking the necessary remedial actions (RA).

In an effort to coordinate planning information between the restoration manager, the Army Materiel Command (AMC), the US Army Environmental Command (USAEC), the Sierra Army Depot (SIAD), the executing agencies, regulatory agencies, and the public, an IAP was completed. The IAP is used to track requirements, schedules, and budgets for all major Army installation cleanup programs.

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

## Acronyms

AEDB-CC	Army Environmental Database - Compliance-related Cleanup
AEDB-R	Army Environmental Database - Restoration
ALF	Abandoned Landfill
AMC	Army Materiel Command
AOC	Area of Concern
ASR	Archived Search Report
Bldg	Building
BLM	Bureau of Land Management
BRAC	Base Realignment and Closure
BTEX	Benzene, Toluene, Ethylbenzene and Xylene
CA	Corrective Action
CAMU	Corrective Action Management Unit
CAP	Corrective Action Plan
CBU	Cluster Bombs
CC	Compliance-related Cleanup
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
COC	Contaminant of Concern
CoRA	Certification of Risk Acceptance
CR	Compliance Restoration
CS	0-Chlorobenzylmalononitrile (tear gas)
CSL	Chemical Systems Laboratory
DD	Decision Document
DERP	Defense Environmental Restoration Program
DMM	Discarded Military Munitions
DoD	Department of Defense
DPDO	Defense Property Disposal Office
DRMO	Defense Reutilization and Marketing Office
DTSC	Department of Toxic Substances Control
EE/CA	Engineering Evaluation/Cost Analysis
EOD	Explosive Ordnance Disposal
EPA	Environmental Protection Agency
ERD	Enhanced Reductive Dechlorination
FFSRA	Federal Facility Site Remediation Agreement
FRA	Final Remedial Action
FS	Feasibility Study
FY	Fiscal Year
HC	Hexachloroethane
HE	High Explosive
HRC	Hydrogen Releasing Compound
HRR	Historical Records Review
IAP	Installation Action Plan
IC	Institutional Control
ICM	Improved Conventional Munitions
INV	Investigation
IR	Installation Restoration

## Acronyms

IRA	Interim Remedial Action
IRP	Installation Restoration Program
IRZ	In Situ Reactive Zone
kg	kilogram
LTM	Long-Term Management
LUC	Land Use Control
LUCIP	Land Use Controls Implementation Plan
MC	Munitions Constituent
MCL	Maximum Contaminant Level
MEC	Munitions and Explosives of Concern
MEP	Master Environmental Plan
mm	millimeter
MMRP	Military Munitions Response Program
MNA	Monitored Natural Attenuation
MR	Munitions Response
MRS	Munitions Response Site
MRSPP	Munitions Response Site Prioritization Protocol
N/A	Not Applicable
NFA	No Further Action
NPL	National Priorities List
O&M	Operations & Maintenance
ODUSD(I&E)	Office of the Deputy Under Secretary of Defense (Installations and Environment)
OPF	Old Popping Furnace
PA	Preliminary Assessment
PBA	Performance-Based Acquisition
PBC	Performance-Based Contract
POL	Petroleum, Oil and Lubricants
PP	Proposed Plan
ppb	parts per billion
ppm	parts per million
RA	Remedial Action
RA(C)	Remedial Action (Construction)
RA(O)	Remedial Action (Operations)
RAB	Restoration Advisory Board
RAP	Remedial Action Plan
RC	Response Complete
RCRA	Resource Conservation and Recovery Act
RFA	RCRA Facility Assessment
RI	Remedial Investigation
RIP	Remedy-in-Place
ROD	Record of Decision
RRSE	Relative Risk Site Evaluation
RWQCB	Regional Water Quality Control Board
SI	Site Inspection
SIAD	Sierra Army Depot

## Acronyms

SSA	Southern Sites Area
SVE	Soil Vapor Extraction
SVOC	Semi-Volatile Organic Compounds
SWMU	Solid Waste Management Unit
TAPP	Technical Assistance for Public Participation
TCE	Trichloroethylene
TNT	trinitrotoluene
TPH	Total Petroleum Hydrocarbon
TPH-d	Total Petroleum Hydrocarbon - diesel
TRC	Technical Review Committee
UBG	Upper Burning Ground
USACE	US Army Corps of Engineers
USACOE	US Army Corps of Engineers
USAEC	US Army Environmental Command
USEPA	US Environmental Protection Agency
UST	Underground Storage Tank
VOC	Volatile Organic Compound
WP	White Phosphorus
WSA	Wilderness Study Areas
ZVI	Zero-Valent Iron

## Installation Information

### Installation Locale

**Installation Size (Acreage):** 36086

**City:** Herlong

**County:** Lassen

**State:** California

### Other Locale Information

SIAD is located in Honey Lake Valley of Lassen County in northeast California, approximately four miles west of the California-Nevada state border and five miles east of US Highway 395. The two largest communities near SIAD are Susanville, California (county seat of Lassen County, located 35 miles northwest of SIAD and Reno, Nevada (located 55 miles southeast of SIAD). Other neighboring communities, all in California, include Doyle (located eight miles south of SIAD), Herlong and the Sage Flats area, located near the southern entrance to the main depot.

The active area of SIAD is 36,086 acres. These areas include the main depot (32,006 acres) and the Upper Burning Ground (UBG) (4,080 acres) located two miles northeast of the depot's main boundary. Mountain ranges bordering SIAD are the Amedee and Skedaddle Mountains to the north, the Fort Sage Mountains to the south, and the Diamond Mountains to the southwest.

### Installation Mission

The mission of the SIAD is to provide rapid expeditionary logistics support and long-term sustainment solutions to the Army and the Joint Force.

### Lead Organization

Army Materiel Command (AMC)

### Lead Executing Agencies for Installation

SIAD, Directorate of Risk Management, Restoration Division

### Regulator Participation

#### Federal

US Environmental Protection Agency (USEPA)

#### State

California Regional Water Quality Control Board (RWQCB), Lahontan Region  
California EPA, Department of Toxic Substances Control (DTSC)

### National Priorities List (NPL) Status

SIERRA ARMY DEPOT is not on the NPL

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

RAB established 199611



## Installation Information

### Installation Program Summaries

#### IRP

**Primary Contaminants of Concern:** Explosives, Metals, Munitions and explosives of concern (MEC), Petroleum, Oil and Lubricants (POL), Semi-volatiles (SVOC), Volatiles (VOC)

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

#### MMRP

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

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

#### CR

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

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

## 5-Year / Periodic Review Summary

### 5-Year / Periodic Review Summary

Status	Start Date	End Date	End FY
Complete	201012	201109	2011
Complete	200512	200609	2006
Planned	201503	201609	2016

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

Associated ROD/DD Name	Sites
ROD/RAP DRMO TRENCH AREA	SIAD-002
Three Sites ROD/RAP	SIAD-003, SIAD-010, SIAD-022

**Results** Based on annual groundwater monitoring results and quarterly CAMU inspections, as presented in the Five-Year Review Report, DTSC concludes the RAO's are being met and the selected remedies remain protective of human health and the environment.

**Actions** To fully comply with the selected remedies, please submit to the State of California monitoring reports on the status of the LUCs on an annual basis.

**Plans** The next Five Year Review is scheduled to be completed in 2016. In the interim, DTSC will continue to review the results of the annual groundwater monitoring program.

### Recommendations and Implementation Plans:

N/A

## Land Use Control (LUC) Summary

**LUC Title:** Abandoned Landfill

**Site(s):** SIAD-003

**ROD/DD Title:** Abandoned Landfill/Southern Sites Area

**Location of LUC**

Abandoned Landfill area is in the cantonment area; south of C St. and west of Main Mag Road.

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

**Types of Engineering Controls:** None

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

**Date in Place:** 200808

**Modification Date:** N/A

**Date Terminated:** N/A

**Inspecting Organization:** State

**Record of LUC:** Master Plan or Equivalent

**Documentation Date:** 200901

**LUC Enforcement:** Annual Inspections, 5 Year Reviews

**Contaminants:** VOC

**Additional Information**

N/A

**LUC Title:** DRMO Trench Area ROD/RAP

**Site(s):** SIAD-002

**ROD/DD Title:** ROD/RAP DRMO TRENCH AREA

**Location of LUC**

Open Trench and DRMO groundwater.

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

**Types of Engineering Controls:** Fences

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

**Date in Place:** 199803

**Modification Date:** N/A

**Date Terminated:** N/A

**Inspecting Organization:** State

**Record of LUC:** Master Plan or Equivalent

**Documentation Date:** N/A

**LUC Enforcement:** 5 Year Reviews

**Contaminants:** VOC

**Additional Information**

N/A

## Land Use Control (LUC) Summary

**LUC Title:** Equipment Yard (Bldg 79)

**Site(s):** SIAD-003

**ROD/DD Title:** Three Sites ROD/RAP

**Location of LUC**

South of potable supply wells, coordinates are in Master Plan files.

**Land Use Restriction:** Media specific - Prohibit activities that results in contact with contaminated sediments

**Types of Engineering Controls:** None

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

**Date in Place:** 200808

**Modification Date:** N/A

**Date Terminated:** N/A

**Inspecting Organization:** State

**Record of LUC:** Master Plan or Equivalent

**Documentation Date:** N/A

**LUC Enforcement:** Annual Inspections, 5 Year Reviews

**Contaminants:** PESTICIDES

**Additional Information**

N/A

**LUC Title:** Nine Sites ROD/RAP

**Site(s):** SIAD-016, SIAD-020

**ROD/DD Title:** ROD/RAP NINE SITES SIERRA ARMY DEPOT

**Location of LUC**

Ammunition Demilitarization and Renovation Area, 1003, Chemical Burial, Construction Debris Landfill, Existing Landfill, Existing Popping Furnace, Large Sewage Treatment Ponds, Lower Burning Grounds and 1960 Demolition Area.

**Land Use Restriction:** Restrict land use - Mitigation area(s) protection

**Types of Engineering Controls:** Fences, Signs

**Types of Institutional Controls:** Restrictive covenants

**Date in Place:** 199610

**Modification Date:** N/A

**Date Terminated:** N/A

**Inspecting Organization:** State

**Record of LUC:** Master Plan or Equivalent

**Documentation Date:** N/A

**LUC Enforcement:** Other

**Contaminants:** Unexploded Ordnance(UXO)

**Additional Information**

N/A

**LUC Title:** Seven Sites ROD/RAP

**Site(s):** SIAD-001, SIAD-011

## Land Use Control (LUC) Summary

**ROD/DD Title:** ROD/RAP SEVEN SITES

**Location of LUC**

SIAD-001 TNT Leaching Beds & SIAD-011 Diesel Spill Area.

**Land Use Restriction:** Media specific restriction - restrict withdrawal or use of groundwater w/out treatment

**Types of Engineering Controls:** Fences

**Types of Institutional Controls:** Dig Permits, Notations in Master Plan, Restrictions on Groundwater Withdrawal

**Date in Place:** 199509

**Modification Date:** N/A

**Date Terminated:** N/A

**Inspecting Organization:** State

**Record of LUC:** Master Plan or Equivalent

**Documentation Date:** N/A

**LUC Enforcement:** 5 Year Reviews

**Contaminants:** ORGANICS, PETROLEUM HYDROCARBON, VOC

**Additional Information**

N/A

**LUC Title:** Three Sites ROD

**Site(s):** SIAD-010, SIAD-022

**ROD/DD Title:** Three Sites ROD/RAP

**Location of LUC**

Upper Burning Grounds, Old Popping Furnace and Equipment Yard (Bldg 79)

**Land Use Restriction:** Landfill restriction - Prohibit activities that would impact the LF cap (or cover system) and drainage system, Landfill restriction - Prohibit excavation on LF cap or cover system, Landfill restriction - Prohibit installation of utility system lines through the site, Landfill restriction - Restrict access to the site, Landfill restriction - Restrict construction of buildings that may interfere with LF cap or cover system, Landfill restriction - Restrict plantings that interfere LF cap or cover system (roots that penetrate the cap or cover system), Landfill restriction - Restrict vehicular traffic, Media specific - Prohibit activities that results in contact with contaminated sediments

**Types of Engineering Controls:** Fences, Signs

**Types of Institutional Controls:** Dig Permits, Notations in Master Plan, Restrictions on land use

**Date in Place:** 200508

**Modification Date:** N/A

**Date Terminated:** N/A

**Inspecting Organization:** State

**Record of LUC:** Master Plan or Equivalent

**Documentation Date:** 200508

**LUC Enforcement:** Annual Inspections, 5 Year Reviews

**Contaminants:** METALS, PESTICIDES

**Additional Information**

N/A

# Cleanup Program Summary

## Installation Historic Activity

In 1942, SIAD began operations involving storage of supplies and inert materials belonging to the Treasury Department. The missions of receipt, storage, and issue of explosives were assigned to the depot upon completion of the large igloo storage area. In 1954, the missions of receipt, storage, and issue of guided missiles and propellant fuels were added.

Activity at the site has fluctuated with the involvement of the United States in active military conflicts. The work force at the site was at an all-time high of 2,327 during the Korean War. The work force rose from a low of 974 to a high of 1,577 in 1967 during the Vietnam War.

On May 30, 1991 the Federal Facility Site Remediation Agreement (FFSRA) was signed between the Army, California DTSC, and California RWQCB. The FFSRA identified and prioritized 22 sites at SIAD and placed them into three different groups. A twenty-third site was later added to the investigation (INV) schedule. Group I contained the sites with the highest contamination potential while Group II and Group III have progressively lower contamination potential. The FFSRA placed tight schedules on the start date of investigations and the delivery date of primary documents for each group of sites.

In 2003, SIAD withdrew their Resource Conservation and Recovery Act (RCRA) Part B permit application and moved toward the current mission as a joint logistics plant.

Seven MMRP Sites achieved response complete (RC) in 2012. An RI/FS will begin in 2013 for a new MMRP Site.

LTM will begin in 2013 for seven sites.

## Installation Program Cleanup Progress

### IRP

**Prior Year Progress:** A new performance-based acquisition (PBA) was awarded to cover long-term management (LTM) for SIAD-010, SIAD-022, and SIAD-020 and remedial action operations RA(O) for SIAD-001, SIAD-002, SIAD-003, and SIAD-014. Enhanced reductive dechlorination (ERD) operations continued for SIAD-001, SIAD-002, SIAD-003, and SIAD-014 under the new PBA. The soil vapor extraction (SVE) pilot test continues to operate at SIAD-002 and SIAD-014.

**Future Plan of Action:** LTM and RA(O) will continue at multiple sites through 2016 under PBA.

### MMRP

**Prior Year Progress:** LTM begins for seven sites (SIAD-006-R-01, SIAD-007-R-01, SIAD-009-R-01, SIAD-010-R-01, SIAD-012-R-01, SIAD-014-R-01 and SIAD-015-R-01). An RI/FS will begin in 2013 for the Defense Reutilization and Marketing Office (DRMO) Yard. DRMO Yard is the newest addition to the MMRP.

BRAC: Institutional controls (ICs) are underway at site SIAD-001-R-01 as is a pilot study to determine if new technology will be effective.

**Future Plan of Action:** The RI/FS will be completed in 2014 for the DRMO Yard. A PBA will cover LTM for seven sites through 2016.

BRAC: Begin a MEC removal at SIAD-001-R-01 using technology being considered during the pilot study.

### CR

**Prior Year Progress:** CC-SIAD601 migrated to the Compliance Restoration Program in 2009. Completed remedial investigation (RI) in 2011. RA(O) (free-product removal) will be completed in 2013. Achieve remedy-in-place (RIP) or RC in 2013.

**Future Plan of Action:** A PBA covers LTM options through 2016 if necessary.

**SIERRA ARMY DEPOT**  
**Army Defense Environmental Restoration Program**  
**Installation Restoration Program**

# IRP Summary

**Installation Total Army Environmental Database-Restoration (AEDB-R) Sites/Closeout Sites Count:** 38/31

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

- 1 Burn Area  
(SIAD-010)
- 3 Disposal Pit/Dry Well  
(SIAD-001, SIAD-002, SIAD-014)
- 2 Explosive Ordnance Disposal Area  
(SIAD-020, SIAD-022)
- 1 Landfill  
(SIAD-003)

## Most Widespread Contaminants of Concern

Explosives, Metals, Munitions and explosives of concern (MEC), Petroleum, Oil and Lubricants (POL), Semi-volatiles (SVOC), Volatiles (VOC)

## Media of Concern

Groundwater, Soil

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

Site ID	Site Name	Action	Remedy	FY
SIAD-016	LOWER BURNING GROUND	FRA	FENCE OR OTHER SITE ACCESS CONTROL MEASURES	1996
SIAD-001	TNT LEACHING BEDS	FRA	NATURAL ATTENUATION	1998
SIAD-001	TNT LEACHING BEDS	FRA	REMOVAL	1998
SIAD-015	LARGE SEWAGE TREATMENT PONDS	FRA	REMOVAL	1998
SIAD-001	TNT LEACHING BEDS	FRA	COMPOSTING	1999
SIAD-002	DRMO TRENCH AREA	FRA	BIOVENTING	2000
SIAD-002	DRMO TRENCH AREA	FRA	SOIL VAPOR EXTRACTION	2000
SIAD-002	DRMO TRENCH AREA	FRA	NATURAL ATTENUATION	2000
SIAD-002	DRMO TRENCH AREA	FRA	REMOVAL	2000
SIAD-011	DIESEL SPILL AREA	FRA	BIOVENTING	2000
SIAD-010	UPPER BURNING GROUND - HANSENs HOLE	FRA	CONTAINMENT	2006
SIAD-020	1960 DEMOLITION AREA	FRA	FENCE OR OTHER SITE ACCESS CONTROL MEASURES	2006
SIAD-022	OLD POPPING FURNACE	FRA	CONTAINMENT	2006
SIAD-PBC	PBC Contract Sierra AD	FRA	OTHER	2008
SIAD-014	BUILDING 210 AREA	FRA	PASSIVE TREATMENT WELLS	2011

## Duration of IRP

**Date of IRP Inception:** 198801

**Estimated Date for Remedy-In-Place (RIP)/Response Complete (RC):** 201701/203009

**Date of IRP completion including Long Term Management (LTM):** 203909



# IRP Contamination Assessment

## Contamination Assessment Overview

Past operations at SIAD have resulted in the generation and disposal of various types of contaminants across the installation. Solvents, heavy metals, and explosives are the primary contaminants. There is groundwater contamination above maximum contaminant levels (MCL) at SIAD-001, SIAD-002, SIAD-003, and SIAD-014. Off-post groundwater contamination (trichloroethylene [TCE]) above the MCL was found at SIAD-014. An IRA of pump-and-treat is temporarily shut down while the pilot study evaluates potential replacement of the pump-and-treat with a SVE. Soil remediation has been performed at SIAD-001, SIAD-002, SIAD-003, SIAD-007, SIAD-011, SIAD-012, and SIAD-015. Soil remediation was completed at SIAD-010 and SIAD-022. The Previous Studies section of this document lists the previous environmental studies conducted for SIAD.

The master environmental plan (MEP) identified 22 sites with contamination potential. An FFSRA with the USEPA and the California USEPA was signed for these sites. In September 1989 site investigations began for the five highest priority (risk) sites.

Additional sites were added, bringing the total to 38. Some sites were declared ineligible and in 1995, some sites were moved to the BRAC. Seven IRP sites of the 38 sites are currently active.

## Cleanup Exit Strategy

The following actions are being taken at these sites:

### SIAD 001/002 [TNT Leaching Beds/DRMO Trench Area]

A ROD has been signed and implemented at both sites - both sites are in monitored natural attenuation (MNA). MNA is being enhanced with in situ ERD in order to preserve/enhance the approved remedy.

### SIAD 003 [Abandoned Landfill/Southern Sites Area (ALF/SSA)]

A ROD was completed in 2008. An in situ ERD remedy has been implemented for the contaminated groundwater plumes at the sites that will minimize LTM.

### SIAD 010 (UBG)

After removing discarded military munitions (DMM) from contaminated soil, contaminated soil was removed and placed into Hansen's Hole and a corrective action management unit (CAMU) was constructed - this is a consolidation unit and avoids costly off-site disposal. Quarterly CAMU inspections continue.

### SIAD 014 (Bldg. 210)

A ROD was completed in 2010. Final remedy is in situ reactive zone (IRZ) operations and maintenance (passive treatment) and ERD. A five-year review will be conducted in 2015.

### SIAD 020 (1960 Demolition Area)

A fence around the site was installed to improve safety. This was not required by the ROD at the site and is being done voluntarily by the Army. Fence inspections continue for LTM.

### SIAD 022 (Old Popping Furnace)

After removing DMM from the area of contamination, contaminated soil was excavated and an on-site CAMU was constructed. Quarterly CAMU inspections continue.

## IRP Previous Studies

1983	Title	Author	Date
	Reassessment of Sierra Army Depot, Herlong, California. Report No. 149R	Environmental Science and Engineering, Inc.	SEP-1983
1988	Master Environmental Plan for the Sierra Army Depot	Energy and Environmental Systems Division, Argonne National Laboratory	OCT-1988
1989	Public Involvement and Response Plan, Sierra Army Depot, Herlong, California	Hunter/ESE, Inc.	APR-1989
1990	Phase I Remedial Investigation/Feasibility Study, Final Sampling Design Plan, Sierra Army Depot, Lassen County, California	James M. Montgomery Consulting Engineers, Inc. and E.C. Jordan	MAR-1990
	Phase I Remedial Investigation/Feasibility Study, Final Quality Assurance/Quality Control Plan, Sierra Army Depot, Lassen County, California	James M. Montgomery Consulting Engineers, Inc. and E.C. Jordan	MAR-1990
	Phase I Remedial Investigation/Feasibility Study, Final Health and Safety Plan, Sierra Army Depot, Lassen County, California	James M. Montgomery Consulting Engineers, Inc. and E.C. Jordan	MAR-1990
	Phase I Remedial Investigation/Feasibility Study, Remedial Investigation, Appendices A - F, Sierra Army Depot, Lassen County, California	James M. Montgomery Consulting Engineers, Inc. and E.C. Jordan	SEP-1990
	Phase I Remedial Investigation/Feasibility Study, Draft Final Interim Remedial Measures Evaluation, Sierra Army Depot, Lassen County, California	James M. Montgomery Consulting Engineers, Inc. and E.C. Jordan	OCT-1990
1991	Phase I Remedial Investigation/Feasibility Study: Final Remedial Investigation, Appendices G-Q, Sierra Army Depot, Lassen County, California	James M. Montgomery Consulting Engineers, Inc. and E.C. Jordan	OCT-1991
1994	Final Design, Design Analysis for Underground Storage Tank Replacement, Sierra Army Depot, California	Montgomery Watson	JUL-1994
	Final Chemical Data Acquisition Plan for Underground Storage Tank Replacement, Sierra Army Depot, California	Montgomery Watson	JUL-1994
	Final Site Safety and Health Plan for Underground Storage Tank Replacement, Sierra Army Depot, California	Montgomery Watson	JUL-1994
	Final Health and Safety Design Analysis for Underground Storage Tank Replacement, Sierra Army Depot, California	Montgomery Watson	JUL-1994
1995	Final Corrected Design, Design Analysis, Underground Storage Tank Replacement, Sierra Army Depot, California	Montgomery Watson	JAN-1995
	Final Corrected Design, Specification No. 94-45, Underground Storage Tank Replacement, Sierra Army Depot, California	Montgomery Watson	JAN-1995
	Draft Final Sampling Plan Addendum, TNT Leaching Beds Area Groundwater Monitoring Implementation, Sierra Army Depot, Lassen County, California	Montgomery Watson and Harding Lawson Associates	FEB-1995
	Final Corrected Design, Design Analysis, Underground Storage Tank Replacement, Sierra Army Depot,	Montgomery Watson	APR-1995

## IRP Previous Studies

1995	Title	Author	Date
	California		
	Final Corrected Design, Specification No. 9545, Underground Storage Tank Replacement, Sierra Army Depot, California	Montgomery Watson	MAY-1995
	Final Record of Decision/Remedial Action Plan, Seven Sites, Sierra Army Depot, Lassen County, California	Montgomery Watson	SEP-1995
	Final Building 210 Area Follow-On Remedial Investigation, Sierra Army Depot, Lassen County, California	Harding Lawson Associates	DEC-1995
1996			
	Proposed Plan for Nine Sites at Sierra Army Depot, Installation Restoration Program	Harding Lawson Associates	FEB-1996
	Draft Final Initial Monitoring Report, Volume I of II, TNT Leaching Beds Area Groundwater Monitoring Implementation, Sierra Army Depot, Lassen County, California	Montgomery Watson and Harding Lawson Associates	FEB-1996
	Draft Final Initial Monitoring Report, Volume II of II, Appendices, TNT Leaching Beds Area Groundwater Monitoring Implementation, Sierra Army Depot, Lassen County, California	Montgomery Watson and Harding Lawson Associates	FEB-1996
	Focused Feasibility Study, Draft Final, Building 1003 Area, Sierra Army Depot, Lassen County, California	Montgomery Watson	FEB-1996
	Draft Final Quarterly Groundwater Monitoring Report, First Quarter, TNT Leaching Beds Area Groundwater Monitoring Implementation, Sierra Army Depot, Lassen County, California	Montgomery Watson	MAR-1996
	Draft Final Sampling Plan, Abandoned Landfill and Southern Sites Area Follow-Up Remedial Investigation/Feasibility Study, Sierra Army Depot, Lassen County California	Montgomery Watson	JUN-1996
	Draft Final Remedial Investigation, DRMO Follow-Up Remedial Investigation/Feasibility Study, Sierra Army Depot, Lassen County, California	Montgomery Watson	JUN-1996
	Draft Final Remedial Investigation Report, Volume II of II, DRMO Follow-Up Remedial Investigation/Feasibility Study, Sierra Army Depot, Lassen County, California	Montgomery Watson	JUN-1996
	Draft Final Delivery Order (PRAC) Diesel Spill Area Remediation, Sierra Army Depot, Lassen County, California	USACOE, Sacramento District	JUL-1996
	Draft Final Delivery Order (PRAC) TNT Leaching Beds Area Remediation, Sierra Army Depot, Lassen County, California	USACOE, Sacramento District	JUL-1996
	Final Record of Decision/Remedial Action Plan, Nine Sites, Total Environmental Program Support, Sierra Army Depot, Lassen County, California	Harding Lawson Associates	OCT-1996
	Field Sampling Plan, Old Popping Furnace, Sierra Army Depot, Lassen County, California	Harding Lawson Associates	OCT-1996
	Safety and Health Phase-Out Report, Sewer Line Repair, Sierra Army Depot, Herlong, California	CAL, Inc. (for USACOE, Sacramento District)	NOV-1996
1997			
	Draft Final Feasibility Study, Trench Area Remedial Investigation/Feasibility Study, Sierra Army Depot, Lassen County, California	Montgomery Watson	JAN-1997

## IRP Previous Studies

1997

Title	Author	Date
Draft Final Phase I Field Operations Plan, Building 210 Area Engineering Evaluation and Cost Analysis Predesign Study, Sierra Army Depot, Lassen County, California	Harding Lawson Associates	MAR-1997
Final Environmental Baseline Survey CERFA Report, Sierra Army Depot Ruse Parcels, Lassen County, California	Harding Lawson Associates	MAR-1997
Revised Final Task Order (PRAC) TNT Leaching Beds Area Remediation, Sierra Army Depot, Lassen County, California	USACOE, Sacramento District	APR-1997
Revised Final Task Order (PRAC) Diesel Spill Area Remediation, Sierra Army Depot, Lassen County, California	USACOE, Sacramento District	APR-1997
Task Order (SmART) Building 1003 Area Remediation, Sierra Army Depot, Lassen County, California	Prepared by USACOE, Sacramento District	MAY-1997
Task Order (SmART) Large Sewage Treatment Ponds Remediation, Sierra Army Depot, Lassen County, California	USACOE, Sacramento District	MAY-1997
Proposed Plan for DRMO Trench Area at Sierra Army Depot, Installation Restoration Program	Sierra Army Depot	JUL-1997
Sampling and Analysis Plan, Large Sewage Treatment Ponds and Building 1003 Area Soil Remediation Projects, Sierra Army Depot, Herlong, California	CAL, Inc. (for USACOE, Sacramento District)	JUL-1997
Investigation-Derived Waste Management, Phase I Field Operations, Building 210 Area Engineering Evaluation and Cost Analysis Predesign Study	Harding Lawson Associates	JUL-1997
Final Project Work Plan, TNT Leaching Beds Area Remediation, Sierra Army Depot, California	Kvaerner Environmental	SEP-1997
Draft Final Remedial Investigation, Volume I of III, Abandoned Landfill and Southern Sites Area Follow-Up Remedial Investigation/Feasibility Study, Sierra Army Depot, Lassen County, California	Montgomery Watson	DEC-1997
Draft Final Remedial Investigation, Volume II of III, Abandoned Landfill and Southern Sites Area Follow-Up Remedial Investigation/Feasibility Study, Sierra Army Depot, Lassen County, California	Montgomery Watson	DEC-1997
Draft Final Remedial Investigation, Volume III of III, Appendices I-P, Abandoned Landfill and Southern Sites Area Follow-Up Remedial Investigation/Feasibility Study, Sierra Army Depot, Lassen County, California	Montgomery Watson	DEC-1997

1998

TNT Leaching Beds Area Remediation, Treatability Phase Report, Sierra Army Depot, Lassen County, California	Kvaerner Environmental	JAN-1998
Final Record of Decision/Remedial Action Plan, DRMO Follow-Up Remedial Investigation/Feasibility Study, Sierra Army Depot, Lassen County, California	Montgomery Watson	MAR-1998
Final Site Soil Closure Report, Building 1003, Sierra Army Depot, Herlong, California	CAL, Inc. (for USACOE)	APR-1998
Final Project Work Plan, Firing Range Berm, Sierra Army Depot, Herlong, California	CAL, Inc. (for USACOE)	MAY-1998
Field Sampling Plan, Old Popping Furnace, Sierra Army Depot, Lassen County, California	Harding Lawson Associates	JUN-1998
Draft Final 1997 Annual Groundwater Monitoring Report, TNT Leaching Beds Area, Sierra Army Depot,	Montgomery Watson	JUN-1998

## IRP Previous Studies

1998	Title	Author	Date
	Lassen County, California		
	Draft Final Annual Groundwater Monitoring Report, 1997, TNT Leaching Beds Area Groundwater Monitoring Implementation, Sierra Army Depot, Lassen County, California	Montgomery Watson	JUL-1998
	Closure Report, TNT Leaching Beds Area Remediation, Paint Shop Subsite, Sierra Army Depot, Lassen County, California	Kvaerner Environmental (for USACOE, Sacramento District)	AUG-1998
	Draft Final DRMO Trench Area (Soils), Sierra Army Depot, Herlong, California	USACOE, Sacramento District	OCT-1998
	Final Record of Decision/Remedial Action Plan, Seven Sites, Explanation of Significant Difference, Sierra Army Depot, Lassen County, California	Montgomery Watson	NOV-1998
	Draft Final Sampling Plan, Abandoned Landfill and Southern Sites Area 1999 Follow-Up Remedial Investigation/Feasibility Study, Sierra Army Depot, Lassen County, California	Montgomery Watson	DEC-1998
1999			
	Pre-Excavation Field Sampling Analysis Results, DRMO Trench Area (Soils) Phase I, Sierra Army Depot, Herlong, California	USACOE, Sacramento District	JAN-1999
	Draft Final Report, Four Preliminary Sites, Vol I of II, Sierra Army Depot, Herlong, Lassen County, California	USACOE, Sacramento District	FEB-1999
	Draft Final Report, Four Preliminary Sites, Vol II of II, Sierra Army Depot, Herlong, Lassen County, California	USACOE, Sacramento District	FEB-1999
	Closure Report, Vol. I of II, TNT Leaching Beds Area Remediation, Sierra Army Depot, Lassen County, California	Kvaerner Environmental	MAR-1999
	Closure Report, Vol. II of II, TNT Leaching Beds Area Remediation, Sierra Army Depot, Lassen County, California	Kvaerner Environmental	MAR-1999
	Final Submittal, DRMO Trench Area (Soils), Sierra Army Depot, Herlong, California	USACOE, Sacramento District	JUN-1999
	Draft Final Field Sampling Design Plan, Upper Burning Ground Follow-on Remedial Investigation, Sierra Army Depot, Lassen County, California	Harding Lawson Associates	SEP-1999
	Draft Final Building 210 Area Engineering Evaluation and Cost Analysis, Sierra Army Depot, Lassen County, California	Harding Lawson Associates	SEP-1999
2000			
	Final Site Closure Report, Existing Fire-Fighting Training Facility, Sierra Army Depot, Lassen County, California	Montgomery Watson and Innovative Technical Solutions, Inc.	JAN-2000
	Asbestos Survey for Sierra Army Depot, Lassen County, California	USACOE, Sacramento District	OCT-2000
2001			
	Draft Final Abandoned Landfill and Southern Sites Area, 1999 Follow-up Remedial Investigation, Volumes I & II, Sierra Army Depot, Lassen County, California	Harding ESE	JUN-2001
	Final Upper Burning Ground Follow-on Remedial Investigation, Volumes I & II, Sierra Army Depot, Lassen County, California	Harding ESE	AUG-2001
2002			

## IRP Previous Studies

**2002**

Title	Author	Date
Final Field Sampling Design Plan for the Old Popping Furnace Follow-on Remedial Investigation, Sierra Army Depot, Lassen County, California	Harding ESE	JUL-2002
Final Abandoned Landfill and Southern Sites Area Work Plan, Sierra Army Depot, Lassen County, California	Harding ESE	JUL-2002
Final Building 210 Area Enhanced Biodegradation Pilot Study Work Plan, Sierra Army Depot, Lassen County, California	Harding ESE	JUL-2002
Final Building 210 Area Pre-Design Plume Assessment Work Plan, Sierra Army Depot, Lassen County, California	Harding ESE	JUL-2002
Final Abandoned Landfill and Southern Sites Area Groundwater Plume Delineation in the Area of Potable Supply Well PSW-02 Work Plan, Sierra Army Depot, Lassen County, California	Harding ESE	JUL-2002
Final Upper Burning Ground Groundwater Evaluation Work Plan, Sierra Army Depot, Lassen County, California	Harding ESE	JUL-2002
Final Upper Burning Ground and Old Popping Furnace - Additional Data Collection Work Plan, Sierra Army Depot, Lassen County, California	Harding ESE	JUL-2002
Final Abandoned Landfill and Southern Sites Area Plume Migration Assessment Work Plan, Sierra Army Depot, Lassen County, California	Harding ESE	JUL-2002
Ordnance and Explosive Engineering Evaluation/Cost Analysis(EE/CA), Honey Lake Area, Sierra Army Depot, Lassen County, California	Earth Tech	JUL-2002
Final Building 210 Area Zero-Valent Iron Pilot Study, Follow-on Enhanced Biodegradation Pilot Study and Additional Data Collection Work Plan, Sierra Army Depot, Lassen County, California	Harding ESE	JUL-2002

**2004**

Draft In situ Reactive Zone Demonstration Program Work Plan, TNT Leaching Beds and DRMO Trench Areas	ARCADIS	JAN-2004
Fourth Quarter 2003 (August 2003 through October 2003) Treatment System Monitoring Report for the Building 210 Area	ARCADIS	JAN-2004
Draft Building 210 Area and ALF/SSA IRZ Work plan	ARCADIS	MAR-2004
Final Focused Feasibility Study for the Upper Burning Ground, Sierra Army Depot, Herlong, California	ARCADIS	APR-2004
Final Focused Feasibility Study for the Equipment Yard, Sierra Army Depot, Herlong, California	ARCADIS	APR-2004
Final Old Popping Furnace Area Remedial Investigation and Feasibility Study, Sierra Army Depot, Herlong, California	ARCADIS	APR-2004
Proposed Plan for Three Sites, Sierra Army Depot, Herlong, California	ARCADIS	APR-2004
Second Quarter 2004 (February 2004 through April 2004) Treatment System Monitoring Report for the Building 210 Area	ARCADIS	JUL-2004
Third Quarter 2004 (May 2004 through July 2004) Treatment System Monitoring Report for the Building 210 Area	ARCADIS	OCT-2004

## IRP Previous Studies

2004	Title	Author	Date
	2004 Annual Groundwater Monitoring Report, DRMO Trench Area	ARCADIS	NOV-2004
	Fourth Quarter 2004 (August 2004 through October 2004) Treatment System Monitoring Report for the Building 210 Area	ARCADIS	DEC-2004
2005	Draft Nano-Scale Zero-Valent Iron Pilot Study Work Plan, Building 210 Area	ARCADIS	FEB-2005
	First Quarter 2005 (November 2004 through January 2005) Treatment System Monitoring Report for the Building 210 Area	ARCADIS	APR-2005
	2004 Annual Groundwater Monitoring Report, TNT Leaching Beds Area	ARCADIS	APR-2005
	DRAFT TNT Leaching Beds and DRMO Trench Areas IRZ Demonstration Program Implementation Report	ARCADIS	MAY-2005
	Building 210 Area and ALF/SSA IRZ Pilot Study Implementation Report	ARCADIS	MAY-2005
	Draft Final Three Sites Record of Decision/Remedial Action Plan	ARCADIS	JUN-2005
	Second Quarter 2005 (February 2005 through April 2005) Treatment System Monitoring Report for the Building 210 Area	ARCADIS	JUL-2005
	Third Quarter 2005 May 2005 through July 2005) Treatment System Monitoring Report for the Building 210 Area	ARCADIS	OCT-2005
	Request to Temporarily Shutdown the Building 210 Area Groundwater Treatment System (Technical Memo)	ARCADIS	NOV-2005
	1960 Demolition Area Fence Installation Report	ARCADIS	NOV-2005
	2005 Annual Groundwater Monitoring Report, DRMO Trench Area	ARCADIS	NOV-2005
	2005 Annual Groundwater Monitoring Report TNT Leaching Beds Area	ARCADIS	NOV-2005
	Final 1960 Demolition Area Land Use Control Implementation Plan	ARCADIS	DEC-2005
2006	OE/UXO Clearance Work Plan	ARCADIS	JAN-2006
	Fourth Quarter 2005 (August 2005 through October 2005) Treatment System Monitoring Report for the Building 210 Area	ARCADIS	JAN-2006
	Draft Soil Vapor Extraction (SVE) Pilot Study Work Plan, Building 210 Area	ARCADIS	JAN-2006
	Final Three Sites Remedial Design/Remedial Action and Post Monitoring Maintenance Plan	ARCADIS	FEB-2006
	Input Parameters for the Groundwater Flow and Transport Model for the Abandoned Landfill/Southern Site Areas and Building 210 Area	ARCADIS	MAR-2006
	First Quarter 2006 (November 2005 through January 2006) Treatment System Monitoring Report for the Building 210 Area	ARCADIS	MAR-2006
	2006 Annual Groundwater Monitoring Report TNT Leaching Beds Area	ARCADIS	DEC-2006

## IRP Previous Studies

2006	Title	Author	Date
	Quarterly Groundwater Monitoring Update for the Temporary Groundwater Treatment System Shutdown at the Building 210 Area (Technical Memo)	ARCADIS	DEC-2006
	2006 Annual Groundwater Monitoring Report, DRMO Trench Area	ARCADIS	DEC-2006
	Work Plan for Confirmation Soil Sampling related to the Soil Vapor Extraction System, Defense Reutilization and Marketing Office Trench Area	ARCADIS	DEC-2006
	First Quarterly Groundwater Monitoring Report, Old Popping Furnace (OPF) and Upper Burning Ground (UBG) Corrective Action Management Units (CAMUs)	ARCADIS	DEC-2006
2007	2nd Quarterly Post-Shutdown (4th Quarter 2006) Groundwater Monitoring Update for the Temporary Groundwater Treatment System Shutdown at the Building 210 Area (Technical Memo)	ARCADIS	MAR-2007
	Results of the Confirmation Soil Sampling related to the Soil Vapor Extraction System, Defense Reutilization and Marketing Office Trench Area	ARCADIS	MAY-2007
	3rd Quarterly Post-Shutdown (1st Quarter 2007) Groundwater Monitoring Update for the Temporary Groundwater Treatment System Shutdown at the Building 210 Area (Technical Memo)	ARCADIS	JUN-2007
	Final Feasibility Study, Abandoned Landfill and Southern Sites Area	ARCADIS	AUG-2007
	Proposed Plan for the Abandoned Landfill and Southern Sites Area	ARCADIS	SEP-2007
	Second Quarterly Groundwater Monitoring Report, Old Popping Furnace (OPF) and Upper Burning Ground (UBG) Corrective Action Management Units (CAMUs)	ARCADIS	OCT-2007
	Third Quarterly Groundwater Monitoring Report, Old Popping Furnace (OPF) and Upper Burning Ground (UBG) Corrective Action Management Units (CAMUs)	ARCADIS	OCT-2007
	DRMO Trench Area 5-Year Report	ARCADIS	NOV-2007
	TNT Leaching Beds Area 5-Year Report	ARCADIS	NOV-2007
	Fourth Quarterly Groundwater Monitoring Report for the Old Popping Furnace and Upper Burning Ground Corrective Action Management Units	ARCADIS	NOV-2007
2008	2007 Annual Groundwater Monitoring Report, TNT Leaching Beds Area	ARCADIS	JAN-2008
	Second Quarter 2007 Groundwater Monitoring Update for the Building 210 Area	ARCADIS	FEB-2008
	Third and Fourth Quarter 2007 Groundwater Monitoring Update for the Building 210 Area	ARCADIS	FEB-2008
	Spill Area- Work Plan-Proposed Confirmation Sampling and Well Abandonment	ARCADIS	MAR-2008
	2007 Annual Groundwater Monitoring Report, DRMO Trench Area	ARCADIS	MAR-2008
	Old Popping Furnace and the Upper Burning Ground 5th and 6th Quarterly Groundwater Monitoring Report	ARCADIS	MAY-2008
	Spill Area-Groundwater Sampling Results for Well Abandonment	ARCADIS	JUN-2008



## IRP Previous Studies

**2008**

Title	Author	Date
Remedial Design/Remedial Action Work plan for Abandoned Landfill and Southern Sites Area	ARCADIS	JUN-2008
Spill Area- Well Abandonment Completion Report	ARCADIS	JUL-2008
1960 Demolition Area - Well Abandonment Completion Report	ARCADIS	JUL-2008
1st and 2nd Quarter 2008 Groundwater Monitoring Update for the Building 210 Area	ARCADIS	JUL-2008
Final - Three Sites Remedial Action Report	ARCADIS	JUL-2008
Final Record of Decision, Abandoned Landfill and Southern Site Area	ARCADIS	AUG-2008
1960 Demo - Year 1 and Year 2 Engineering Controls Inspection Results (2006 & 2007)	ARCADIS	OCT-2008
3 Sites- Year 1 and Year 2 Engineering Controls Inspection Results (2006,2007), OPF, UBG and Bldg 79 Equipment Yard	ARCADIS	OCT-2008
3 Sites - CAMU Cover Annual Inspection Reports for 2006 and 2007, OPF and UBG	ARCADIS	OCT-2008

**2009**

3 Sites - 2008 Annual Groundwater Monitoring Report for the OPF and UBG CAMUs	ARCADIS	MAR-2009
Bldg 210 - Third and Fourth Quarter 2008 Groundwater Monitoring Update for the Bldg 210 Area	ARCADIS	MAR-2009
1960 Demo - Year 3 Fencing Inspection Results (2008)	ARCADIS	APR-2009
3 Sites - CAMU Cover Annual Inspection Reports for 2008, OPF, UBG	ARCADIS	APR-2009
3 Sites - Engineering Controls Inspection Results (2008), OPF, UBG and Bldg 79 Equipment Yard	ARCADIS	APR-2009
DRMO - Request to Decommission the SVE Components in the Active Yard DRMO	ARCADIS	MAY-2009
DRMO - 2008 Annual Groundwater Monitoring Report , DRMO	ARCADIS	JUN-2009
TNT - 2008 Annual Groundwater Monitoring Report, TNT Leaching Beds	ARCADIS	JUN-2009
Bldg 210 - Proposed Hydraulic Monitoring Test at Bldg 210 Area	ARCADIS	JUN-2009
ALF/SSA - Remedy-in-place Implementation Report, Abandoned Landfill and Southern Sites Areas	ARCADIS	JUL-2009
1960 Demolition Area Annual Land Use Control Audit 2006-2008	SIAD	AUG-2009
3 Sites - OPF and UBG CAMUs and Bldg 79 Equipment Yard LUC Audit 2006-2008	SIAD	AUG-2009
Bldg 210 - First and Second Quarter 2009 Groundwater Monitoring Update for Bldg 210 Area	ARCADIS	AUG-2009
Bldg 210 - Request to Shutdown and Decommission The Bldg 210 Groundwater Treatment System	ARCADIS	SEP-2009
Bldg 210- Proposed Plan for Bldg 210 Area	ARCADIS	DEC-2009
Bldg 210 - Final Feasibility Study for the Building 210 Area	ARCADIS	DEC-2009

**2010**

3 Sites - CAMU Cover Annual Inspection Reports for 2009, Old Popping Furnace and Upper Burning Grounds	ARCADIS	JAN-2010
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## IRP Previous Studies

**2010**

Title	Author	Date
DRMO - 2009 Annual Groundwater Monitoring Report, DRMO Trench Area	ARCADIS	FEB-2010
TNT - 2009 Annual Groundwater Monitoring Report, TNT Leaching Beds Area	ARCADIS	FEB-2010
Year 4 Fencing Inspection Results (2009)	ARCADIS	FEB-2010
Work Plan for Transects 2 through 6 Installation, Operation, Testing, and Monitoring	ARCADIS	APR-2010
Third and Fourth Quarter 2009 Groundwater Monitoring Update for the Building 210	ARCADIS	APR-2010
Revised Work Plan - Proposed Well Abandonment and Groundwater Monitoring Program	ARCADIS	MAY-2010
Record of Decision	ARCADIS	JUN-2010
Well Abandonment Completion Letter Report	ARCADIS	JUL-2010
Work Plan for Follow-up Confirmation Soil Sampling related to the Soil Vapor Extraction System	ARCADIS	JUL-2010
Remedial Design/Remedial Action Work Plan	ARCADIS	SEP-2010
Year 5 Fencing Inspection Results (2010)	ARCADIS	OCT-2010
First and Second Quarter 2010 Groundwater Monitoring Update for the Building 210 Area	ARCADIS	OCT-2010
First 5-Year Review	ARCADIS	NOV-2010

**2011**

2010 Annual Groundwater Monitoring Report - OPF/UPF CAMU	ARCADIS	JAN-2011
2009 and 2010 Annual Groundwater Monitoring Report for the Old Popping Furnace	ARCADIS	JAN-2011
Request for NFA Alpha Team Training Area - Approval Letter from DTSC	California Department of Toxic Substance Control	MAY-2011
2010 Annual Groundwater Monitoring Report - DRMO	ARCADIS	MAY-2011
2010 Annual Groundwater Monitoring Report ALF/SSA	ARCADIS	OCT-2011
2010, 3rd & 4th Quarter, Groundwater Monitoring Update Report - Bldg 210	ARCADIS	OCT-2011
5-Year Review - DRMO	ARCADIS	OCT-2011
5-Year Review - TNT	ARCADIS	OCT-2011
5-Year Review - 3 Sites	ARCADIS	OCT-2011
2011 Annual Groundwater Monitoring Report OPF/UPF CAMU	ARCADIS	DEC-2011

**2012**

2012 LUC Inspection and Engineering Checklist - 3-Sites	ARCADIS	JAN-2012
Remedy in Place Report - Building 210	ARCADIS	JAN-2012
2011 CAMU Cover Annual Inspection Report - OPF/UBG	ARCADIS	JAN-2012
2012 Annual Fence Inspection Report - 1960 Demolition Area	ARCADIS	JAN-2012
2012 Annual Groundwater Monitoring Report OPF/UPG CAMU	ARCADIS	DEC-2012

## IRP Previous Studies

	<b>Title</b>	<b>Author</b>	<b>Date</b>
<b>2012</b>			
	2012 Annual Groundwater Monitoring Report ALF/SSA	ARCADIS	DEC-2012
<b>2013</b>			
	2012 Annual Groundwater Monitoring Report - DRMO	ARCADIS	JAN-2013
	2012 Annual Groundwater Monitoring Report - TNT	ARCADIS	FEB-2013
	Bldg 210 Groundwater Monitoring Report	ARCADIS	FEB-2013

**SIERRA ARMY DEPOT**  
**Installation Restoration Program**  
**Site Descriptions**

**Site ID: SIAD-001**  
**Site Name: TNT LEACHING BEDS**

**STATUS**

**Regulatory Driver:** CERCLA

**RRSE:** HIGH

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

**Media of Concern:** Groundwater

<b>Phases</b>	<b>Start</b>	<b>End</b>
PA.....	198804.....	198810
SI.....	198804.....	198810
RI/FS.....	198909.....	199304
RD.....	199501.....	199611
RA(C).....	199508.....	199811
RA(O).....	199601.....	202609
<b>RIP Date:</b>	199811	
<b>RC Date:</b>	202609	

**SITE DESCRIPTION**

The trinitrotoluene (TNT) Leaching Beds Area (SIAD-001) is comprised of the TNT Leaching Beds and the Paint Shop. The TNT Leaching Beds consists of two former TNT leaching beds used for disposal of wastewater from the ammunition shell dismantling and washout facility. The two leaching beds were unlined shallow depressions about 50 by 50 feet and 50 by 100 feet. The water used to flush out explosives was transported through a concrete trench leading to the TNT leaching beds where it was allowed to evaporate and infiltrate the soils. From 1940 to 1949 the washout facility was in operation and at maximum capacity could process and reclaim TNT from eight hundred 105mm shells per day. Over time, the paint shop operations released TCE.

In 1993, the remedial RI/FS was completed and identified explosives and VOCs in the soil and groundwater and in September 1995 the ROD was signed. The selected remedy included composting of explosives contaminated soils, institutional controls and MNA for the groundwater contamination. Groundwater monitoring started in 1996.

In December 1997, the composting action was started and was completed in December 1998. The final site soil closure report was approved by state regulators in FY99. In 2001, the Comprehensive Environmental Response Compensation and Liability Act of 1980 (CERCLA) reviews were started.

In summer 2004, an IRZ demonstration program (molasses injections) was implemented to accelerate the degradation of VOCs (primarily TCE) in groundwater.

In 2005 and 2011, the five-year reviews were completed recommending continued MNA with optimization of wells and analytes. The next five-year review will be completed under the current performance-based contract (PBC) in 2016.

**CLEANUP/EXIT STRATEGY**

MNA will continue with optimization of wells and analytes. In 2011 the third five-year review was completed. A fourth five-year review will be accomplished in 2016. A PBC covers this site through 2017.

Site ID: SIAD-002

Site Name: DRMO TRENCH AREA

## STATUS

Regulatory Driver: CERCLA

RRSE: HIGH

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

Media of Concern: Groundwater, Soil

Phases	Start	End
PA.....	198804.....	198810
SI.....	198804.....	198810
RI/FS.....	198909.....	199612
RD.....	199808.....	199907
RA(C).....	199908.....	201701
RA(O).....	200010.....	201801
LTM.....	201802.....	203106

RIP Date: 201701

RC Date: 201801

## SITE DESCRIPTION

The DRMO Trench Area consisted of an open trench about 290 by 40 by 10 feet deep, the Burn and Debris Area, and the Active DRMO Yard.

The trench was used to dispose of wood pallets, cardboard tubing, waste oil, sludge, and solvents. The site was used extensively from 1942 to 1973 and in limited capacity from 1973 to 1987. Between 1942 and 1973 about 190 liters per day of waste oils, sludge, solvents, and cleaning fluids from the vehicle maintenance activities were disposed of and burned in the DRMO Trench Area.

In February 1997, the RI/FS was completed and in March 1998 the ROD was signed. It called for soil removal, operation of an SVE system, and MNA.

In December 1999, the burn and debris area had soil removed for off-site disposal; therefore, metals are no longer a contaminant of concern (COC). Groundwater contamination is monitored to assess MNA. In FY00, five additional groundwater monitoring wells were installed. In September 2000 SVE and bioventing within the open trench and a portion of the Active Yard began operation.

In summer 2004, a bioremediation (in situ) groundwater IRZ demonstration program (molasses injections) was implemented to accelerate the degradation of VOCs, (primarily TCE) in the groundwater.

A third five-year review was completed in 2011. The ERD/SVE system began in 2011 and continues to operate through 2013. VOC concentrations continue to increase.

## CLEANUP/EXIT STRATEGY

MNA with optimization of wells and analytes will continue. The fourth five-year review will be conducted in 2016. A PBC covers this site through 2017.

**Site ID: SIAD-003**

**Site Name: ABANDONED LANDFILL**

## STATUS

**Regulatory Driver:** CERCLA

**RRSE:** HIGH

Contaminants of Concern: Metals, Volatiles (VOC)

Media of Concern: Groundwater, Soil

Phases	Start	End
PA.....	198804.....	198810
SI.....	198804.....	198810
RD.....	200308.....	200508
RA(C).....	200308.....	201310
RA(O).....	200308.....	201810
LTM.....	201901.....	203809

**RIP Date:** 201310

**RC Date:** 201810

## SITE DESCRIPTION

SIAD-003 is made up of the ALF and the SSA. From the early-1940s to 1965 the ALF was used as the main disposal area for SIAD domestic wastes. The primary method of disposal was waste burning followed by spreading and burning of the resulting residue. The ALF is a trench type landfill without a liner or leachate collection system. The dimensions of this site are approximately 1,600 by 1,500 feet (approximately 55 acres).

The SSA is located south of the ALF and north of the potable supply wells PSW-02 and PSW-08. This area includes the Equipment Yard, Equipment Maintenance Yard, Fuel Sump Area, Former Officer's Club Pool and Washrack Area. Some of these areas are still active; however; the contamination is from past activities.

In 1990, the RI/FS began. Groundwater under the ALF and the SSA is contaminated with TCE and total petroleum hydrocarbons (TPH). Because of previous TCE detections, monitoring of potable supply wells is ongoing. In FY03, a preliminary groundwater model and a slug/pump test were completed, and six new guard wells were installed.

In January 2003, perchlorate was detected (eight parts per billion [ppb]) in well ALF-05-MWA; however, downgradient wells and adjacent wells did not detect perchlorate. There have been no perchlorate detections in subsequent sampling events.

In summer 2004, an IRZ pilot study (molasses injections) was implemented to evaluate the technology to degrade VOCs (primarily TCE) in the groundwater.

The Equipment Yard is included in the three sites ROD, which was signed in 2005. The soil remedy of hot spot removal and off-site disposal for the Equipment Yard was completed in FY06.

An FS, ROD, and RIP were completed in FY08.

ERD operations and maintenance are ongoing with estimated completion in 2013. A five-year review is anticipated in 2016. Annual ERD O&M will continue through FY19.

LTM is expected to begin by 2014.

## CLEANUP/EXIT STRATEGY

ERD operations and maintenance are ongoing with estimated completion in 2013. IRZ technology will be the final remedy. A first five-year review will be conducted in 2016. PBC covers this site through 2017.

Site Name: UPPER BURNING GROUND - HANSENS HOLE

STATUS

Regulatory Driver: CERCLA

RRSE: HIGH

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

Media of Concern: Soil

Phases	Start	End
PA.....	198804.....	198810
SI.....	198804.....	198810
RI/FS.....	199009.....	200510
RD.....	200308.....	200511
RA(C).....	200511.....	200606
RA(O).....	200511.....	200606
LTM.....	200701.....	203601

RIP Date: 200606

RC Date: 200606

SITE DESCRIPTION

The UBG is a 4,030 acre area located north of the main depot. The site was used to burn primers, fuses, propellants, pyrotechnics, flare materials, and high explosives that could not be detonated. The site was also used as an open demolition area.

Six past activity sub-sites comprise the UBG installation restoration program (IRP) site. These sub-sites are: Hansen's Hole, the Old Demolition Area, the Open Trenches and Ash Pile, and the north and south extension of the Upper Burn Area and the Lower Burn Area. The remaining UBG area will be remediated under MMRP and/or compliance-related cleanup (CC) programs (RCRA-closure).

In 1990, the RI work at these six sub-sites began. Additional RI work was completed in FY01. The RI has identified metals contamination in the soil and the groundwater contains naturally occurring arsenic at high concentrations.

In September 2001, production activities stopped and in May 2003 SIAD withdrew the RCRA Part B permit and is currently negotiating with the state for closure requirements. Burn activities at the Demolition Area and Lower Burning Area are allowed on an emergency basis only.

The focused FS was finalized and the proposed plan (PP) was completed in 2004. In 2005, the ROD was signed. RIP/RC was achieved in 2006 by removal of DMM, removal of metals-contaminated soil, and placement of the metals-contaminated soil from the six sub-sites in a CAMU (constructed as a part of this action) in Hansen's Hole.

Groundwater monitoring, and inspections and maintenance of the CAMU continue. The next five-year review will be completed in 2016.

The next five-year review will be conducted in 2016. A PBC covers this site through 2017.

CLEANUP/EXIT STRATEGY

Groundwater monitoring and inspections and maintenance of the CAMU continue. The CAMU will require LTM, including routine maintenance, groundwater monitoring, and five-year reviews.



**Site ID: SIAD-014**  
**Site Name: BUILDING 210 AREA**

**STATUS**

**Regulatory Driver:** CERCLA  
**RRSE:** MEDIUM  
Contaminants of Concern: Volatiles (VOC)  
Media of Concern: Groundwater

<b>Phases</b>	<b>Start</b>	<b>End</b>
PA.....	198804.....	198810
SI.....	198804.....	198810
RD.....	200308.....	200509
RA(C).....	200505.....	201105
RA(O).....	200509.....	203009
LTM.....	203010.....	203909
<b>RIP Date:</b>	201105	
<b>RC Date:</b>	203009	

**SITE DESCRIPTION**

The Building (Bldg) 210 Area is located near the southeast corner of SIAD and includes the areas adjacent to Bldgs 208, 209 and 210. From 1942 until 1949 Bldg 210 was used as a vehicle maintenance facility. In 1949, a popping furnace was installed. It was used during the 1950s and 1960s for the demilitarization of small-arms ammunition and was deactivated by 1979. Additional activities included sand blasting, spray painting, steam cleaning, powder packaging, and tank engine fogging.

Waste generated at the site included degreasing solvents, oils, sludge and residues from the popping furnace operations.

From the 1940s until 1973, buildings adjacent to Bldg 210 were used for vehicle maintenance.

In 1995, an RI was completed which indicated that TCE contamination up to 1,800 ppb in groundwater had migrated off-post to the south. Approximately 51 acres of land off-post has been impacted by groundwater contamination.

In FY00, an engineering evaluation/cost analysis (EE/CA) was completed and an interim groundwater pump-and-treat system was installed and began operation.

Numerous pilot studies have been completed at this site including zero-valent iron (ZVI) and enhanced bioremediation hydrogen releasing compound (HRC). These pilot studies included:

- an HRC pilot study conducted in November 2000 which was not effective,
- a micro-scale ZVI pilot study conducted in October 2001 which identified a small decrease of TCE, but rebounded with results inconclusive,
- a follow-on HRC pilot study conducted in July 2002 which identified a slight decrease in TCE, but no degradation products and
- a follow-on micro-scale ZVI pilot study conducted in May 2003 which identified a steady decrease of TCE.

In summer 2004, an IRZ pilot study (molasses injections) was implemented to evaluate the technology to degrade VOCs (primarily TCE) in groundwater.

In 2006, the pump-and-treat system temporarily closed and was removed in 2009.

An SVE pilot test for treatment of groundwater is underway and IRZ technology is operational and will be expanded. Groundwater monitoring continues and a five-year review will be prepared in 2016.

A ROD, dated June 2010, designated ERD as the selected remedy. A PBC covers this site through 2017.

**CLEANUP/EXIT STRATEGY**

An SVE pilot test for treatment of groundwater is underway and IRZ technology is operational and will be expanded. Groundwater

**Site ID: SIAD-014**  
**Site Name: BUILDING 210 AREA**

monitoring continues. The final remedy is in place and the first five-year review will be conducted in 2016.

**Site ID: SIAD-020**  
**Site Name: 1960 DEMOLITION AREA**

**STATUS**

**Regulatory Driver:** CERCLA

**RRSE:** MEDIUM

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

Media of Concern: Soil

<b>Phases</b>	<b>Start</b>	<b>End</b>
PA.....	198804.....	198810
SI.....	198804.....	198810
RI/FS.....	199205.....	199205
RA(C).....	200308.....	200512
LTM.....	200601.....	203501

**RIP Date:** N/A

**RC Date:** 200512

**SITE DESCRIPTION**

The 1960 Demolition Area is located in the northern portion of SIAD. The site is about 1,700 by 2,000 feet (approximately 80 acres). This area was developed during the 1960s when the UBG demolition area was closed for construction. Between 1960 and 1961, 36 500-pound bombs (per detonation) were detonated at a rate of 12 times per day (432 bombs per day). Some of the metal fragments from this activity remain on the surface.

In 1961, 0-chlorobenzylmalononitrile (CS) tear gas grenades were also detonated at a rate of 200 to 248 pounds per day for a three-month period. During the 1970s, NIKE Hercules XM-30 motors were fired in silos on the site. The solid-based propellant was burned in the silos during the firings. Approximately 24 surface depressions (trenches) created by detonated bombs are located at the 1960 Demolition Area. A review of aerial photographs indicates the trenches are 300-500 feet long, 150 feet wide and up to 20 feet deep.

In 1994, the RI was completed. This site was included in the Nine Sites ROD signed in October 1996. Information to date indicates that perchlorate-containing munitions were not disposed of at this site.

This site is associated with MMRP site SIAD-007-R-01. The selected action is ICs and access restrictions (fencing and signage). This was completed in FY05.

This site was closed by the ROD with no further action (NFA) under the IRP. The range inventory looked at the area and identified it as an MRS SIAD-017-R-01. No five-year reviews were required by the ROD.

**CLEANUP/EXIT STRATEGY**

LTM of fencing and signage will continue through FY35. A PBC covers this site through 2017.

**Site ID: SIAD-022**  
**Site Name: OLD POPPING FURNACE**

**STATUS**

Regulatory Driver: CERCLA

RRSE: HIGH

Contaminants of Concern: Metals

Media of Concern: Groundwater, Soil

<b>Phases</b>	<b>Start</b>	<b>End</b>
PA.....	198810.....	198810
SI.....	198810.....	198810
RI/FS.....	199703.....	200507
RD.....	200308.....	200507
RA(C).....	200308.....	200606
LTM.....	200707.....	203509

RIP Date: N/A

RC Date: 200607

**SITE DESCRIPTION**

The Old Popping Furnace (OPF) was located in the northeast corner of the main depot and encompassed a small area just west of the entrance of the Lower Burning Ground (SIAD-010). The site is about 1,000 by 1,000 feet (23 acres). During the 1950s this area was used for the demilitarization of small-arms ammunition. Some of the metal fragments from this activity remain on the surface. In accordance with regulatory requirements at the time, this furnace was operated without air emissions controls, and contamination spread over about 15 acres.

The RI indicated elevated concentrations of metals (primarily lead) in soil and elevated concentrations of naturally occurring arsenic in the groundwater. In 2004 the RI/FS and PP were finalized and in 2005 the three sites ROD was signed.

In 2006, lead-contaminated soil was consolidated into an on-site CAMU.

Groundwater monitoring, and inspections and maintenance of the CAMU continue. A five-year review will be completed in 2016.

The next five-year review will be conducted in 2016. A PBC covers this site through 2017.

**CLEANUP/EXIT STRATEGY**

The CAMU is in LTM which includes CAMU maintenance, groundwater monitoring and five-year reviews. A PBC will cover costs through FY13. The next five-year review will be conducted in 2016.

## Site Closeout (No Further Action) Summary

Site ID	Site Name	NFA Date	Documentation
SIAD-004	CONSTRUCTION DEBRIS LANDFILL	199511	Nine Sites ROD 1996 October
SIAD-005	CHEMICAL BURIAL SITE	199511	Nine Sites ROD 1996 October
SIAD-009	AMMO DEMIL AND RENOVATION	199511	Nine Sites ROD 1996 October
SIAD-011	DIESEL SPILL AREA	200306	ESD 1998 November
SIAD-012	BLDG 1003 AREA	199511	Completion Report June 1998
SIAD-015	LARGE SEWAGE TREATMENT PONDS	199806	Soil Closure Report June 1998
SIAD-016	LOWER BURNING GROUND	199909	Moved to MMRP
SIAD-017	NIKE MISSILE FUEL DISPOSAL SITE A	199501	Seven Sites ROD (NFA) 8 September 1995
SIAD-018	NIKE MISSILE FUEL DISPOSAL SITE B	199501	Seven Sites ROD (NFA) 8 September 1995
SIAD-019	TOXICS STORAGE AREA AT BLDG 578	199501	Seven Sites ROD (NFA) 8 September 1995
SIAD-021	EXISTING POPPING FURNACE	198810	Moved to CC
SIAD-024	AMMUNITION HAZARD TEST SITE	199008	Moved to MMRP
SIAD-025	"K" BLOCK AREA	199008	Written documentation formally closing out this site is being researched.
SIAD-026	AMMO MAINTENANCE (BLDG #640)	199008	Moved to CC
SIAD-027	ABANDONED LANDFILL #2	199008	Written documentation formally closing out this site is being researched.
SIAD-028	TRANSFORMERS-250 ON INSTALLATION	199008	This is an active site and ineligible for ER,A funding.
SIAD-029	HOSPITAL (BLDG #150)	199806	This is an active site and ineligible for ER,A funding.
SIAD-031	STORAGE SILOS	199008	This is an active site and ineligible for ER,A funding.
SIAD-032	BUILDING # T-79	199008	Remediated under the Abandoned Landfill site SIAD-003
SIAD-033	POSSIBLE BURIAL SITE	199008	Written documentation formally closing out this site is being researched.
SIAD-034	SEPTIC TANKS/LEACH FIELDS	199008	This is an active site and ineligible for ER,A funding.
SIAD-035	STORAGE IGLOOS (8)	199008	This is an active site and ineligible for ER,A funding.
SIAD-036	BLG 75 & 79 AREA	199008	Remediated under the Abandoned Landfill site SIAD-003
SIAD-037	DIESEL SUMP AREA	199611	Remediated under the Abandoned Landfill site SIAD-003
SIAD-038	NORTHWEST WAREHOUSE AREA	199902	Written documentation formally closing out this site is being researched.
SIAD-039	SMALL SEWAGE TREATMENT PONDS	199908	This is an active site and ineligible for ER,A funding.
SIAD-042	SW-AREA	199903	This is an active site and ineligible for ER,A funding.
SIAD-056	STRATEGIC ORE PILES	199902	Moved to CC
SIAD-057	INSTALLATION WIDE GW PLUME	199911	Included in the PBC SIAD-058
SIAD-058	SIAD SPILL AREAS (FINAL ROD SITES)	201109	Installation-wide Well Abandonment and

## Site Closeout (No Further Action) Summary

Site ID	Site Name	NFA Date	Documentation
			An Installation-wide Groundwater Monitoring Plan.
SIAD-PBC	PBC Contract Sierra AD	200809	

# IRP Schedule

Date of IRP Inception: 198801

## Past Phase Completion Milestones

### 1989

SI (SIAD-001 - TNT LEACHING BEDS, SIAD-002 - DRMO TRENCH AREA, SIAD-003 - ABANDONED LANDFILL, SIAD-004 - CONSTRUCTION DEBRIS LANDFILL, SIAD-005 - CHEMICAL BURIAL SITE, SIAD-009 - AMMO DEMIL AND RENOVATION, SIAD-010 - UPPER BURNING GROUND - HANSENS HOLE, SIAD-011 - DIESEL SPILL AREA, SIAD-012 - BLDG 1003 AREA, SIAD-014 - BUILDING 210 AREA, SIAD-015 - LARGE SEWAGE TREATMENT PONDS, SIAD-016 - LOWER BURNING GROUND, SIAD-017 - NIKE MISSILE FUEL DISPOSAL SITE A, SIAD-018 - NIKE MISSILE FUEL DISPOSAL SITE B, SIAD-019 - TOXICS STORAGE AREA AT BLDG 578, SIAD-020 - 1960 DEMOLITION AREA, SIAD-021 - EXISTING POPPING FURNACE, SIAD-022 - OLD POPPING FURNACE)

PA (SIAD-001 - TNT LEACHING BEDS, SIAD-002 - DRMO TRENCH AREA, SIAD-003 - ABANDONED LANDFILL, SIAD-004 - CONSTRUCTION DEBRIS LANDFILL, SIAD-005 - CHEMICAL BURIAL SITE, SIAD-009 - AMMO DEMIL AND RENOVATION, SIAD-010 - UPPER BURNING GROUND - HANSENS HOLE, SIAD-011 - DIESEL SPILL AREA, SIAD-012 - BLDG 1003 AREA, SIAD-014 - BUILDING 210 AREA, SIAD-015 - LARGE SEWAGE TREATMENT PONDS, SIAD-016 - LOWER BURNING GROUND, SIAD-017 - NIKE MISSILE FUEL DISPOSAL SITE A, SIAD-018 - NIKE MISSILE FUEL DISPOSAL SITE B, SIAD-019 - TOXICS STORAGE AREA AT BLDG 578, SIAD-020 - 1960 DEMOLITION AREA, SIAD-021 - EXISTING POPPING FURNACE, SIAD-022 - OLD POPPING FURNACE)

### 1990

PA (SIAD-024 - AMMUNITION HAZARD TEST SITE, SIAD-025 - "K" BLOCK AREA, SIAD-026 - AMMO MAINTENANCE (BLDG #640), SIAD-027 - ABANDONED LANDFILL #2, SIAD-028 - TRANSFORMERS-250 ON INSTALLATION, SIAD-029 - HOSPITAL (BLDG #150), SIAD-031 - STORAGE SILOS, SIAD-032 - BUILDING # T-79, SIAD-033 - POSSIBLE BURIAL SITE, SIAD-034 - SEPTIC TANKS/LEACH FIELDS, SIAD-035 - STORAGE IGLOOS (8), SIAD-036 - BLG 75 & 79 AREA)

SI (SIAD-024 - AMMUNITION HAZARD TEST SITE, SIAD-025 - "K" BLOCK AREA, SIAD-026 - AMMO MAINTENANCE (BLDG #640), SIAD-027 - ABANDONED LANDFILL #2, SIAD-028 - TRANSFORMERS-250 ON INSTALLATION, SIAD-031 - STORAGE SILOS, SIAD-032 - BUILDING # T-79, SIAD-033 - POSSIBLE BURIAL SITE, SIAD-034 - SEPTIC TANKS/LEACH FIELDS, SIAD-035 - STORAGE IGLOOS (8))

### 1991

PA (SIAD-057 - INSTALLATION WIDE GW PLUME, SIAD-058 - SIAD SPILL AREAS (FINAL ROD SITES))

### 1992

RI/FS (SIAD-020 - 1960 DEMOLITION AREA)

### 1993

RI/FS (SIAD-001 - TNT LEACHING BEDS, SIAD-011 - DIESEL SPILL AREA)

### 1994

RI/FS (SIAD-017 - NIKE MISSILE FUEL DISPOSAL SITE A, SIAD-018 - NIKE MISSILE FUEL DISPOSAL SITE B, SIAD-019 - TOXICS STORAGE AREA AT BLDG 578)

### 1996

RA(C) (SIAD-016 - LOWER BURNING GROUND)

### RI/FS

(SIAD-004 - CONSTRUCTION DEBRIS LANDFILL, SIAD-005 - CHEMICAL BURIAL SITE, SIAD-009 - AMMO DEMIL AND RENOVATION, SIAD-012 - BLDG 1003 AREA, SIAD-015 - LARGE SEWAGE TREATMENT PONDS, SIAD-016 - LOWER BURNING GROUND)

### 1997

RI/FS (SIAD-002 - DRMO TRENCH AREA)

PA (SIAD-037 - DIESEL SUMP AREA, SIAD-038 - NORTHWEST WAREHOUSE AREA, SIAD-039 - SMALL SEWAGE TREATMENT PONDS, SIAD-042 - SW-AREA, SIAD-056 - STRATEGIC ORE PILES)

RD (SIAD-001 - TNT LEACHING BEDS, SIAD-015 - LARGE SEWAGE TREATMENT PONDS)

### 1998

SI (SIAD-029 - HOSPITAL (BLDG #150), SIAD-057 - INSTALLATION WIDE GW PLUME)

PA (SIAD-PBC - PBC Contract Sierra AD)

RA(C) (SIAD-015 - LARGE SEWAGE TREATMENT PONDS)

RD	(SIAD-011 - DIESEL SPILL AREA)
<b>1999</b>	
RA(C)	(SIAD-001 - TNT LEACHING BEDS)
SI	(SIAD-038 - NORTHWEST WAREHOUSE AREA, SIAD-039 - SMALL SEWAGE TREATMENT PONDS, SIAD-042 - SW-AREA)
RD	(SIAD-002 - DRMO TRENCH AREA)
<b>2000</b>	
RA(C)	(SIAD-011 - DIESEL SPILL AREA)
RI/FS	(SIAD-057 - INSTALLATION WIDE GW PLUME)
SI	(SIAD-058 - SIAD SPILL AREAS (FINAL ROD SITES))
<b>2003</b>	
RA(O)	(SIAD-011 - DIESEL SPILL AREA)
<b>2005</b>	
RI/FS	(SIAD-022 - OLD POPPING FURNACE)
RD	(SIAD-003 - ABANDONED LANDFILL, SIAD-014 - BUILDING 210 AREA, SIAD-022 - OLD POPPING FURNACE)
<b>2006</b>	
RA(O)	(SIAD-010 - UPPER BURNING GROUND - HANSENs HOLE)
RA(C)	(SIAD-010 - UPPER BURNING GROUND - HANSENs HOLE, SIAD-020 - 1960 DEMOLITION AREA, SIAD-022 - OLD POPPING FURNACE)
RD	(SIAD-010 - UPPER BURNING GROUND - HANSENs HOLE)
RI/FS	(SIAD-010 - UPPER BURNING GROUND - HANSENs HOLE)
<b>2008</b>	
RA(C)	(SIAD-PBC - PBC Contract Sierra AD)
<b>2011</b>	
RA(C)	(SIAD-014 - BUILDING 210 AREA)
RI/FS	(SIAD-058 - SIAD SPILL AREAS (FINAL ROD SITES))

**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:** 201701

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

**Estimated Completion Date of IRP at Installation (including LTM phase):** 203909



## SIERRA ARMY DEPOT IRP Schedule

= phase underway

SITE ID	SITE NAME	PHASE	FY14	FY15	FY16	FY17	FY18	FY19+
SIAD-001	TNT LEACHING BEDS	RA(O)						
SITE ID	SITE NAME	PHASE	FY14	FY15	FY16	FY17	FY18	FY19+
SIAD-002	DRMO TRENCH AREA	RA(C)						
		RA(O)						
		LTM						
SITE ID	SITE NAME	PHASE	FY14	FY15	FY16	FY17	FY18	FY19+
SIAD-003	ABANDONED LANDFILL	RA(C)						
		RA(O)						
		LTM						
SITE ID	SITE NAME	PHASE	FY14	FY15	FY16	FY17	FY18	FY19+
SIAD-010	UPPER BURNING GROUND - HANSENs HOLE	LTM						
SITE ID	SITE NAME	PHASE	FY14	FY15	FY16	FY17	FY18	FY19+
SIAD-014	BUILDING 210 AREA	RA(O)						
		LTM						
SITE ID	SITE NAME	PHASE	FY14	FY15	FY16	FY17	FY18	FY19+
SIAD-020	1960 DEMOLITION AREA	LTM						
SITE ID	SITE NAME	PHASE	FY14	FY15	FY16	FY17	FY18	FY19+
SIAD-022	OLD POPPING FURNACE	LTM						

**SIERRA ARMY DEPOT**  
**Army Defense Environmental Restoration Program**  
**Military Munitions Response Program**

# MMRP Summary

**Installation Total Army Environmental Database-Restoration (AEDB-R) Sites/Closeout Sites Count:** 13/4

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

- 1 Mixed Waste Area  
(SIAD-017-R-01)
- 3 Open Burn  
(SIAD-007-R-01, SIAD-009-R-01, SIAD-012-R-01)
- 5 Unexploded Munitions/Ordnance  
(PBA@MR SIAD, SIAD-006-R-01, SIAD-010-R-01, SIAD-014-R-01, SIAD-015-R-01)

**Most Widespread Contaminants of Concern**

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

**Media of Concern**

Groundwater, Soil

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

Site ID	Site Name	Action	Remedy	FY
PBA@MR SIAD	MR PBC contract Sierra AD	FRA	UXO CLEARANCE	2013
PBA@MR SIAD	MR PBC contract Sierra AD	FRA	INSTITUTIONAL CONTROLS	2013
SIAD-006- R-01	.50 CALIBER FIRING RANGE	FRA	UXO CLEARANCE	2013
SIAD-007- R-01	1960 DEMOLITION AREA	FRA	UXO CLEARANCE	2013
SIAD-009- R-01	HAZARD CLASSIFICATION TEST SITE	FRA	UXO CLEARANCE	2013
SIAD-010- R-01	HONEY LAKE DEMOLITION RANGE C	FRA	INSTITUTIONAL CONTROLS	2013
SIAD-010- R-01	HONEY LAKE DEMOLITION RANGE C	FRA	UXO CLEARANCE	2013
SIAD-012- R-01	LOWER BURNING GROUND	FRA	UXO CLEARANCE	2013
SIAD-014- R-01	UPPER BURNING GROUND	FRA	INSTITUTIONAL CONTROLS	2013
SIAD-014- R-01	UPPER BURNING GROUND	FRA	UXO CLEARANCE	2013
SIAD-015- R-01	BLM-ADMINISTERED PUBLIC LAND	FRA	UXO CLEARANCE	2013
SIAD-015- R-01	BLM-ADMINISTERED PUBLIC LAND	FRA	INSTITUTIONAL CONTROLS	2013

**Duration of MMRP**

**Date of MMRP Inception** 200301

**Estimated Date for Remedy-In-Place (RIP)/Response Complete (RC):** 201508/201508

**Date of MMRP completion including Long Term Management (LTM):** 204201

# MMRP Contamination Assessment

## Contamination Assessment Overview

Thirteen sites were identified during the MMRP range inventory. Four of those sites are considered RC and NFA is required. One site is being addressed under the BRAC program. At this time, if there is off-post contamination at any of the identified sites, it is not known.

In July 2004, the site inspection (SI) at each site began and was completed in December 2005; however, the UBG portion was not included during the range inventory. The entire area of the UBG was believed to be operating as a RCRA regulated munitions disposal site and, therefore, specifically excluded from the MMRP. Subsequent to the range inventory, two specific areas (the 50-acre Lower Burning Area and the 35-acre Demolition Area) were determined to be MMRP eligible.

As a result of the research conducted for the historical records review (HRR) for the UBG, two additional sites associated with the UBG were determined to be eligible for the MMRP. These transferred sites [located outside the installation boundary and not under Department of Defense (DoD) control] include the Bureau of Land Management (BLM), Administered Public Land MRS, and the gravel pit (Stacy) MRS. Seven MRS were combined to create seven sites. An additional MMRP site was added to the program in 2012 (DRMO Yard) totaling eight MMRP sites. A record of decision for seven sites was completed December 2012. A RI/FS for DRMO Yard and LTM for seven sites will begin in 2013.

## Cleanup Exit Strategy

Please see the site-specific cleanup exit strategies.

## MMRP Previous Studies

Year	Title	Author	Date
2003	Final US Army Closed, Transferring and Transferred Range/Site Inventory for Sierra Army Depot, CA	TechLaw Inc.	SEP-2003
2005	Final Historical Records Review, Volumes 1 and 2, Sierra Army Depot, CA	TechLaw Inc.	MAY-2005
	Final Work Plan, Sierra Army Depot, CA	TechLaw Inc.	JUN-2005
	Final Site Inspection Report, Sierra Army Depot, CA	TechLaw Inc.	AUG-2005
2006	Upper Burning Ground, Final Historical Records Review, Sierra Army Depot, CA	TLI Solutions, Inc.	AUG-2006
2007	Upper Burning Ground, Final Site Inspection Work Plan, Sierra Army Depot, CA	TLI Solutions, Inc.	APR-2007
2008	Upper Burning Ground, Final Site Inspection Report, Sierra Army Depot, CA	TLI Solutions, Inc.	SEP-2008
2010	Project Management Plan	ARCADIS	MAR-2010
	Performance Based Acquisition Quality Assurance Surveillance Plan	ARCADIS	MAR-2010
	Monitoring Well Placement Rationale and Natural Occurrence of Arsenic in Groundwater, Military Munitions Response Program Sites	ARCADIS	JUL-2010
	Accident Prevention Plans and Health and Safety Plans	ARCADIS, USA Environmental, and Malcolm Pirnie	AUG-2010
	Fact Sheet for the Draft Military Munitions Response Program Seven Sites Remedial Investigation/Feasibility Study Work Plan	ARCADIS	SEP-2010
	Explosives Site Plan	ARCADIS	SEP-2010
	Certification of Risk Acceptance (CoRA) for Clearance of Improved Conventional Munitions (ICMs)/Submunitions	ARCADIS	OCT-2010
	Soil and Groundwater Investigation Work Plan	ARCADIS	OCT-2010
	Site-wide Quality Assurance Project Plan	ARCADIS	OCT-2010
	Military Munitions Response Program Seven Sites Remedial Investigation/Feasibility Study Work Plan	ARCADIS	NOV-2010
	Field Sampling Plan	ARCADIS	NOV-2010
2011	Soil and Groundwater Investigation Report - Building 640	ARCADIS	JAN-2011
	Building 640 Sierra Army Depot - Summary of Grab Groundwater Samples and Proposed Well Installation	ARCADIS	JAN-2011
	Field Completion Report for Building 640	ARCADIS	JUN-2011
	Soil and Groundwater Investigation Report - Building 640	ARCADIS	SEP-2011
	7-Sites Remedial Action Field Work Completion Report	ARCADIS	NOV-2011

## MMRP Previous Studies

	<b>Title</b>	<b>Author</b>	<b>Date</b>
<b>2011</b>			
	7-Sites Remedial Design/Remedial Action Work Plan	ARCADIS	DEC-2011
<b>2012</b>			
	MMRP 7-Sites Remedial Investigation and Feasibility Study	ARCADIS	APR-2012
	MMRP 7-Sites Proposed Plan	ARCADIS	JUL-2012
	MMRP 7-Sites Record of Decision	ARCADIS	DEC-2012

**SIERRA ARMY DEPOT**  
**Military Munitions Response Program**  
**Site Descriptions**

**Site ID: PBA@MR SIAD**  
**Site Name: MR PBC contract Sierra AD**

**STATUS**

**Regulatory Driver:** CERCLA  
**MRSPP Score:** Evaluation pending

<b>Phases</b>	<b>Start</b>	<b>End</b>
PA.....	200409.....	200507
SI.....	200509.....	200809
RI/FS.....	200803.....	201210
RD.....	201001.....	201210
RA(C).....	201001.....	201212
LTM.....	201301.....	204201
<b>RIP Date:</b>	N/A	
<b>RC Date:</b>	201212	

**SITE DESCRIPTION**

This site was created to compile these MR PBC sites:  
SIAD-006-R-01 SIAD-007-R-01 SIAD-009-R-01  
SIAD-010-R-01 SIAD-012-R-01 SIAD-013-R-01  
SIAD-014-R-01 SIAD-015-R-01.

Phase schedule for individual sites under the PBC reflect overall contract performance dates, as opposed to site-specific process phase dates. RC dates correspond to the date of the contract award (January 2010). ROD was completed December 2012. The next five-year review is scheduled for 2016.

An RI/FS and a ROD for seven MMRP sites were completed in 2012.

An RI/FS and a ROD for seven MMRP sites were completed in 2012.

**CLEANUP/EXIT STRATEGY**

LTM is projected to begin in 2013. A Land Use Controls Implementation Plan (LUCIP) will be submitted in 2016. A PBC covers all MMRP sites through 2017.



**Site ID: SIAD-006-R-01**  
**Site Name: .50 CALIBER FIRING RANGE**

**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.....	200301.....	200305
SI.....	200407.....	200512
RI/FS.....	200803.....	201212
RD.....	201001.....	201212
RA(C).....	201001.....	201212
LTM.....	201301.....	204201
<b>RIP Date:</b>	N/A	
<b>RC Date:</b>	201212	

**SITE DESCRIPTION**

The .50 Caliber Firing Range MMRP site consists of approximately 1,350 acres in the northern portion of the installation. The range fan for the .50 Caliber Range extends from east to west, with the furthest extent of the range fan situated on property that has been transferred to the Lassen Reuse Authority under BRAC. The BRAC property is not included in the estimated acreage listed for this site. Also included is the Surveillance Test Site that is located partially in the operational range and partially to the south of the operational range. The eastern most area is adjacent to the operational 7.62 millimeter (mm) range. In 1997, the range fan for the .50 Caliber Firing Range (located in the northwest portion of the main depot area) was shortened to function as an active 7.62 mm range, leaving a closed section of the range fan. Because a map of the new 7.62 mm range fan was unavailable, the size of the range fan was estimated based on current regulations. The majority of this range is covered by Honey Lake Demolition Range C.

This range was used from the 1940s to 1998. Items located at the site during the SI fieldwork in 2005 included white phosphorus (WP) grenade fragments, thermite, 40mm high explosive (HE), 40mm CS grenades, riot control grenades, land mines, flares, signal ground illumination grenades, illumination candles, a ground burst simulator, signal illumination flares (ground parachute green star, ground green star cluster, ground parachute white star, and ground parachute red star), projectile fuses, .50 Caliber and 7.62mm expended rounds. The area is currently undeveloped. No known MR actions or clearances have been conducted at this MRS site.

MEC surface sweeps were conducted in 2010. The PBC contract covers this site through RC in December 2012. ROD was completed December 2012 and LTM will continue thereafter. The remedy is ICs, SIs and access restrictions to address MEC. The first five-year review is scheduled for 2016.

Cost for this site is being tracked under PBA@MR-SIAD.

**CLEANUP/EXIT STRATEGY**

A LUCIP and a five-year review will be submitted in 2016. A PBC covers the LTM for this site through 2017.

**Site ID: SIAD-007-R-01**  
**Site Name: 1960 DEMOLITION 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.....	200301.....	200305
SI.....	200407.....	200512
RI/FS.....	201001.....	201210
RD.....	201001.....	201210
RA(C).....	201001.....	201212
LTM.....	201301.....	204201

**RIP Date:** N/A

**RC Date:** 201212

**SITE DESCRIPTION**

Operations at the 1960 Demolition Area began in 1960 during renovation of the UBG. Between 1960 and 1961, thirty-six 500-pound bombs (per detonation) were detonated at a rate of 12 times per day (432 bombs per day). During these same years, tear gas detonation occurred at a rate of approximately 200 - 249 pounds/day for three months. Although the available documentation does not specify what form the tear gas was in, the assumption is that these were tear gas grenades.

The 1960 Demolition Area contains two columns of 12 elongated trenches that form a total of 24 depressions created by the detonation of 500-pound bombs. The largest of the 24 depressions is located in the southern half of the site and is approximately 600 feet long, 100 feet wide, and 20 to 30 feet deep. The 1988 RCRA facility assessment (RFA) described the trenches as ranging in size from 400 to 600 feet long, 300 to 600 feet wide, and approximately 15 feet deep. The 1988 RFA refers to this area as Solid Waste Management Unit (SWMU) 13. The 1994 Group IIIB RI described the depressions as having very steep-sided berms, devoid of vegetation, and deeply incised by erosional gullies.

The surface of the site consists of an abundance of scattered metal debris, especially in the southern half. The debris included jagged pieces of steel bomb fragments ranging in size from one inch to one foot or more in diameter. The area south of the main bomb craters contained concrete-lined silos, scattered wooden crates, and bomb casings.

In 1961 and in the mid-1970s, the Army fired Nike Hercules XM-30 motors inside underground silos. During firing of the motors, solid-based propellant was burned in the silos. One cylindrical concrete structure was observed at the site during the 1988 RFA. The structure was described as below grade, three feet in diameter, and eight feet deep. It was reported as likely to be one of the silos used for firing Hercules XM-30 missile motors. The 1988 RFA reported that it was likely that several other silos are contained within the site. According to installation personnel, the silos had concrete sides with dirt floors and were demolished by Explosive Ordnance Disposal (EOD) personnel. The motor remains from missile testing were sent to the Defense Property Disposal Office (DPDO) for salvage. Between 1973 and 1974, CS grenades were also burned at the site.

Because the 1960 Demolition Area intersects with the .50 Caliber Firing Range, it may contain remnants from small arms training and from activities conducted on the Surveillance Test Site. Because the range of the 40mm grenade launcher used at the Surveillance Test Site is not long enough to reach the 1960 Demolition Area, it is not likely that these rounds would have impacted this range. In 2006, the site was fenced.

The PBC contract covers this site through RC. Administrative closure was anticipated for this site but the regulators required additional work. Site was previously closed with a ROD under the IRP. NFA is expected after PBC completion December 2012.

**CLEANUP/EXIT STRATEGY**

A LUCIP and a five-year review will be submitted in 2016. A PBC covers LTM for this site through 2017.

**Site ID: SIAD-009-R-01**

**Site Name: HAZARD CLASSIFICATION TEST SITE**

**STATUS**

**Regulatory Driver:** CERCLA

**MRSPP Score:** 05

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

Media of Concern: Groundwater, Soil

<b>Phases</b>	<b>Start</b>	<b>End</b>
PA.....	200301.....	200305
SI.....	200407.....	200512
RI/FS.....	201001.....	201212
RD.....	201001.....	201212
RA(C).....	201001.....	201212
LTM.....	201301.....	204201

**RIP Date:** N/A

**RC Date:** 201212

**SITE DESCRIPTION**

This closed site of about 165 acres located in the northwestern portion of the main depot area was also known as an ammunition hazard test site. A small portion of this site is covered by the range fan of an active 7.62 mm range. A larger portion covering the northwest corner of the range falls within the boundary of Honey Lake Demolition Range C (Range C). The munitions used in Range C take precedence over those used at this site; consequently, the overlapping acreage is included with Range C.

According to a 1979 installation assessment, this area was used to blow/burn 8-inch, 40mm, 135mm, CBU (cluster bombs), and other conventional munitions for test purposes. According to a 1983 reassessment report, activities conducted at this site were designed to evaluate the fire capabilities and disposal procedures for improved conventional weapons. The hazard test site was used approximately three to four months per year, and all metal generated during the operations was collected and sent to the DPDO for disposal. SIAD staff stated that CBUs were demolished at this closed site from 1969-1973 and the site is heavily contaminated with scrap metal. The site is locked and is near a road which had been transferred to the state under BRAC.

Under the IRP, a site investigation and a RI/FS have been completed for this site. According to SIAD, the USEPA has conducted a walkthrough at the site and determined that the site did not warrant any further investigation. The site is considered to be RC under the IRP and is currently undeveloped. The site is within the depot boundary fence.

The PBC covers this site through RC in December 2012.

**CLEANUP/EXIT STRATEGY**

A LUCIP and a five-year review will be submitted in 2016. A PBC covers LTM for this site through 2017.

**Site ID: SIAD-010-R-01**

**Site Name: HONEY LAKE DEMOLITION RANGE C**

## 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.....	200301.....	200305
SI.....	200407.....	200512
RI/FS.....	201001.....	201210
RD.....	201001.....	201210
RA(C).....	201001.....	201212
LTM.....	201301.....	204201

**RIP Date:** N/A

**RC Date:** 201212

## SITE DESCRIPTION

This closed range (Range C) of about 861 acres is located along the western boundary of the installation. Range C lies within the maximum fragment arc of Honey Lake Demolition Range and comprises approximately one-quarter of the entire demolition range. The rest of the demolition range falls within BRAC property. Range C overlaps the western portions of the Hazard Classification Test Site and the .50 Caliber Range and takes precedence over them. Range C was used from 1945 to approximately 1958, with the most frequent use during the 1940s. The hazard classification test site was used from 1969 to 1973 and the .50 Caliber Range was used from 1960 to 1997.

In 1996, the entire Honey Lake Demolition Range was evaluated as part of an archive search report (ASR). The ASR team conducted a site visit and observed demolition range fragments on the extreme western edge of Range C. They also observed fragments further inland that were the result of the hazard classification test site, which is within this area. While 105mm HE shells were the most common item destroyed at the site, other typical munitions that were detonated or burned at the Honey Lake Demolition Range include .30, .45, and .50 caliber rounds (ball, tracer, and incendiary); 20mm high explosive incendiary cartridges; 60mm and 81mm mortars, HE and WP smoke; 75mm HE and WP smoke shells; 105mm HE shells; 2.36 inch HE anti-tank (bazooka) and WP rockets; 4.5 inch HE rockets; fragmentation, hexachloroethane (HC) smoke, red smoke, and WP smoke hand grenades; WP and anti-tank rifle grenades; Bangalore torpedoes, anti-personnel and anti-tank mines; pyrotechnics; and general purpose cluster and fragmentation bombs; fuses; loose explosives; bulk high explosives; ballistite powder; black powder; and propellant. The Hazard Classification Test Site was used to blow/burn 8-inch, 40mm, 135mm, bombs, and other conventional munitions for test purposes.

The site is currently undeveloped and is contained within the depot boundary fence.

The PBC covers this site through RC in December 2012. MEC surface sweeps were performed in 2010. Institutional controls and access restrictions to address MEC concerns are the anticipated remedy.

## CLEANUP/EXIT STRATEGY

A LUCIP and a five-year review will be submitted in 2016. A PBC covers LTM for this site through 2017.

**Site ID: SIAD-012-R-01**  
**Site Name: LOWER BURNING GROUND**

**STATUS**

**Regulatory Driver:** CERCLA  
**MRSPP Score:** 03  
Contaminants of Concern: Munitions and explosives of concern (MEC), Munitions constituents (MC)  
Media of Concern: Groundwater, Soil

<b>Phases</b>	<b>Start</b>	<b>End</b>
PA.....	200301.....	200305
SI.....	200407.....	200512
RI/FS.....	201001.....	201212
RD.....	201001.....	201212
RA(C).....	201001.....	201212
LTM.....	201301.....	204201
<b>RIP Date:</b>	N/A	
<b>RC Date:</b>	201212	

**SITE DESCRIPTION**

The Lower Burning Ground consists of approximately 1,315 undeveloped acres near the northeast corner of the main depot and encompasses a large, irregularly shaped area that measures approximately 5,300 feet by 1,800 feet. The 1983 reassessment report referred to the Lower Burning Ground as Chemical Systems Laboratory (CSL) Area 24 and explains that it includes a rectangular area referred to as CSL Area 25, or the Interim Burning Area A. The site is included in the 1994 Group IIIB RI, which describes the northern Lower Burning Ground area as having several open pits, associated soil mounds, and long paired alignments of gravel. The central area contains a relatively large elongated pit. The Interim Burning Area also contains long paired alignments.

According to the 1983 Reassessment Report, between 1946 and the 1980s, the Army performed continuous pit and ground surface burning of powder projectiles and various pyrotechnics. Activities began during construction/renovation of the UBG and consisted of detonation, burning, and demolition of various types of ammunition, bombs, grenades, and pyrotechnics. Materials consisted of excess powder and waste products from demilitarization operations.

Reportedly, there was a considerable amount of uncontrolled dumping of a wide variety of materials into pits. The material consisted of solvents, thinners, paint sludges, and degreasing sludges. In the northern portion of the Lower Burning Ground, the Army also burned CS and did some pre-burning of incendiaries. The CS is assumed to have been in the form of riot control grenades; however, bulk material may have been burned at this site. Periodically, metal scrap and debris were removed from the pits and taken to the DPDO for disposal. After removal, the pits were backfilled and covered.

The site was closed under the IRP. The PBC covers this site through RC. Administrative closure was anticipated for this site in December 2010 but the regulators required additional work. The site was previously closed with a ROD under the IRP. The seven site MMRP ROD was completed in 2012. Cost for this site is tracked under PBA@MR SIAD.

**CLEANUP/EXIT STRATEGY**

A LUCIP and a five-year review will be submitted in 2016. A PBC covers LTM for this site through 2017.

**Site ID: SIAD-014-R-01**  
**Site Name: UPPER BURNING GROUND**

**STATUS**

**Regulatory Driver:** CERCLA

**MRSPP Score:** 04

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

Media of Concern: Groundwater, Soil

<b>Phases</b>	<b>Start</b>	<b>End</b>
PA.....	200409.....	200507
SI.....	200509.....	200809
RI/FS.....	200803.....	201212
RD.....	201001.....	201212
RA(C).....	201001.....	201212
LTM.....	201301.....	204201

**RIP Date:** N/A

**RC Date:** 201212

**SITE DESCRIPTION**

The UBG occupies 3,915 acres just northeast of the SIAD. Although seven sites were identified at SIAD during the Phase III range inventory, the UBG was not included at that time. The entire area of the UBG was believed to be operating as a RCRA regulated munitions disposal site and, therefore, specifically excluded from the MMRP. Subsequent to the range inventory, two specific areas (the 50-acre Lower Burning Area and the 35-acre Demolition Area) within the UBG were determined to constitute the permitted disposal area and are currently only used for emergency detonations. The remainder of the UBG should be evaluated under the MMRP.

Activities including burning, munitions related demolition, and other disposal operations, have occurred at the UBG since the 1940s. All types of munitions have been disposed of at the UBG including rockets, landmines, propellants, bombs, mortars, pyrotechnics, and grenades. The Southern Extension of the Upper Burning Area, the Open Trenches and Ash Pile, and Hansen's Hole are sites inside the UBG which have been addressed under the IRP. All other areas of the UBG are eligible for the MMRP. Several of the areas inside UBG boundaries are fenced, due to safety concerns from MEC. There have been MEC clearances performed on sections of the UBG, but not over the whole site.

A work plan for sites SIAD-014-R-01 and SIAD-015-R-01 was completed in 2010. The PBC covers this site through RC in December 2014. ICs and access restrictions to address MEC concerns are the anticipated remedy.

**CLEANUP/EXIT STRATEGY**

A LUCIP and a five-year review will be submitted in 2016. A PBC covers LTM for this site through 2017.

**Site ID: SIAD-015-R-01**

**Site Name: BLM-ADMINISTERED PUBLIC LAND**

**STATUS**

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

<b>Phases</b>	<b>Start</b>	<b>End</b>
PA.....	200409.....	200507
SI.....	200509.....	200809
RI/FS.....	200803.....	201212
RD.....	201001.....	201212
RA(C).....	201001.....	201212
<b>LTM.....</b>	<b>201301.....</b>	<b>204201</b>
<b>RIP Date:</b>	N/A	
<b>RC Date:</b>	201212	

**SITE DESCRIPTION**

On Jan. 12, 2006, Susan Wannebo, a BLM realty specialist, established that BLM-administered public land withdrawn from public access consisted of 1,773 off-site acres adjacent to the eastern border of the UBG.

According to a BLM news release, SIAD explosive experts destroyed more than 800 small, anti-personnel bombs in the area. They were described as baseball size bomblets that apparently scattered while Army depot EOD destroyed the larger cluster bombs at the UBG. The closure affected areas west of Skedaddle Road and south of Spencer Basin Road. The roads remained open, and signs were posted to warn the public that the areas could be dangerous.

Two wilderness study areas (WSA), the Skedaddle Mountain WSA and the Dry Valley Rim WSA, are located near the property. WSAs provide opportunities for solitude and primitive types of recreation, big game hunting, and wildlife, wild horse, and burro viewing.

A work plan for sites SIAD-014-R-01 and SIAD-015-R-01 was completed in 2010. The PBC covers this site through RC - December 2014. MEC surface sweeps were performed in 2010. ICs and access restrictions to address MEC concerns are the anticipated remedy.

**CLEANUP/EXIT STRATEGY**

A LUCIP and a five-year review will be submitted in 2016. A PBC covers LTM for this site through 2017.

**Site ID: SIAD-017-R-01**  
**Site Name: DRMO Yard**

**STATUS**

**Regulatory Driver:** CERCLA  
**MRSPP Score:** Evaluation pending  
**Contaminants of Concern:** Metals, Munitions constituents (MC)  
**Media of Concern:** Soil

<b>Phases</b>	<b>Start</b>	<b>End</b>
PA.....	200905.....	200909
SI.....	201203.....	201306
RI/FS.....	201207.....	201508

**RIP Date:** N/A  
**RC Date:** 201508

**SITE DESCRIPTION**

The DRMO Yard Area is approximately seven acres located in the north part of the DRMO area. The site was used extensively from 1942 to 1973 and in limited capacity since that time. Between 1942 and 1973 the site disposed about 190 liters per day of waste oils, scrap metal, sludge, solvents, cleaning and recently found munitions related debris. The contractors at the DRMO yard have uncovered what appear to be burial pits (three) during a one-foot excavation. The size and depth of each burial pit is unknown because the excavation depth by contractors was limited to one foot. Metal and MCs remain below the one-foot excavation.

A new PBC will cover the RI/FS expected to be completed in 2014.

**CLEANUP/EXIT STRATEGY**

Future requirements for this site will be defined in the RI/FS.



## Site Closeout (No Further Action) Summary

Site ID	Site Name	NFA Date	Documentation
SIAD-008-R-01	BLOCK C	200512	No contamination found during SI dated December 2005.
SIAD-011-R-01	RIFLE RANGE D	200512	No contamination found during SI dated December 2005.
SIAD-013-R-01	ALPHA TEAM TRAINING AREA	201104	Received NFA letter 20 April 2011 from the California Department of Toxic Substances Control.
SIAD-016-R-01	GRAVEL PIT(STACY)	200809	No evidence of military munitions found during the Draft SI dated October 2007. As such, this site was recommended for NFA.

# MMRP Schedule

**Date of MMRP Inception** 200301

## Past Phase Completion Milestones

### 2003

PA (SIAD-006-R-01 - .50 CALIBER FIRING RANGE, SIAD-007-R-01 - 1960 DEMOLITION AREA, SIAD-008-R-01 - BLOCK C, SIAD-009-R-01 - HAZARD CLASSIFICATION TEST SITE, SIAD-010-R-01 - HONEY LAKE DEMOLITION RANGE C, SIAD-011-R-01 - RIFLE RANGE D, SIAD-012-R-01 - LOWER BURNING GROUND, SIAD-013-R-01 - ALPHA TEAM TRAINING AREA)

### 2005

PA (PBA@MR SIAD - MR PBC contract Sierra AD, SIAD-014-R-01 - UPPER BURNING GROUND, SIAD-015-R-01 - BLM-ADMINISTERED PUBLIC LAND, SIAD-016-R-01 - GRAVEL PIT(STACY))

### 2006

SI (SIAD-006-R-01 - .50 CALIBER FIRING RANGE, SIAD-007-R-01 - 1960 DEMOLITION AREA, SIAD-008-R-01 - BLOCK C, SIAD-009-R-01 - HAZARD CLASSIFICATION TEST SITE, SIAD-010-R-01 - HONEY LAKE DEMOLITION RANGE C, SIAD-011-R-01 - RIFLE RANGE D, SIAD-012-R-01 - LOWER BURNING GROUND, SIAD-013-R-01 - ALPHA TEAM TRAINING AREA)

### 2008

SI (PBA@MR SIAD - MR PBC contract Sierra AD, SIAD-014-R-01 - UPPER BURNING GROUND, SIAD-015-R-01 - BLM-ADMINISTERED PUBLIC LAND, SIAD-016-R-01 - GRAVEL PIT(STACY))

### 2009

PA (SIAD-017-R-01 - DRMO Yard)

### 2011

RI/FS (SIAD-013-R-01 - ALPHA TEAM TRAINING AREA)

## Projected Phase Completion Milestones

See attached schedule

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

Site ID	Site Name	ROD/DD Title	ROD/DD Date
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**Final RA(C) Completion Date:** 201212

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

**Estimated Completion Date of MMRP at Installation (including LTM phase):** 204201

## SIERRA ARMY DEPOT MMRP Schedule

= phase underway

SITE ID	SITE NAME	PHASE	FY14	FY15	FY16	FY17	FY18	FY19+
PBA@MR SIAD	MR PBC contract Sierra AD	LTM						
SITE ID	SITE NAME	PHASE	FY14	FY15	FY16	FY17	FY18	FY19+
SIAD-006-R-01	.50 CALIBER FIRING RANGE	LTM						
SITE ID	SITE NAME	PHASE	FY14	FY15	FY16	FY17	FY18	FY19+
SIAD-007-R-01	1960 DEMOLITION AREA	LTM						
SITE ID	SITE NAME	PHASE	FY14	FY15	FY16	FY17	FY18	FY19+
SIAD-009-R-01	HAZARD CLASSIFICATION TEST SITE	LTM						
SITE ID	SITE NAME	PHASE	FY14	FY15	FY16	FY17	FY18	FY19+
SIAD-010-R-01	HONEY LAKE DEMOLITION RANGE C	LTM						
SITE ID	SITE NAME	PHASE	FY14	FY15	FY16	FY17	FY18	FY19+
SIAD-012-R-01	LOWER BURNING GROUND	LTM						
SITE ID	SITE NAME	PHASE	FY14	FY15	FY16	FY17	FY18	FY19+
SIAD-014-R-01	UPPER BURNING GROUND	LTM						
SITE ID	SITE NAME	PHASE	FY14	FY15	FY16	FY17	FY18	FY19+
SIAD-015-R-01	BLM-ADMINISTERED PUBLIC LAND	LTM						
SITE ID	SITE NAME	PHASE	FY14	FY15	FY16	FY17	FY18	FY19+
SIAD-017-R-01	DRMO Yard	RI/FS						

**SIERRA ARMY DEPOT**  
**Army Defense Environmental Restoration Program**  
**Compliance Restoration**

## CR Summary

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

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

1        Underground Storage Tank  
          (CC-SIAD601)

**Most Widespread Contaminants of Concern**

Petroleum, Oil and Lubricants (POL)

**Media of Concern**

Groundwater, Soil

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

Site ID	Site Name	Action	Remedy	FY
N/A				

**Duration of CR**

**Date of CR Inception:** 198804

**Estimated Date for Remedy-In-Place (RIP)/Response Complete (RC):** 201312/201312

**Date of CR completion including Long Term Management (LTM):** 201609

## 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 Defense Environmental Restoration Program (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 CC program eligible for the DERP. Sites that are now eligible for the 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 IR sites; however, the newly eligible sites are being coded as compliance restoration (CR) in AEDB-R to distinguish them from the original IR sites and IR metrics. CC-SIAD601 migrated to the Compliance Restoration Program in 2009.

### Cleanup Exit Strategy

Building 640 is in the RA(O) phase. The future remedy is projected to be groundwater monitoring and active groundwater remediation (extraction of free-product). Beginning in 2012, one year of active groundwater remediation, and five years of groundwater monitoring are anticipated.

## CR Previous Studies

	Title	Author	Date
2011	Military Munitions Response Program Building 640 UST Site Soil and Groundwater Investigation Report	ARCADIS	MAY-2011

**SIERRA ARMY DEPOT**  
**Compliance Restoration**  
**Site Descriptions**



**Site ID: CC-SIAD601**  
**Site Name: Building 640 UST**

**STATUS**

**Regulatory Driver:** CERCLA  
Contaminants of Concern: Petroleum, Oil and Lubricants (POL)  
Media of Concern: Groundwater, Soil

<b>Phases</b>	<b>Start</b>	<b>End</b>
PA.....	200401.....	200403
SI.....	201001.....	201103
RI/FS.....	201001.....	201103
RD.....	201101.....	201203
RA(C).....	201101.....	201312
LTM.....	201312.....	201609

**RIP Date:** N/A  
**RC Date:** 201312

**SITE DESCRIPTION**

The Bldg 640 area is located north of the main gate of the installation, in the western portion of SIAD along the west side of Chewing Gum Road. Bldg 640 is one of the buildings in an ammunition maintenance facility complex located close to the western boundary of the depot. On Jan. 8, 1997, when the heating boiler inside Bldg 640 was removed, a 17,500-gallon underground storage tank (UST) was still in use. The contractor's field notes for the tank removal indicated the top of the tank was four feet below the ground surface. The tank was 10 feet in diameter and 28 feet long. The UST was found to have one large hole on the bottom and the west side.

The UST excavation had staining and odor beneath where the hole was observed. Confirmation of the analytical results showed detectable levels of total petroleum hydrocarbons-diesel (TPH-d), and benzene, toluene, ethylbenzene and xylenes (BTEX). Soil and groundwater samples were taken after excavation of the site. The results were that the groundwater had 900 parts per million (ppm) TPH; the California TPH regulatory limit is 100 ppm. The soil had 5800 ppm; the California TPH regulatory limit for soil also is 100 ppm. Free-product is expected to be recovered from the groundwater.

This site was previously in the Army Environmental Database-Compliance Clean-Up (AEDB-CC) under CC-SIAD601. It migrated to the Compliance Restoration (CR) program in 2009. The PBC covers this site through RI in December 2011.

Following the completion of the RI, projected site work will include preparation of a work plan, active groundwater remediation and groundwater monitoring for five years.

A new PBA which addresses the RA phase in 2012 was completed and LTM will begin this year.

A PBA covers SIAD601 through 2016. The site may qualify for the California Low-Threat Underground Storage Tank Case Closure Policy.

**CLEANUP/EXIT STRATEGY**

Beginning in 2016 or sooner, a request for NFA/well abandonment work plan, well abandonment, and a closure report are anticipated.

## Site Closeout (No Further Action) Summary

Site ID	Site Name	NFA Date	Documentation
CCPBA@SIAD	CR PBC Contract Sierra AD	201212	

## CR Schedule

**Date of CR Inception:** 198804

### **Past Phase Completion Milestones**

**1998**

ISC (CCPBA@SIAD - CR PBC Contract Sierra AD)

**2004**

PA (CC-SIAD601 - Building 640 UST)

**2011**

RI/FS (CC-SIAD601 - Building 640 UST)

SI (CC-SIAD601 - Building 640 UST)

**2012**

RD (CC-SIAD601 - Building 640 UST)

### **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:** 201312

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

**Estimated Completion Date of CR at Installation (including LTM phase):** 201609

## SIERRA ARMY DEPOT CR Schedule

= phase underway

SITE ID	SITE NAME	PHASE	FY14	FY15	FY16	FY17	FY18	FY19+
CC-SIAD601	Building 640 UST	RA(C)						
		LTM						

## Community Involvement

**Technical Review Committee (TRC):** 199005

**Community Involvement Plan (Date Published):** 199006

**Restoration Advisory Board (RAB):** RAB established 199611

**RAB Adjournment Date:** N/A

**RAB Adjournment Reason:** None

### Additional Community Involvement Information

The restoration program at SIAD started in 1987 and in 1991 a Federal Facilities Site Remediation Agreement (FFSRA) was signed. Community input was received through a TRC that had intermittent community attendance from 1993 to 1996. In December 1996, a RAB was unofficially formed. In 1997, a total of eight meetings were held and by October of that year the RAB charter was signed.

Surveys have been provided to community members expressing interest and community members have been interviewed for the update to the community relations plan. Responses were received from the community and regulatory agencies. The plan was completed in 2008 but never finalized; subsequent programmatic changes indicate the plan requires revision. Plan revision began in 2010.

The RAB includes eight community members. Meetings are held three times per year. The charter was updated in 2004. A tour of the sites was conducted for the RAB members in May 2008. The public interest has diminished to one person. The last meeting was held in September 2012 and the next meeting is anticipated to be held July 2013. The Community Involvement Plan will be updated in FY13.

### Administrative Record is located at

Sierra Army Depot  
63 E Street (Building 63)  
Herlong, California 96113  
(530)827-4612

### Information Repository is located at

Susanville Library, 1618 Main Street, Susanville, CA 96130; 530-251-8127  
Washoe County Library, 301 S. Center St., Reno, NV 89505; (775)-327-8300  
Herlong Library, Bldg 2067, Herlong, CA; 530-827-207

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

**TAPP Title:** N/A

**Potential TAPP:** N/A

