

**Final Site Inspection Work Plan**



**FINAL  
SITE INSPECTION WORK PLAN**

**Upper Burning Ground  
Sierra Army Depot  
Herlong, California**

**April 2007**



**U.S. Army  
Corps of Engineers**





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April 20, 2007

Ms. Young Chong  
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**RE: General Services Administration Schedule Number GS-10F-0168J, Delivery Order No. W91238-05-F-0153; Transmittal of Final Site Inspection Work Plan for the Upper Burning Ground at Sierra Army Depot, California**

Dear Ms. Chong:

Enclosed is one copy of the Final Site Inspection Work Plan for the Upper Burning Ground at Sierra Army Depot, California. We have submitted an additional eight copies of the Final Site Inspection Work Plan, as noted below. All comments that were received on the Draft Site Inspection Work Plan have been addressed. However, any remaining questions on the responses have been requested to be sent to you no later than May 4, 2006 (2 weeks).

If you have any questions or comments concerning this submittal, please call me at (303) 763-8881.

Sincerely,

A handwritten signature in black ink that reads "Gene Barber" with a stylized flourish at the end.

Gene Barber  
Project Manager

Enclosures

cc: Ms. Mary Ellen Maly, USAEC (1 copy)  
Mr. Joe King, USAEC (1 copy)  
Ms. Susan Holliday, SIAD (1 copy)  
Ms. Francesca D'Onofrio, DTSC (1 copy)  
Ms. Lorraine Larson-Hallock, DTSC (1 copy)  
Mr. Jeff Fontana, BLM (1 copy)  
Ms. Betina Johnson, USACE - Huntsville (1 copy)  
Mr. David Ahlborn, Earth Tech (1 copy)

IF: 31198.008.081



# TRANSMITTAL SHEET

US Army Corps  
of Engineers  
Sacramento District

DATE: 20 April 2007

**TO: Sierra Army Depot Stakeholders**  
(see attached)

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**PROJECT:** Site Inspection Under the Military Munitions Response Program  
Final Site Inspection Work Plan  
**CONTRACT NO:** GS-10F-0168J, Delivery Order No. W91238-05-F-0153  
**INSTALLATIONS:** Sierra Army Depot, California

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THE ENCLOSED DOCUMENTS ARE BEING TRANSMITTED TO YOU FOR:

COORDINATION  REVIEW & COMMENTS  INCORPORATION  INFORMATION

**DOCUMENTS ENCLOSED:** - Final Site Inspection Work Plan for the Upper Burning Ground at Sierra Army Depot, California, dated April 2007 by TLI Solutions, Inc.

**REMARKS:** All,

Included is the Final Site Inspection Work Plan for the Upper Burning Ground at Sierra Army Depot for your review. All comments that were received on the Draft Site Inspection Work Plan have been addressed. However, any remaining questions on the responses should be provided to me electronically ([young.s.chong@usace.army.mil](mailto:young.s.chong@usace.army.mil)), or by fax or mail with 14 days (4 May 2007).

Additionally, a compact disc containing the electronic files, which include the text of the final report and all the figures is provided as Appendix E.

Sincerely,

Young Chong

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If you have any questions, please let me know.

**FROM:** Young Chong  
Project Manager

RptTRM\_final WP.doc

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***FINAL SITE INSPECTION WORK PLAN***  
**UPPER BURNING GROUND**  
**SIERRA ARMY DEPOT**  
**HERLONG, CALIFORNIA**

---

**April 2007**

Prepared For:

**U.S. ARMY CORPS OF ENGINEERS, SACRAMENTO DISTRICT**  
1325 J Street  
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Prepared By:

**TLI SOLUTIONS, INC.**  
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***FINAL SITE INSPECTION WORK PLAN***  
**UPPER BURNING GROUND**  
**SIERRA ARMY DEPOT**  
**HERLONG, CALIFORNIA**

General Services Administration Schedule Number: GS-10F-0168J  
Delivery Order No.: W91238-05-F-0153

Reviewed and Approved by:

\_\_\_\_\_  
Gene Barber  
Project Manager  
TLI Solutions, Inc.

\_\_\_\_\_  
Cheryl Mahoney  
Technical Team Lead  
TLI Solutions, Inc.

TLI Solutions, Inc. prepared this report at the direction of the U.S. Army Corps of Engineers (USACE). This document should be used only with the approval of USACE. This report is based, in part, on information provided in other documents and is subject to the limitations and qualifications presented in the referenced documents.

April 2007

**FINAL  
SITE INSPECTION WORK PLAN  
UPPER BURNING GROUND  
SIERRA ARMY DEPOT**

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Appendix B	Technical Project Planning Meeting Notes
Appendix C	Accident Prevention Plan
Appendix D	Ordnance Contact Report
Appendix E	Electronic Files

## ACRONYMS AND ABBREVIATIONS

ACGIH	American Conference of Governmental Industrial Hygienists
AEDB-R	Army Environmental Database-Restoration
AHA	Activity Hazard Analysis
ALARA	As Low As Reasonably Achievable
AMC	Army Materiel Command
AOI	Areas of Interest
APP	Accident Prevention Plan
ARS	Advance Range Survey
BBPs	Blood-Borne Pathogens
bgs	Below Ground Surface
BLM	Bureau of Land Management
BNAs	Base-Neutral Acids
CA	California
CBUs	Cluster Bomb Units
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CIH	Certified Industrial Hygienist
CNS	Central Nervous System
COC	Constituents of Concern
CEHNC	Corps of Engineers – Huntsville Center
CHHSLs	California Human Health Screening Levels
CPR	Cardiopulmonary Resuscitation
CS	O-chlorobenzomalnitrite
CSHP	Corporate Safety and Health Program
CSP	Certified Safety Professional
CTC	Cost to Complete
CTT	Closed, Transferring, and Transferred
CWM	Chemical Warfare Materiel
DA	Demolition Area
DDESb	Department of Defense Explosive Safety Board
DID	Data Item Description
DMM	Discarded Military Munitions
DNT	Dinitrotoluene
DoD	Department of Defense
DQOs	Data Quality Objectives
DRMO	Defense Reutilization Marketing Office
DTSC	Department of Toxic Substances Control
EA	Environmental Assessment
EAP	Employee Assistance Program
EE/CA	Engineering Evaluation/Cost Analysis
EM	Electromagnetic
EMR	Experience Modification Rate
EMT	Emergency Medical Technician
EOD	Explosive Ordnance Disposal
F	Fahrenheit

## **ACRONYMS AND ABBREVIATIONS (continued)**

FSP	Field Sampling Plan
FUDS	Formerly Used Defense Site
FY	Fiscal Year
GPS	Global Positioning System
HAZWOPER	Hazardous Waste Operations and Emergency Response
HBV	Hepatitis B Virus
HE	High Explosive
HIV	Human Immunodeficiency Virus
HMX	Cyclotetramethylenetetranitramine
HRR	Historical Records Review
HTRW	Hazardous, Toxic, and Radioactive Waste
HTW	Hazardous and Toxic Waste
ICMs	Improved Conventional Munitions
IDW	Investigative derived waste
IRP	Installation Restoration Program
ISD	Interim Status Document
kg	Kilograms
LBA	Lower Burning Area
m	Meter
MC	Munitions Constituents
MEC	Munitions and Explosives of Concern
mg	Milligram
MMRP	Military Munitions Response Program
MR	Munitions Response
MSD	Minimum Separation Distance
MSDS	Material Safety Data Sheets
msl	Mean Sea Level
NC	Nitrocellulose
NCP	National Contingency Plan
NFA	No Further Action
NG	Nitroglycerine
NQ	Nitroguanidine
ODA	Old Demolition Area
OE	Ordnance and Explosives
OSHA	Occupational Safety and Health Administration
OZ	Operational Zone
PA	Preliminary Assessment
PDO	Property Disposal Office
PELs	Permissible Exposure Limits
PETN	Pentaerythritoltetranitrate
PM	Project Manager
POC	Point of Contact
POD	Pacific Ocean Division
PPE	Personal Protective Equipment

## **ACRONYMS AND ABBREVIATIONS (concluded)**

PRGs	Preliminary Remedial Goals
QA	Quality Assurance
QC	Quality Control
RCRA	Resource Conservation and Recovery Act
RDX	Cyclotetramethylenetrinitramine
RELS	Recommended Exposure Limits
RFA	RCRA Facility Assessment
RI	Remedial Investigation
RIE	Risk Management
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
SI	Site Inspection
SIAD	Sierra Army Depot
SOP	Standard Operating Procedure
SOW	Scope of Work
SPD	South Pacific Division
STL	Severn Trent Laboratories
STLC	Soluble Threshold Limit Concentrations
SUXOS	Senior Unexploded Ordnance Supervisor
SWMU	Solid Waste Management Unit
SZ	Support Zone
TAL	Target Analyte List
TCL	Target Compound List
TDS	Total Dissolved Solvents
TEC	USACE Topographic Engineering Center
Tetryl	Trinitrophenylmethylnitramine
TTLC	Total Threshold Limit Concentration
TLV	Threshold Limit Values
TNT	Trinitrotoluene
TP	Technical Paper
TPP	Technical Project Planning
UBA	Upper Burning Area
UBG	Upper Burning Ground
U.S.	United States
USACE	United States Army Corps of Engineers
USAEC	United States Army Environmental Command
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey
UXO	Unexploded Ordnance
UXOSO	Unexploded Ordnance Safety Officer
WP	White Phosphorous
WSA	Wilderness Study Area

## 1.0 PROJECT BACKGROUND

This Work Plan has been developed in support of United States Army Corps of Engineers (USACE) and United States Army Environmental Command (USAEC) Military Munitions Response Program (MMRP) site inspection and investigation activities to be conducted at Sierra Army Depot (SIAD), California. Overall coordination of activities described within this Work Plan is provided by USACE Sacramento District. This Work Plan should be used in conjunction with the Final Site Inspection Generic Work Plan, dated October 2004, and revised July 2006, developed for the MMRP and included as Appendix E to this Work Plan.

### 1.1 PURPOSE/SCOPE

The National Defense Authorization Act of Fiscal Year (FY) 2002 and the finalized Department of Defense (DoD) Directive 4715.11, *Environmental and Explosives Safety Management on Department of Defense Active and Inactive Ranges within the United States*, required DoD to maintain an inventory of operational ranges and closed, transferred, and transferring (CTT) ranges, which are known or suspected to contain Munitions and Explosives of Concern (MEC), including unexploded ordnance (UXO) and discarded military munitions (DMM), as well as Munitions Constituents (MC). The Army completed their initial inventory in the following phases:

1. Advanced Range Survey (ARS), Phase 1, was completed in FY2000 in response to Senate Report 106-50. Phase 1 was a data call that requested information on all ranges associated with each United States (U.S.) Army installation through their major command to help estimate the cost associated with range response action.
  - The ARS for SIAD did not identify any CTT ranges.
2. The Operational Range Inventory, Phase 2, was completed in FY2001. Phase 2 of the inventory effort involved collecting data at each U.S. Army installation that potentially contained one or more operational ranges.
  - The Phase 2 Inventory for SIAD was conducted by USAEC through an Army contractor in the Fall of 2001, and the results were documented in an operational range inventory binder dated March 14, 2002, that was submitted to USAEC, U.S. Army Materiel Command (AMC), and SIAD. The Phase 2 binder contained maps that delineated the operational range boundaries. The remainder of the property inside the installation's boundary was designated as other than operational range by default. Phase 2 data relating to the locations of the operational and other than operational range area was provided to the Phase 3 team prior to the visit to SIAD to collect the Phase 3 CTT range data.
3. The CTT (or "other than operational") Range Inventory, Phase 3, was completed in December 2003. Phase 3 inventoried other than operational ranges and sites with UXO, DMM, and MC at each U.S. Army installation.

- The Final CTT Range/Site Inventory Report for SIAD was submitted to USAEC in September 2003 by TLI Solutions, Inc. (formerly TechLaw, Inc.). A site visit to SIAD was conducted during the week of January 13, 2003, to collect the CTT range and site inventory data. While on site, the data collection team reviewed historical records and interviewed appropriate installation personnel. Although seven sites were identified at SIAD during the Phase 3 Range Inventory, the Upper Burning Ground (UBG) was not included at that time. It was assumed that the entire area of the UBG was operating as a permitted munitions disposal site under the Resource Conservation and Recovery Act (RCRA) and therefore, specifically excluded from the MMRP. Since that time, it has been determined that two specific areas within the UBG constitute the permitted disposal area and that the remainder of the site is eligible for the MMRP.

Because of the location of the two RCRA sites within the UBG, this SI Work Plan also serves as the preliminary site investigation for the purpose of RCRA Corrective Action as a result of potential releases from the previous RCRA Open Burn and Open Detonation treatment units. As such, this Work Plan and the work to be performed will comply with the California Code of Regulations (CCR) and the RCRA specifications for Corrective Action.

## **1.2 SITE INSPECTION**

The Phase 3 Range Inventory completed in September 2003 marked the completion of the Preliminary Assessment (PA) Phase of work under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA). The Site Inspection (SI) will constitute the second phase of the CERCLA Process. The SI for the seven Munitions Response (MR) sites at the Main Depot that were identified in the Range Inventory was completed by TLI in August 2005.

The Historical Records Review (HRR) is the initial step in the MMRP SI process. In March 2006, TLI submitted the Draft Historical Records Review report for the UBG to SIAD. The Final HRR for the UBG was submitted to the stakeholders in August 2006, after all comments that were received on the Draft HRR had been addressed.

The purpose of the HRR was to perform a records search to document historical and other known information for the MR sites at SIAD, to supplement the information developed during the Range Inventory, and to support the Technical Project Planning (TPP) process. The information presented in the HRR facilitated decision-making related to those areas where more information is needed to determine the next steps to be taken in the CERCLA process for the MR sites at SIAD. The information developed for each MR site is summarized in Section 2.0 of the Work Plan.

## **1.3 PURPOSE AND SCOPE OF WORK PLAN**

This Work Plan is intended to provide and/or reference all relevant USACE guidance and TLI Standard Operating Procedures (SOPs) necessary to conduct a SI at the MR sites at

SIAD to determine if there is sufficient evidence that UXO, DMM, or MC related to past site activities are present at the sites. The goal of the SI is not to confirm all types of UXO or DMM present, nor define the nature and extent of contamination at a particular site. The primary goal of the SI is to determine whether further investigation of the sites, such as a Remedial Investigation and/or Feasibility Study (RI/FS) will be needed; whether an immediate response is needed; or whether the sites qualify for no further action (NFA) by DoD.

This Work Plan is compliant with and developed in accordance with the requirements of EM-200-1-3, Requirements for the Preparation of Sampling and Analysis Plans (February 2001). Other guidance documents that may be applicable to the SI at SIAD UBG are identified in Section 10.0 of this report and in the Generic Work Plan, provided electronically as Appendix E.

This site-specific Work Plan for SIAD includes the following appendices:

- Appendix A: Field Sampling Plan
- Appendix B: Meeting Notes from the Technical Project Planning Meeting
- Appendix C: Accident Prevention Plan
- Appendix D: Ordnance Contact Form
- Appendix E: Electronic Files

#### **1.4 WORK AUTHORITY**

All work performed under this work plan is under the authority of the USACE Sacramento District as specified in Delivery Order No. W91238-05-F-0153, Modification No. 2.

USACE Sacramento District/South Pacific Division Range Support Center will provide contract management on the project, and U.S. Army Engineering and Support Center Huntsville will provide quality assurance (QA) support on the project.

TLI's Project Manager (PM) for this effort is Mr. Gene Barber (Ph. 303-763-7188; email [gbarber@TLIsolutions.com](mailto:gbarber@TLIsolutions.com)). Mr. Barber is responsible for ensuring that tasks assigned to TLI by USACE are completed on schedule and within established budgets.

Additional key contacts for this program are:

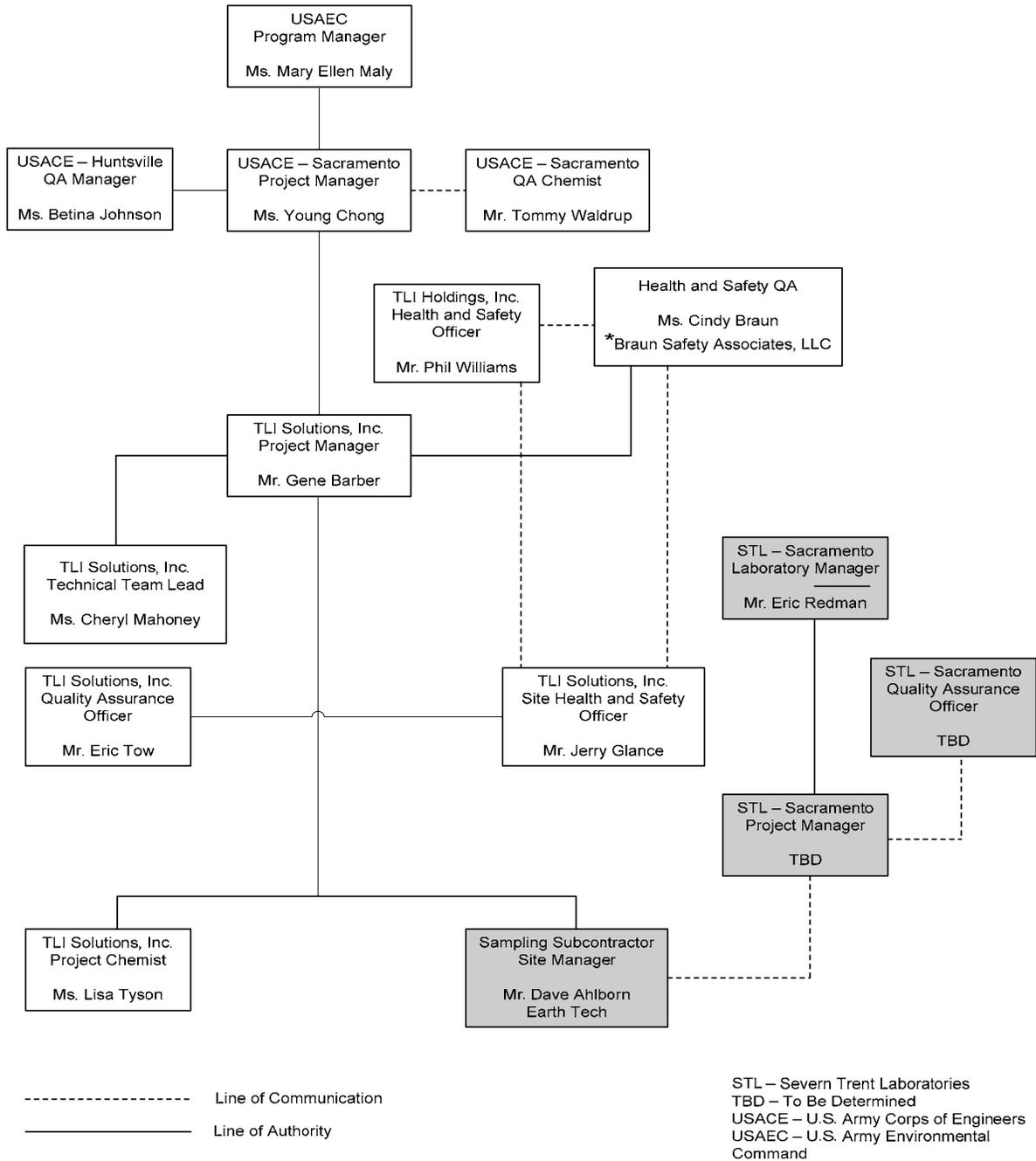
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Ms. Betina Johnson, QA Support, USACE Huntsville District (Ph. 256-895-1238; email [Betina.V.Johnson@hnd01.usace.army.mil](mailto:Betina.V.Johnson@hnd01.usace.army.mil))

Ms. Mary Ellen Maly, Program Manager, USAEC (Ph. 410-436-1511; email [maryellen.h.maly@us.army.mil](mailto:maryellen.h.maly@us.army.mil))

The project organization is presented in Figure 1 and illustrates the lines of authority and communication for the project.

**Figure 1-1  
Project Organization**



\* Braun Safety Associates, LLC will provide third party QA review of the APP to ensure it meets all TLI Holdings requirements and addresses all applicable laws, regulations, and safety protocols

## 2.0 SITE DESCRIPTIONS AND HISTORY

SIAD, historically called Honey Lake Bombing Range, Honey Lake Military Reservation, and Sierra Ordnance Depot, is located in Lassen County in northeastern California; approximately four miles west of the California-Nevada state border and five miles east of U.S. Highway 395 (refer to Figures 2-1 and 2-2 for location). The two largest communities near SIAD are Susanville, California and Reno, Nevada. Susanville, the county seat of Lassen County with population of 17,500, lies 40 miles northwest of SIAD. Reno with a population of 180,480 is 55 miles southeast of SIAD. The town of Herlong and the Sage Flats Area are located near the southern entrance to the Main Depot. SIAD is located within Townships 27 through 29 North and Ranges 15 through 17 East.

Public and private land surrounds the SIAD. The U.S. Forest Service exercises jurisdiction over the Plumas National Forest, west of Highway 395. The Bureau of Land Management (BLM) manages most of the land in the hills to the north and southeast of the SIAD. SIAD is composed of two areas connected by a road that include the Main Depot and the UBG, located one mile northeast of the Main Depot boundary. Throughout this report, the use of the Main Depot represents the main portion of SIAD. The property between the two areas is, with the exception of the connecting road, owned by the BLM.

Seven MMRP eligible sites located within the Main Depot were identified at SIAD during the Army CTT Range Inventory. The SI for the MR sites identified in the Range Inventory was completed by TLI Solutions, Inc., in August 2005. The UBG was later identified as an MMRP eligible site. Two additional sites associated with the UBG were determined to be eligible for the MMRP as a result of the research conducted for the HRR. Table 2-1 identifies the three sites. Their Army Environmental Database-Restoration (AEDB-R) identification numbers will be determined after the SI field work is completed. Of the three identified munitions sites, one is closed and two are transferred sites, meaning they are located off property currently owned or controlled by the Army.

**Table 2-1: MR Sites**

MR Site Name	AEDB-R Number	Acreage
Upper Burning Ground	TBD	3,915
BLM-Administered Public Land	TBD	1,773
Gravel Pit (Stacy)	TBD	41

Subsections 2.1, 2.2, and 2.3 provide descriptions of each of the three MR sites, including history such as types of ordnance used and periods of use, and previous investigations. More detailed information regarding these sites is presented in the Final HRR. The activities to be conducted during the SI field work for each of these sites is provided in the Field Sampling Plan provided as Appendix A.

Site characteristics for each MR site are also provided in the following sections. General physical characteristics for the SIAD installation and the area around UBG, including climate, geology, and demography, are presented in the following paragraphs to alleviate duplication of this information.

SIAD is located in an area with average temperatures ranging from 35° Fahrenheit (F) to 85° F, with a record high of 104° F and a record low of -20° F. The area is arid with average low relative humidity and rainfall. The average annual precipitation is between 5.6 and 11.5 inches per year occurring mainly between October and March. The mean snowfall is 22 inches. The average wind speed is 6.4 miles per hour; general wind pattern is south to northeast with occasional strong winds of up to 90 miles per hour.

SIAD is located at the edge of Amedee Mountain in rugged, relatively barren terrain, covered in parts by brush. The elevation varies between 4,039 feet to 5,479 feet above mean sea level (msl). At least 5,000 feet of unconsolidated basin-fill deposits, semi-consolidated sediments, and volcanic rock overlie granitic bedrock. Granitic bedrock forms the lower impermeable boundary to groundwater flow in the Honey Lake Basin and is 5,000 to 6,000 feet below ground surface (bgs). Volcanic rock over granitic rock in the western Diamond Mountains and southern Fort Sage Mountains creates an important water source and groundwater migration route. Honey Lake Valley, situated across the northwest end of the Walker Lane fault system, has a moderate earthquake history.

## **2.1 THE UPPER BURNING GROUND AND CORRESPONDING AREAS OF INTEREST**

The size of the UBG has increased over time. Property comprising the UBG was acquired during 1942, 1952, and 1958 and is located north of the Main Depot, outside the northeast corner of the installation. As of the date of the December 1979 *Installation Assessment* (1979 IA), written by the US Army Toxic and Hazardous Materials Agency, the site consisted of 1,519 acres. More recent reports indicate that the site encompasses from 3,896 acres to 4,030 acres. The UBG is connected to the Main Depot by Cross/Demolition Road (Figures 2-1, 2-2, and 2-3). Bureau of Land Management land lies between the two properties.

Numerous Areas of Interest (AOIs) were identified in and around the UBG. A list of the AOIs identified and discussed in the HRR is provided in Table 2-2 and depicted on Figure 2-3. Based on information collected for the HRR, several of the AOIs were determined to be ineligible for the MMRP. Two of the AOIs, the Demolition Area and the Lower Burning Area, are RCRA sites that are being addressed under a RCRA Closure Plan. Several other areas were either partially or completely addressed under the Installation Restoration Program (IRP). Table 2-2 provides the MR eligibility determination for each AOI. Those that were determined to be ineligible will not be discussed further in this report. Detailed information regarding the ineligible sites is provided in the HRR.



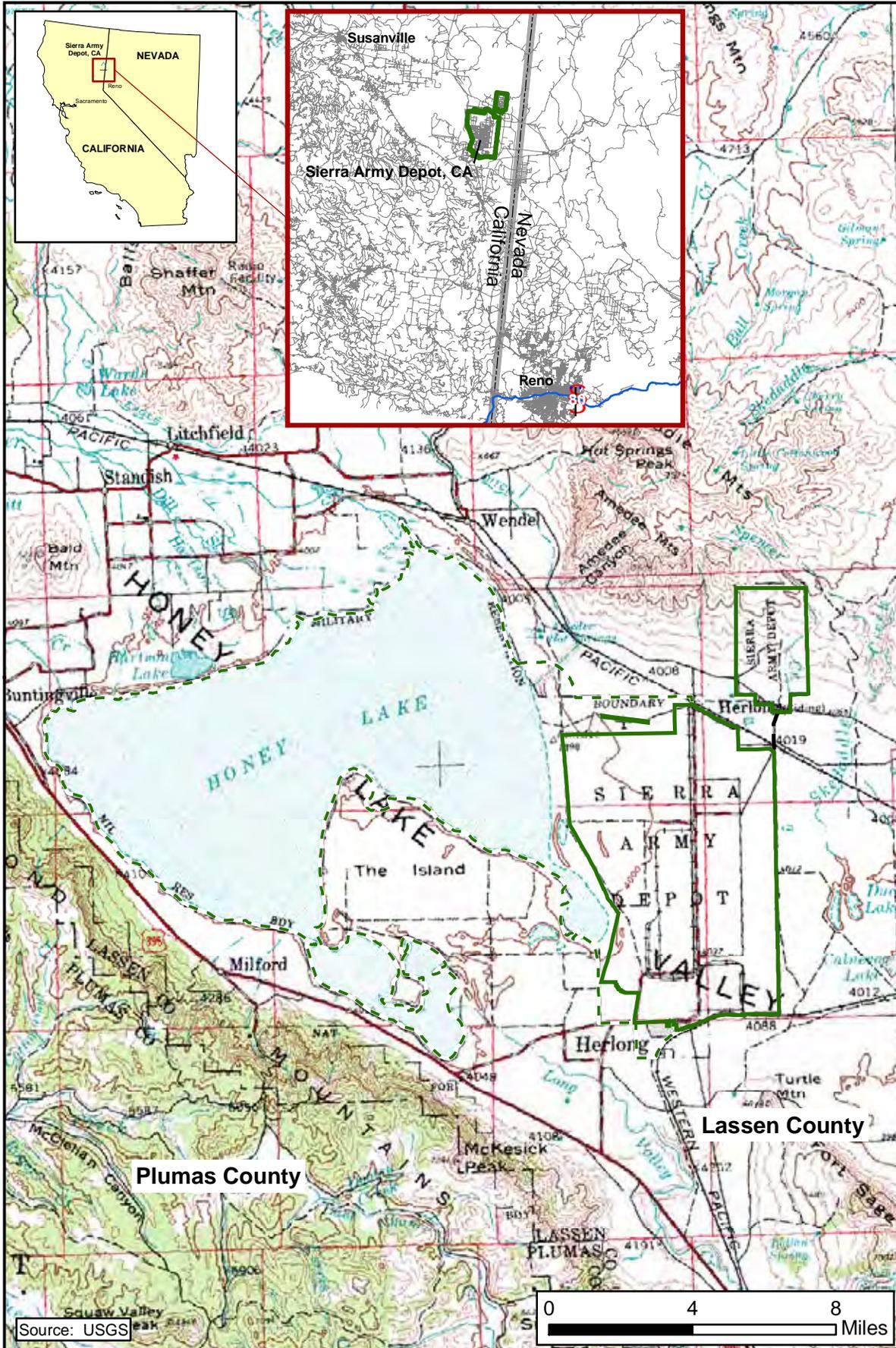
# Site Inspection Work Plan Upper Burning Ground Sierra Army Depot, CA



**Figure 2-1  
Installation Location  
Map**

**Legend**

- Contour Line (200 feet interval)
- Streams
- Roads
- Major Roads
- Water Bodies
- Connecting Road
- Installation Boundary
- BRAC Property



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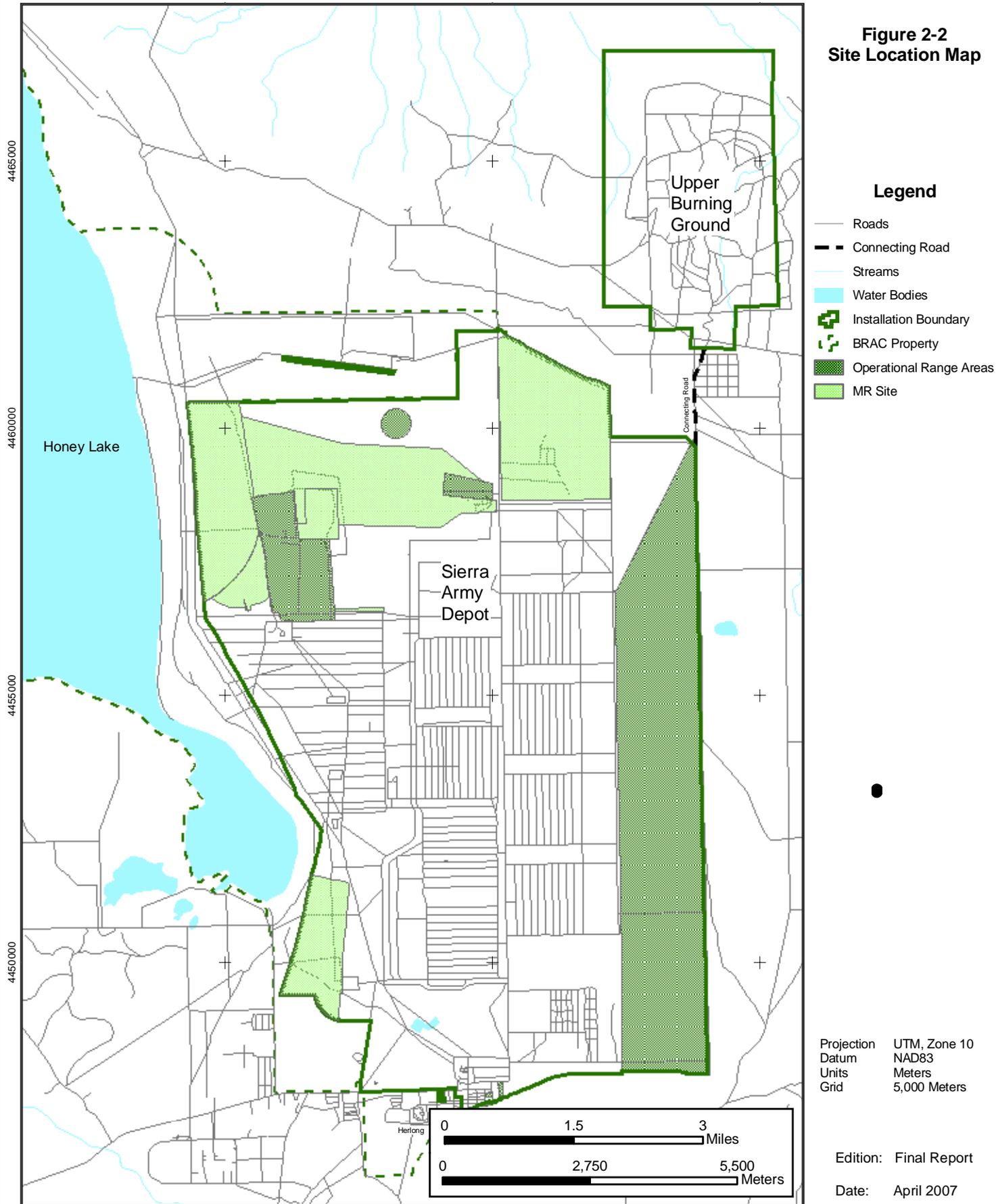
# Site Inspection Work Plan Upper Burning Ground Sierra Army Depot, CA



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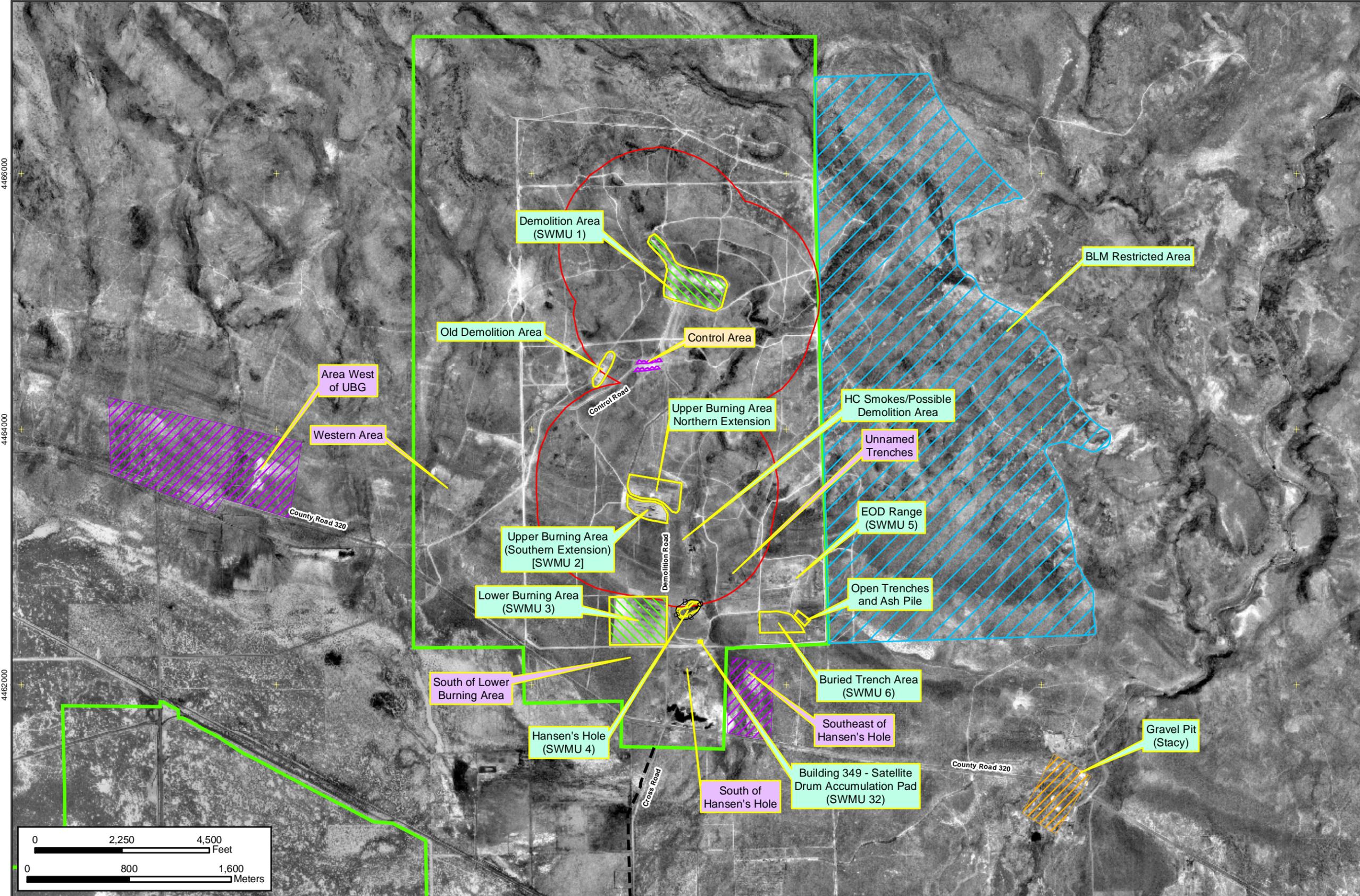


Site Inspection Work Plan  
Upper Burning Ground  
Sierra Army Depot, CA



744000 746000 748000 750000 752000 754000

Figure 2-3  
Areas of Interest



Legend

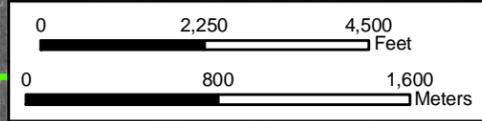
- Connecting Road
- Installation Boundary
- BLM-Administered Public Land (Restricted Use as of July 12, 1990)
- Gravel Pit (Stacy)
- Area to be Ground Truthed during SI Field Work
- Approximate Location of Fence
- Areas of Interest
- RCRA ISD Authority Site
- Control Area
- Safety Zone
- Potential Area of Interest Defined by Aerial Imagery

Aerial Source: USGS  
Aerial Date: July 27, 1993

Projection UTM, Zone 17  
Datum NAD83  
Units Meters  
Grid 2,000 Meters

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**Table 2-2: Areas of Interest Identified in the HRR**

<b>Area of Interest</b>	<b>MR Eligibility</b>
Demolition Area (DA)	This site was operated under the RCRA (Interim Status Document) ISD Authority and is not MR eligible
Lower Burning Area (LBA)	This site was operated under the RCRA ISD Authority and is not MR eligible
Open Trenches and Ash Pile	This site has been fully addressed under the IRP and is not MR eligible
Hansen’s Hole	This site has been fully addressed under the IRP and is not MR eligible
Upper Burning Area (UBA): Southern Extension (SWMU #2) and Northern Extension	A portion of the Southern Extension was addressed under the IRP. The remainder is MR eligible.
Old Demolition Area (ODA)	This site is MR eligible
EOD Range	This site is MR eligible
Buried Trench Area	This site is MR eligible
Building 349-Satelite Drum Accumulation Pad (Bldg 349)	This site is MR eligible
Unnamed trenches	This site is MR eligible
HC Smokes/ Possible Demolition Area	This site is MR eligible
Western Area	This site is MR eligible
South of Hansen’s Hole	This site is MR eligible
Southeast of Hansen’s Hole	This site requires additional evaluation to determine MR eligibility
Area West of UBG	This site requires additional evaluation to determine MR eligibility
Area South of the LBA	This site is MR eligible

It was decided after completion of the Final HRR Report, that the balance of the area located within the UBG that was not previously identified as an AOI should be added to the list of AOIs. This area has been added to avoid confusion regarding the extent of UBG MR Site.

**Table 2-3: Additional Area of Interest**

<b>Area of Interest</b>	<b>MR Eligibility</b>
Remaining Areas Within the UBG	This site is MR eligible

Subsections 2.1.3 through 2.1.8, provide information regarding the known and potential Areas of Interest located within the UBG.

### **2.1.1 Overview of Operations At The Upper Burning Ground**

Although the exact date is unknown, it appears that activities, including burning, munitions-related demolition, and other disposal operations, have occurred at the UBG

since sometime during the late 1940s or early 1950s. Ordnance and other explosive materials were sent to SIAD from all over the world. The 1979 IA lists seven burning and demolition grounds at the UBG, which began operations in the 1940s. It was noted that not all of the areas were in use as of 1979. It was also noted that some areas were seldom used and one was reserved for White Phosphorous (WP) only. The UBG has treated a wide range of munition-related waste materials, including bombs, warheads, rocket motors, propellant charges, grenades, and mines, all of which contain different components (e.g., metal casings, explosive charges, propellants).

Although the first date of use as an open burn/open detonation (OB/OD) area is unknown, in March 1951, a new location was proposed for the demolition site within the UBG. This site does not appear to match the location of any of the known sites, but it may coincide with the location of MEC items found in recent years and ground disturbances identified in aerial photographs. As of August 1951, this proposed area was enclosed by six miles of barbed wire fence. In this 1951 version, the UBG encompassed the majority of the currently identified AOIs, with the exception of the Demolition Area. As justification for construction of the fence, it was noted that the fence was needed to isolate the area to prevent cattle or hunters from trespassing. The danger was stated to be quite prevalent during “explosion periods” and from walking on “duds” or unexploded components after explosion periods. At some point, the fenced area was expanded to include the Active Demolition Area. Currently, there is also a larger fence that encompasses the entire property comprising the UBG, as well as BLM property to the east.

The area comprising the UBG saw significant development between 1951 and 1954 as evidenced by aerial photography from these years. Numerous roads were created and many areas appeared to have man-made disturbances.

The UBG was closed for construction/renovation from 1960-61 and the munitions-related waste materials listed above that were normally treated or destroyed at the UBG were treated or destroyed at the Main Depot.

In the early 1970s, obsolete lead azide was destroyed at the UBG by open-pit demolition. “Empties” from items used in the Surveillance Test Site, located in the Main Depot, were returned at the UBG and the brass was then sent to the Property Disposal Office (PDO). As of 1979, items burned at the UBG included:

WP; High explosives (HE)-filled projectiles; bombs and fragmentation bombs; rocket warheads and inert-loaded items; primers; small arms ammunition; canister mines; various cluster bomb units (CBUs); 8-inch, 155mm, 105mm, and “smaller” munitions; fuzes; grenades, pyrotechnic items; and other HE-filled munitions.

Detonation and burning limits varied depending on the items being destroyed and the location, but generally, there was a total burning limit of 6,805-kilograms (kg) at the UBG and a limit per detonation of 4,536 kg. In 1961 there was one shot of 11,340 kg and

in 1978, a series of twenty 5,716 kg shots were made. WP shells were burned on site from 1961 to 1981. In 1976, it was noted that the detonations at the UBG were conducted on an average of 12 times per month with no more than five detonations per day and each detonation not exceeding 10,000 pounds (4,536 kg).

From 1980 to 2003, SIAD operated its OB/OD operations as an “interim status” facility under RCRA and applied for a RCRA permit in the early 1990s. That application was under various states of review, until SIAD officially withdrew the application in May 2003. Since September 2001, SIAD has used the OB/OD only in emergency situations or for national security reasons. According to Ms. Susan Holliday, SIAD, the last detonation under interim status was in September 2001. Mr. Kirk Bausman, SIAD, stated that several emergency detonations have taken place utilizing EOD since that time. It was determined that two areas in the UBG, consisting of approximately 85 acres, were operated under authority of a RCRA Interim Status Document (ISD) Authority and are not eligible for the MMRP. The sites are the Lower Burning Area (35 acres) and the Active Demolition Area (50 acres). The MMRP specifically excludes permitted disposal sites; therefore, these two areas are precluded from MMRP eligibility. It should be noted that even though the sites are not eligible for the MMRP, information regarding operations at the two RCRA sites is included below because it is possible that items used at these sites were kicked out during the OB/OD process into the surrounding areas.

The amount of munitions-related waste materials SIAD treated varied from year to year. Until September 2001, the installation’s waste treatment permit allowed SIAD to destroy 30,000 tons of munitions-related waste material in OB/OD operations per year, but the actual amounts of munitions-related waste treated were typically lower. The last detonation was in September 2001. In a settlement agreement filed in 2002, the Army agreed to discontinue use of the OB/OD areas, except in emergency or national security situations. In January 10, 2004, the DTSC terminated SIAD’s Interim Status authority for the operation of the open burn and open detonation treatment units (the DA and LBA). Because of the termination, SIAD was required to close the units and apply for an emergency permit on a case-by-case basis for OB/OD activities.

### **2.1.2 Site Characteristics at the Upper Burning Ground**

The following sections include a description of the environment of the UBG MR site based on existing knowledge.

#### **2.1.2.1 *Surface Water Features/Hydrology***

The area is drained by Spencer Creek and two unnamed intermittent creeks adjacent to Spencer Creek on the west. Drainage basin soils have very high runoff potential and fairly steep slopes in the upper reaches; runoff flows off-post, via Spencer Creek, into the vicinity of Herlong railroad siding. Runoff of the entire area could occur during high intensity rain events and the flow could cross the UBG southern boundary onto either the northeast corner of the Main Depot or immediately adjacent lands. There is a six foot deep, manmade drainage channel along the northern boundary of the Northern Extension

UBA. There are also small drainage channels along the southern perimeter of Southern Extension UBA.

### **2.1.2.2 *Geology***

Madeline very stony loam in hydrologic Group D covers the central and northern 60 percent of the UBG, predominately above the 1,341-m elevation contour. The soil thickness is not uniform due to basaltic rock outcroppings. Group D soils predominate in the Spencer Creek and both unnamed creeks' drainage basins. Group D soils have very slow infiltration and water transmission rates. The soil is primarily clay or claypan near the surface, with shallow soils over nearly impervious materials.

Group B soils located on alluvial fans cover approximately 40 percent of the southern portion of the UBG, predominately below the 4,400 foot contour [with scattered Group A solids at the lower elevations (4,101 foot MSL contour and below)]. Group B soils are composed of cobbly alluvial sand; Liebermann sandy loam and loam; Liebermann-Herlong complex; and Stacy sandy loam. The subsurface material is moderately permeable basalt and near shore lake deposits, with alluvium, cobbles, and gravel in a sand/silt matrix, silts and clay. There is a moderate infiltration and water transmission rate. A severe soil erosion hazard lies in the southwestern and southeastern portions of the UBG.

Due to the presence of basaltic outcrops, the northern two-thirds of the UBG lies in the aquifer recharge area. Natural groundwater recharge occurs through infiltration of precipitation in upland areas and infiltration of stream flow in alluvial fan areas. The water level gradient in the southern portion of the UBG generally tilts to the south/southwest towards Honey Lake. The gradient is influenced by private wells on a farm between UBG and the Main Depot. When pumping, the direction of flow is towards the wells. The depth to groundwater in the southern portion of the UBG ranges between 18 to 80 feet bgs. The upper several hundred feet of alluvium and relatively flat gradient impede groundwater movement. The groundwater wells in this area reportedly contain hazardous concentrations of total dissolved solids (TDS), boron, fluoride, and nitrate. Isolated "pockets" of water have been encountered in excavations at the UBG.

### **2.1.2.3 *Security, Buildings, Utilities, and Other Structures***

The Main Depot and the majority of the UBG are fenced. Some of the sites within the UBG are also fenced. There is a locked security gate at the entrance to the UBG on Demolition Road. All visitors must check in with the security office. It appears that there is a buried cable located along Control Area Road. There is a break building in the south central portion of the UBG and structures related to the Control Area in the central portion of the UBG. These structures and an above ground storage tank located west of Demolition Road, between the Upper Burning Area and the Lower Burning Area, are visible on historic aerial photographs.

#### **2.1.2.4 Land Use**

The UBG is currently available for emergency munitions detonation only. The UBG is located within the Wendell Planning Area and the largest land use category is grazing/open space, with approximately one-third devoted to military use. BLM property and recreational areas are located adjacent to the site.

#### **2.1.2.5 Cultural, Natural, and Archaeological Resources**

No cultural, archaeological, or historical resources are currently known to be associated with the UBG. Endangered species associated with Spencer Creek include the bald eagle, the Modoc sucker, and the American peregrine falcon. Threatened species include the northern spotted owl. Mammal species of concern include the pygmy rabbit, pale Townsend's big-eared bat, spotted bat, small-footed myotis bat, long-eared myotis bat, fringed myotis bat, long-legged myotis bat, and Yuma bat. Bird species of concern include the tricolored blackbird, ferruginous hawk, American peregrine falcon, and the bank swallow. The northern sagebrush lizard is also a Species of Concern at Spencer Creek.

#### **2.1.3 Old Demolition Area**

The ODA encompasses approximately six acres located within the UBG, southwest of the Demolition Area, between West Canyon and Control Area Roads (Figure 2-3).

##### **2.1.3.1 Site History of the Old Demolition Area**

According to the 1992 *Group II Remedial Investigation Feasibility Study, Final Remedial Investigation Report (RI)* (1992 RI) and the 2001 *Draft Final Upper Burning Ground Follow-on Remedial Investigation* (2001 Follow-on RI), white phosphorous and other smoke-producing ordnance were demilitarized at the ODA between 1961 and 1981.

The ODA consists of six semi-elliptical depressions (also referred to as craters) excavated horizontally into the side of a low-lying hill. The depressions form a northeast to southwest trending alignment. A shallow drainage channel located approximately 150 feet northwest of the ODA parallels the trending alignment. The average depression measures about 50-feet wide by 60-feet long.

The ODA is first represented as six rectangular shaped areas that are darker than the surrounding disturbed areas on a 1966 aerial. The area exhibits more ground scarring in the 1970 aerial that becomes more localized in 1984 and 1990 aerials.

##### **2.1.3.2 Previous Investigations at the Old Demolition Area**

Table 2-4 provides a summary of the previous investigations conducted at the ODA. A more detailed description of the previous investigations is provided in the Final HRR dated August 2006.

**Table 2-4: OLD DEMOLITION AREA**

**Historic Use:** Demil of WP and other smoke producing ordnance

<b>Program</b>	<b>MC Sampling</b>	<b>MEC</b>	<b>Findings</b>	<b>Conclusions</b>
<b>IR</b>	<p>(1981) - 14 surface soil samples collected from the demolition craters and the adjacent drainage</p> <p>(1992) - 12 composite soil samples collected from each of the 6 demolition pits. Samples were composited from 5 locations and from 2 depth intervals, 0-6 and 6-12 inches.</p> <p>(1999) - surface- and subsurface-soil samples were taken at 4 locations to a depth of 24 inches.</p> <p>- Metals in soil and sediment were compared with their respective California Title 22 Total Threshold Limit Concentration (TTLC) values.</p>	<p>- UXO clearance incidental to IRP work</p> <p>(1999) Metal debris was encountered at several sample locations throughout the borehole depth</p>	<p>(1981) - Extractable arsenic was the only metal found above the detection limit, but it did not exceed the RCRA hazardous criteria</p> <p>- Low concentrations of explosives were found in 4 of the 14 samples</p> <p>- metal concentrations less than PRGs</p> <p>(1992) Lead, beryllium, mercury, and antimony exceeded background levels in all 12 samples.</p> <p>-2,4,6- TNT was the only explosive compound detected</p> <p>(1999) - Copper in soil exceeded its TTLC value, and soluble concentrations of lead exceeded the Soluble Threshold Limit Concentrations (STLCs)</p> <p>- Cadmium, lead, and zinc from sediment samples exceeded STLCs</p> <p>- Explosives in soil included 2,4,6-TNT, 2,4-DNT, and RDX</p> <p>- 7 explosives were detected in 5 sediment samples</p>	<p>- According to the 2003 UBG FS, metal concentrations in ODA soil samples were less than the PRGs for arsenic, chromium VI, and lead; therefore, no remedial activities were recommended for the site.</p>
<b>MR</b>	<p>- Analysis of metals and explosives was completed under the IRP</p>	<p>- Determination regarding existence of MEC is still required</p>	<p>- N/A</p>	<p>- Soil sampling has been addressed by the IRP</p> <p>- Qualifies for the MMRP to address MEC</p>

### 2.1.3.3 *Summary of MEC and MC*

Based on the available information, the types of MEC associated with the Old Demolition Area may include pyrotechnics, white phosphorus, and smoke producing ordnance.

MC associated with this site may include:

- Aluminum
- Aluminum Powder
- Ammonium Nitrate
- Ammonium Perchlorate
- Cellulose Nitrate
- Chromium
- Copper
- Dinitrotoluene (DNT)
- Hexachloroethane
- Cyclotetramethylene Tetranitramine (HMX)
- Iron
- Lead Thiocyanate (in primer mix for simulator)
- Magnesium Powder
- Nitrocellulose
- Nitroglycerin (NG)
- PETN
- Phosphorus
- Potassium Chlorate
- Potassium Nitrate
- RDX
- Red Phosphorus (part of simulator)
- Silicon
- Sodium Nitrate
- Strontium Nitrate
- Sulfur
- Tetranitrocarbazole
- Tetryl
- TNT
- WP
- Zinc
- Zinc Oxide
- Zirconium Hydride

### 2.1.4 **Upper Burning Area (UBA) – Northern and Southern Extensions**

The Upper Burning Area is divided by Demolition Road into the Northern and Southern Extensions and is located to the south and downslope from the Demolition Area and southeast of the Old Demolition Area. The Northern Extension consists of approximately 30 acres bordered on the west and south by the paved Demolition Road. The Southern Extension encompasses 12 acres and is bordered on the east and north by Demolition Road. Refer to Figure 2-3 for the site location.

#### 2.1.4.1 *Site History of the UBA – Northern and Southern Extensions*

The UBA (Southern Extension) was active for at least 50 years prior to 1992. In reports on the area written before the 1992 RI, the UBA was thought to include only the area presently known as the Southern Extension. The 1992 RI is the first report to identify the Northern Extension, which it refers to as the Area North of the UBA. According to the 1992 RI, metal debris generated during demilitarization was transported and flashed in the UBA to remove any remaining explosive residue. Although these areas were named as two parts of the UBA, it does not appear that the two sections ever operated as one whole site.

Based on the Topographic Engineering Center (TEC) evaluation of aerial photographs, the UBA first appears in the 1954 aerial as ground scarring in the Northern Extension and as approximately eight pits in the Southern Extension. The 1970 aerial contained

evidence of approximately five pits in the Southern Extension, and east-west trending scarring in the Northern Extension. The 1984 aerial depicted ground scarring at the western edge of the boundary between the Northern and Southern Extensions. In the 1993 aerial, scarring is more distinct. Both the Northern and Southern Extensions may have been used as OB/OD areas, which could have caused the pits and scarring. The operational histories and previous investigations for the Northern and Southern Extensions are provided below.

#### **2.1.4.2 Site History - Northern Extension of the UBA**

The extent of the operational period for the Northern Extension is not clearly defined. According to 1992 RI, the area was reported to contain buried trenches where all types of small detonations and large burns, including primers, missile motors, fuses, boxes, and packing material occurred prior to 1966 (Figure 2-4). The number and areal distribution of the trenches was unknown. After burning/demolition activities were completed, the metals were reclaimed and the ash was buried in the trenches. The trenches were then backfilled with native soil.

During field activities conducted as part of the 2001 Follow-on RI, several 105mm projectiles were identified by the Explosive Ordnance Disposal (EOD) team near the center of the Northern Extension. They were then removed by Army personnel to provide safe access for the field teams.

Surface features associated with the Northern Extension include a manmade storm drainage channel that trends northwest to southeast and crosses the northeastern corner of the Northern Extension and a dirt firebreak road that traverses the northern, eastern, and southeastern perimeter. The southwestern and western perimeter is bordered by Demolition (Demo) Road. Large surface metal and shallow subsurface metal features were noted during the geophysical survey (discussed below). There is also a northwest-southeast trending manmade ridge approximately 10-feet to 20-feet wide, 2-feet to 4-feet high, and 700-feet in length, consisting of boulders and surface soil.

#### **2.1.4.3 Site History - Southern Extension of the UBA**

Although the precise dates of operation are unknown, it is estimated that this site was operational from the early 1940s until 1999. According to the 1992 RI, the site was used since the early 1940s. However, the 1988 *RCRA Facility Assessment* (1988 RFA) notes that this area was in operation from 1950 to 1981. In the TEC aerial photographs, it appears that there was some disturbance in the area in 1954. Earlier photographs do not cover the relevant area. SWMU #2, a RCRA-regulated area, approximately 300-feet by 1,000 feet in size, is located within the boundaries of the Southern Extension (Figure 2-5).

According to the June 2005 Draft *Final Three Sites Record of Decision/Remedial Action Plan* (2005 ROD), the Southern Extension was used to clean explosive/fuel residues from bulk metal by open burning from 1972 to 1999. The 1992 RI describes a 50-year history that included burning primers, fuses, propellants, pyrotechnics, flare materials, and high



# Site Inspection Work Plan Upper Burning Ground Sierra Army Depot, CA



**Figure 2-4  
Previous  
Investigations at the  
Upper Burning  
Area Northern  
Extension**

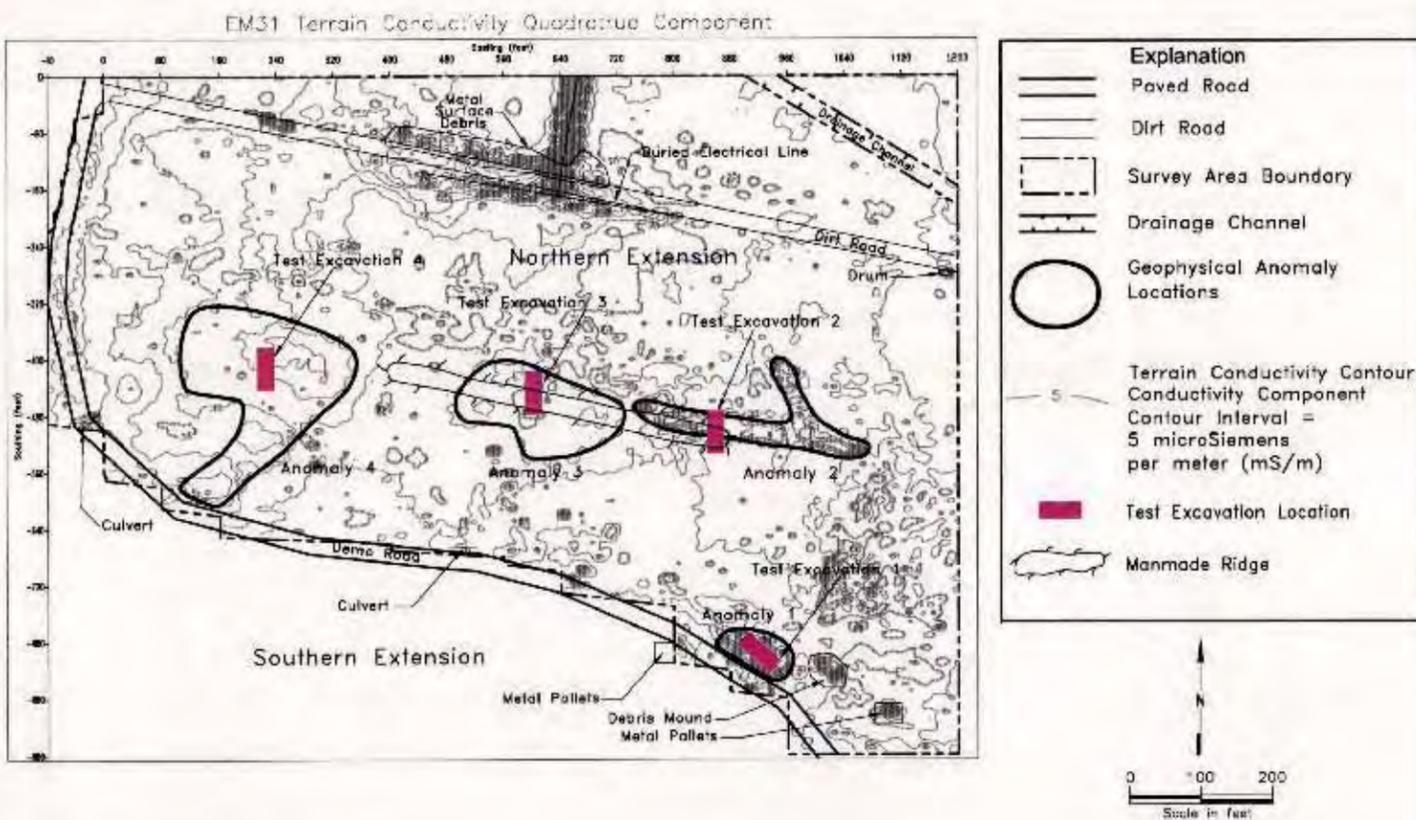


**Legend**

- Site Feature
- Upper Burning Area Northern Extension (defined by Harding Lawson Associates)
- Installation Boundary

Geophysical Data for the  
Upper Burning Area Northern Extension  
provided by Mactec

**Upper Burning Area  
Northern Extension**

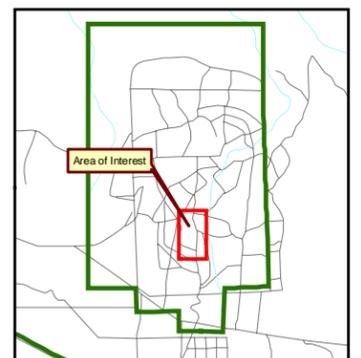


Sources:  
SIAD003484  
SIAD004593

Aerial Source: Google Earth  
Aerial Date: 2000

Edition: Final Report

Date: April 2007





# Site Inspection Work Plan Upper Burning Ground Sierra Army Depot, CA



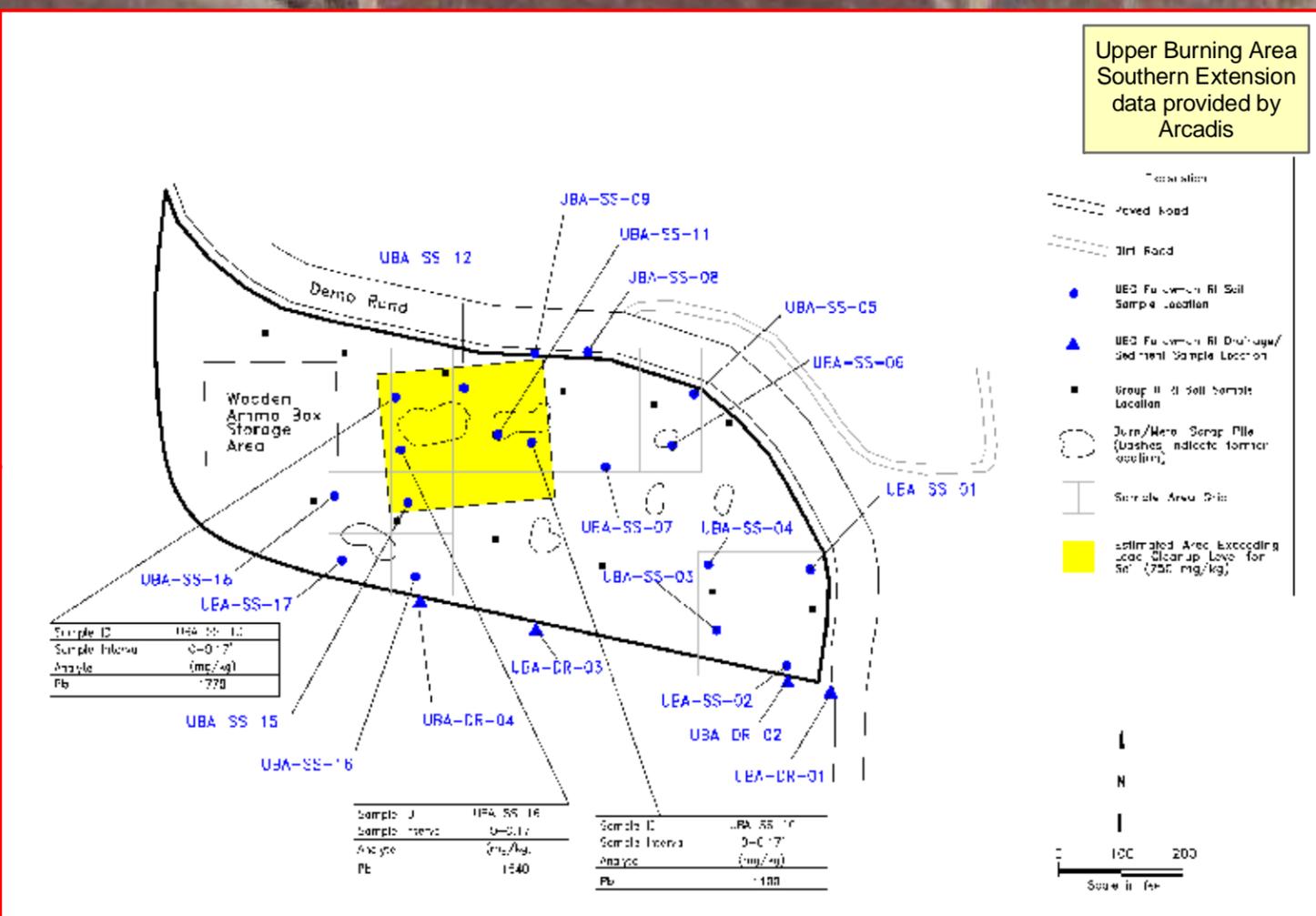
**Figure 2-5  
Previous  
Investigations at  
the Upper Burning  
Area Southern  
Extension**



### Legend

- Installation Boundary
- Upper Burning Area Southern Extension (defined by Harding Lawson Associates)

Upper Burning Area Southern Extension

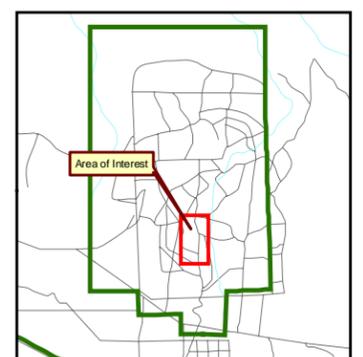


Sources:  
SIAD003484  
SIAD004593  
SIAD005662

Aerial Source: Google Earth  
Aerial Date: 2000

Edition: Final Report

Date: April 2007



explosives that could not be detonated. The site was also used as an open demolition area for small detonations of less than 10 pounds. The 1988 RFA specifies that between 1950 and 1981, operations at SWMU #2 involved open burning of propellants and white phosphorous. Generally, there was a 15,000-pound-per operation limit on burning. The residue from burning operations was removed to the Lower Burning Grounds on the Main Depot for disposal.

As of 1992, the site was used to flash metals before they were containerized and bulk shipped to the Defense Reutilization Marketing Office (DRMO). Flashing was performed on the ground by placing the metal debris in the center of a large bed made of wooden ammunition boxes, which were then ignited.

**2.1.4.4 Previous Investigations at the Northern Extension of the UBA**

Table 2-5 provides a summary of the previous investigations conducted at the Northern Extension of the UBG. A more detailed description of the previous investigations is provided in the Final HRR dated August 2006.

<b>Table 2-5: NORTHERN EXTENSION OF THE UBA</b>				
<b>Historic Use</b>				
<ul style="list-style-type: none"> <li>- Buried trenches where all types of small detonations and large burns, including primers, missile motors, and fuses, occurred prior to 1966</li> <li>- After burning/demolition activities were completed, metals were reclaimed and the ash was buried in the trenches.</li> <li>-Trenches were backfilled with native soil</li> </ul>				
<b>Program</b>	<b>MC Sampling</b>	<b>MEC</b>	<b>Findings</b>	<b>Conclusions</b>
<b>IR</b>	(1999)- Soil samples were collected from each test excavation. Soil and sediment samples were gathered to test for total and soluble metals, as well as explosives.	(2001) - surface feature mapping, UXO clearance for a geophysical survey, geophysical survey, UXO clearance for each sample location, test excavations, soil and drainage/sediment sample collection, and a land survey of the sample locations - Two electromagnetic (EM) geophysical surveys were conducted to identify if there were buried disposal or burn trenches/pits	(1999) - All metal concentrations in both soil and sediment samples were less than their respective TTLC values. Lead exceeded the STLC value - metal concentrations less than preliminary remediation goals (PRGs)  - Six explosives were detected in randomly collected soil samples, soil samples of opportunity, or test excavation soil	- Soil containing elevated metals or explosive concentrations did not appear to be moving into drainage areas from the Northern Extension. Metal concentrations in soil samples were less than their PRGs for arsenic, chromium VI, and lead, and no remedial activities were recommended for the Northern Extension - Four anomalous areas were identified, the anomalies were excavated; metal fragments were containerized and removed by SIAD

Program	MC Sampling	MEC	Findings	Conclusions
		- Metal fragments were identified by the Ordnance and Explosives (OE) team to be non-intact OE debris	samples (2,4,6-TNT, 2,4-DNT, RDX, and Tetryl)	personnel to the DRMO for decontamination and recycling
MR	- N/A	- N/A	- N/A	- Qualifies for MMRP - Metals were completely addressed under the IRP

#### 2.1.4.5 Previous Investigations at the Southern Extension of the UBA

Table 2-6 provides a summary of the previous investigations conducted at the Southern Extension of the UBA. A more detailed description of the previous investigations is provided in the Final HRR dated August 2006.

#### 2.1.4.6 Summary of MEC and MC

Based on the available information, the types of MEC associated with the Upper Burning Area – Northern and Southern Extensions site may include:

- Pyrotechnics
  - Flare materials
  - Pyrotechnics
  - white phosphorus and white phosphorus shells
- 105mm projectiles

Based on the historic use of the site, it is also possible that the following items may have been used at this site:

- Bulk High Explosives, and Demolition Materials
  - High-explosive components and devices
  - Bulk plastic explosives removed from anti-tank mines
  - Charge Demolition, Composition C4
  - Charge Assembly, Demolition M183
  - Cap Electric Blasting M6
  - Cap Non-Electric Blasting M7
  - Fuse Blasting Time
  - Igniter, Fuse Blasting Time
  - Cord Detonating
  - Miscellaneous priming and initiating devices - type unknown
- Bulk Low Explosives
  - Artillery and mortar propellant charges and increment bags

**Table 2-6: SOUTHERN EXTENSION OF THE UBA**

<b>Historic Use</b>				
<p><u>Open burning</u> -to clean explosive/fuel residues from bulk metal                      - primers, fuses, propellants, pyrotechnics, flare materials, and high explosives. propellants and WP                      - Generally, a 15,000-pound-per operation limit on burning                      - used to flash metals before they were containerized</p> <p><u>Open demolition</u> -for small detonations of less than 10 pounds</p>				
<b>Program</b>	<b>MC Sampling</b>	<b>MEC</b>	<b>Findings</b>	<b>Conclusions</b>
IR	(1992) - Surface soil samples tested for CA Title 22 metals and explosives (2001) - Soil samples at 18 locations and 8 samples at 4 drainage sample locations -No explosives detected	(2001) - Fragments of metal shell casings, nails, and other unidentified metal debris were identified and moved during sampling - 2005 ROD selected a remedy for the Southern Extension that included ordnance explosives/unexploded ordnance clearance	(1991) - copper exceeded the STLC value (1992) - 17 metals were detected in excess of background levels Lead above background in 100 % of surface samples and in 92 % of samples from the near-surface. - Explosive compounds in 11 of the 24 soil samples (2001) - Total metal concentrations in the 36 samples were generally less than their respective TTLC values. - 9 explosives were infrequently detected at concentrations less than 1 mg/kg with the exception of Tetryl - RDX in 2 subsurface samples, but not in surface soil. Tetryl was found in 4 samples - Total and soluble metal concentrations in the eight sediment samples were less than their respective TTLC and STLC values. Lead, zinc, and cadmium exceeded STLC values at respective maximum concentrations of 65.7 mg/L; 3,200 mg/L; and 1.16 mg/L	(2001) - Testing supported the conclusion that little vertical migration of metals from the surface to deeper intervals had occurred. Also concluded that there did not appear to be migration of elevated concentrations into drainage areas - The 2003 UBG FS recommended soil removal - Per the Three Sites ROD (signed 2005), a portion of the area was remediated by ARCADIS in 2005/2006 (Figure 2-5). - Per the ROD, lead-contaminated soil was excavated to approximately 1-foot below ground surface and placed in an approximately 1-acre CAMU in Hansen’s Hole
MR	- N/A	- N/A	- N/A	- The remainder of the site qualifies for MMRP

- Bulk Propellants
  - Solid Rocket Propellants
  - Propellant munitions/components
  - Liquid Propellants

MC associated with this site may include:

- |                        |  |                                      |
|------------------------|--|--------------------------------------|
| • Aluminum Powder      | • Lead Styphnate                                 | • Potassium Perchlorate              |
| • Aluminum             | • Lead Thiocyanate (in primer mix for simulator) | • RDX                                |
| • Ammonium Nitrate     | • Lead-Sodium Dinitro Ortho                      | • Red Phosphorus (part of simulator) |
| • Ammonium Perchlorate | • Magnesium Powder                               | • Silicon                            |
| • Barium Nitrate       | • Nitrocellulose (NC)                            | • Sodium Nitrate                     |
| • Brass                | • NG   | • Strontium Nitrate                  |
| • Cellulose Nitrate    | • Nitroguanidine (NQ)                            | • Sulfur                             |
| • Chromium             | • Pentaerythritoltetranitrate (PETN)             | • Tetranitrocarbazole                |
| • Copper               | • Phosphorus                                     | • Tetratol                           |
| • Diazodinitrophenol   | • Picric Acid                                    | • Tetryl                             |
| • Diphenylamine        | • Potassium Chlorate                             | • Tin                                |
| • DNT                  | • Potassium Nitrate                              | • TNT                                |
| • Ethyl Centralite     |  | • Tritonal Aluminum                  |
| • Hexachloroethane     |  | • Zinc Oxide                         |
| • HMX                  |  | • Zinc                               |
| • Iron                 |  | • Zirconium Hydride                  |
| • Lead Azide           |  |                                      |

#### **2.1.4.7 Site Recommendations**

The portion of this site that was addressed under the IRP, as described in a 2006 Action Summary memorandum provided by ARCADIS G&M, Inc., is considered response complete and will not be addressed here. The remainder of the site is eligible for the MMRP and will be addressed by this Work Plan.

#### **2.1.5 EOD Range**

The EOD Range is located north of the Open Trenches and Ash Pile Site, near the eastern boundary of the UBG (Figure 2-3).

##### **2.1.5.1 Site History of the EOD Range**

The EOD Unit, operating under the RCRA Interim Status Document Authority, used the EOD Range, also known as SWMU # 5 for emergency detonations and burning of munitions. The unit was unlined, and covered with native soils and shrubs. The EOD

Group was also allowed to bring live munitions to this area from offsite to detonate or disarm. Detonation limits varied, but were generally 10,000 pounds per operation on detonations. Periodically, metal debris from blasting operations was collected and brought to the DRMO for disposal.

According to the TEC report, visible ground disturbances that were identified as a possible mine, were apparent in a 1954 aerial photograph. Although the specific dates of operation are unknown, the site was closed for construction/renovation from 1961 to 1962, at which time the munitions-related waste materials were treated or destroyed at the main depot. Between 1970 and 1981, the ground scarring visible in the aerial photographs appeared to have increased. There are disturbed areas that may have been pits present on the 1970 photograph. Dark areas that might have been pits were present in 1990. The site was operational as of 1988.

According to an October 7, 2004 treatment report, emergency treatment of ten M117A 750-pound bombs was conducted on September 23, 2004. They were taken from an open storage area in the Main Depot to the “Old EOD Range” at the UBG. All bombs and donor material were consumed by the detonation and no residue was visible. According to Mr. Bausman, this occurred at the Demolition Grounds, not the Old EOD Range.

When interviewed on January 13, 2006, Former 1<sup>st</sup> SGT Joe Ritz stated that operations at the EOD Range had already been established prior to his arrival at SIAD in 1983, and to his knowledge, they continued after he left SIAD in 1991. In a conversation with Mr. Dan Galbreath, Chief of Explosive Operations Division, on the same date, Mr. Galbreath established that operations ceased at the location in approximately 1994.

Mr. Ritz described the EOD Range as an area consisting of approximately 100 square yards located approximately one-quarter mile east of the Building 349, Satellite Drum Accumulation Pad, or what he called the “Break Building”. The “safe area” was 100 yards south of the demolition/burn area behind railroad ties and a dirt bunker. Although the EOD Range discussed in this section is farther to the east than Mr. Ritz described, based on his description of the area, an assumption was made that the two are the same.

Mr. Ritz stated that disposal activities included everything that the Depot had in storage, as well as what he assumed were naval shipments, as water released from the railcars as they were opened. Munitions included MK82s; 250, 750, and 2,000 lb. bombs; submunitions; and naval rounds with "yellow D". They burned small arms up to .50 caliber with dunnage and diesel fuel in pits. As discussed above, it does appear that there may have been pits present in the 1970 and 1990 aerial photographs. Donor material included flat, block, and military TNT, C4, bombs, and land mines. Once a year the National Guard would bulldoze the area to level out pits that were between 15 and 20 feet deep.

There have been no known previous investigations at this site.

### **2.1.5.2 Summary of MEC and MC**

Specific munitions types are unknown. Detonations were limited to 10,000 pounds per operation. It is assumed that any of the previously noted munitions may have been detonated here.

### **2.1.6 Buried Trench Area**

The Buried Trench Area lies in a large graded area of approximately 11.65 acres located in the southeast corner of the UBG, east of the Open Trenches and Ash Pile and east of Hansen's Hole. The Buried Trench Area is separated from the Open Trenches by a dirt road. Approximately 750 feet of open area separates the Buried Trench Area from the EOD Range on the north.

#### **2.1.6.1 Site History of the Buried Trench Area**

The Buried Trench Area encompasses SWMU #6, a RCRA-regulated site under the ISD Authority. This site was operated under the Interim Status Document and will be addressed as a corrective action. According to the 1988 RFA, operations in SWMU #6 began in 1946 and ceased in May 1988. As of the date of the 1988 RFA, the three most recently active trenches measured 12-feet by 90-feet and were 10-feet deep. It was noted that other trenches might have been located in other areas outside of the most recent trench activity (Figures 2-3 and 2-6).

According to the 1992 RI, as many as fifteen buried trenches are located at this site. Activities in the buried trenches primarily involved burning pyrotechnics and small detonations of less than 10 pounds of material. Materials burned in the unlined trenches from various demilitarization operations included excess powder and munitions-related waste products such as burn propellants, primers, excess powder, fuses, and explosive packaging materials. Ashes, metal slag, and burned debris may have remained in the trench following burns and were the primary byproducts. While the metal was periodically recovered for shipment to the DRMO, the ashes remained in the bottom of the trench. Trenches were filled in when the sides became unstable, and a new trench was excavated adjacent to the old one.

All open trenches in the area were filled and graded between the time operations ceased in May 1988 and the August 1988 RFA was completed. One month prior to the visual site inspection for the 1988 RFA, scrap metal remained to be taken to DRMO for recycling.

It was noted that the burning trenches were dug into the subsurface sediments, and that those sediments appeared to be considerably more permeable than the surface soils. During an onsite reassessment in March 1983, the surface of the undisturbed areas was flooded while the pits were dry.

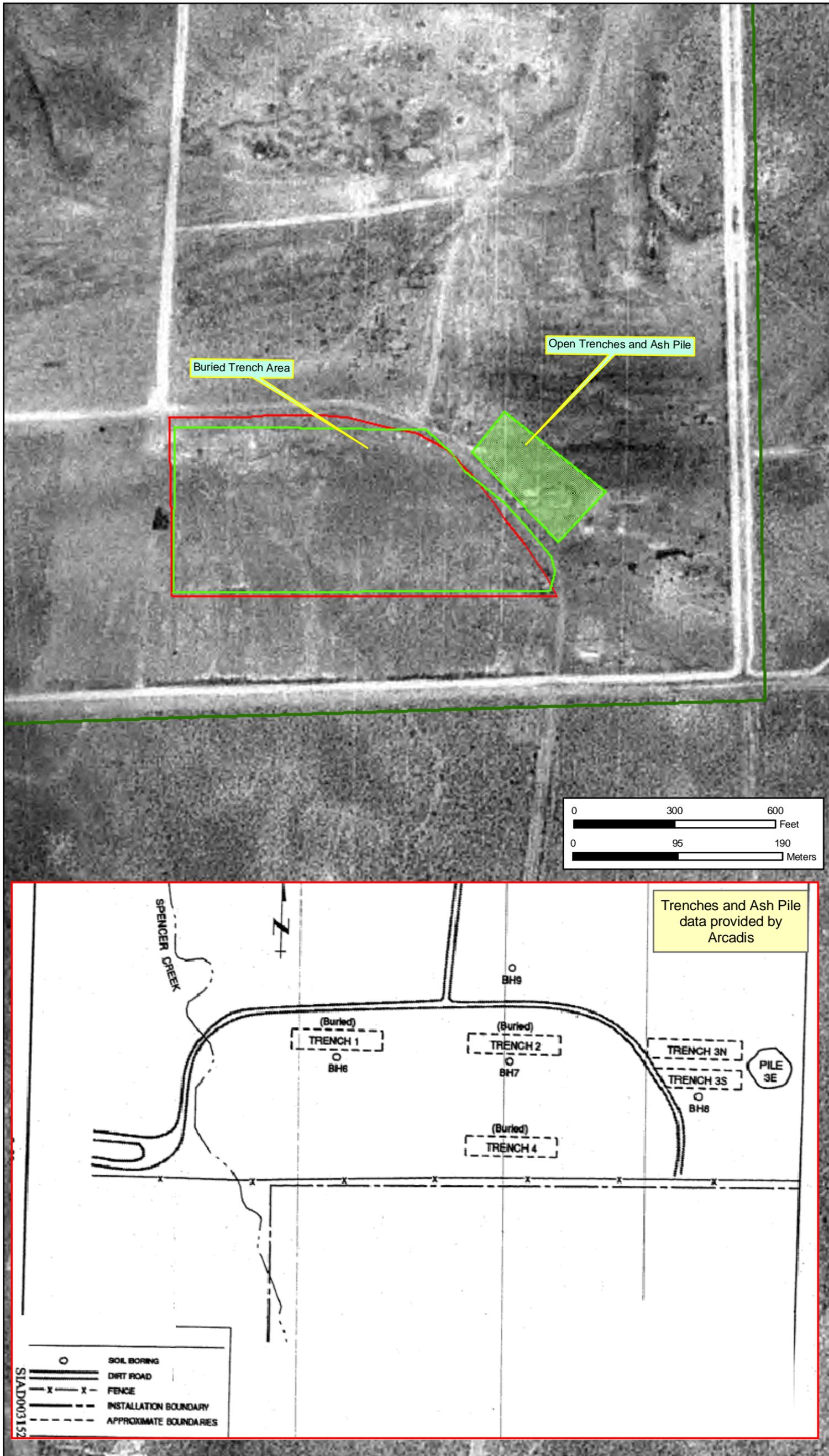
TEC analysis identified scarring in the area in 1973 and there was east-west scarring across the northern portion of the Buried Trench Area in the 1990 aerial photograph.



# Site Inspection Work Plan Upper Burning Ground Sierra Army Depot, CA



**Figure 2-6  
Previous  
Investigations at  
the Buried Trenches  
MR Site and Adjacent  
IRP Sites**



**Legend**

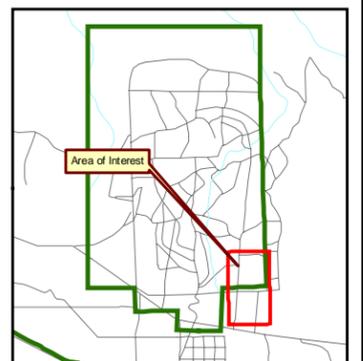
- Installation Boundary
- Areas of Interest (defined by James M. Montgomery Consulting Engineers)
- Areas of Interest (defined by Harding Lawson Associates)
- Completed under IRP (Excluded)

Sources:  
SIAD000864  
SIAD003484  
SIAD003152

Aerial Source: USGS  
Aerial Date: July 27, 1993

Edition: Final Report

Date: April 2007



**2.1.6.2 Previous Investigations at the Buried Trench Area**

Table 2-7 provides a summary of the previous investigations conducted at the Buried Trench Area. A more detailed description of the previous investigations is provided in the Final HRR dated August 2006.

<b>Table 2-7: BURIED TRENCH AREA</b>				
<b>Historic Use</b>				
<ul style="list-style-type: none"> <li>- burning pyrotechnics including excess powder and munitions-related waste products such as burn propellants, primers, excess powder, and fuses</li> <li>- small detonations of less than 10 pounds of material</li> <li>- Ashes, metal slag, and burned debris may have remained in the trench following burns and were the primary byproducts.</li> </ul>				
<b>Program</b>	<b>MC Sampling</b>	<b>MEC</b>	<b>Findings</b>	<b>Conclusions</b>
<b>IR</b>	(1992) -Soil samples were collected from the 3 test pits and samples were collected at various intervals (Figure 2-6). - Surface soil samples from the trenches were also analyzed for base-neutral acids (BNAs)	(1992) - Used remote sensing geophysics to locate three buried trenches, which reportedly had been cleared of debris and backfilled with clean fill	-Arsenic detected above background in 5 of the 8 samples - Lead was detected in the 8-foot interval of one sample. Lead was not detected above background in any of the other samples. Antimony was detected in this same sample -No explosives were detected in the test pits excavated in the three buried trenches - Explosives were found in two surface soil samples (TNT and 2,4-DNT) - Small quantities of di-n-butyl phthalate and No. 2 fuel were detected	- The April 2004 <i>Proposed Plan for Three Sites</i> explained that the buried trenches were originally thought to contain projectiles and scrap metal from shells, but investigations had not confirmed the presence of buried munitions; therefore, no further work was planned
<b>MR</b>	- N/A	- N/A	- N/A	- Although sampling was conducted in the test pits, the remainder of the Buried Trench Area was not sampled. It is unclear how much of the area was included in the previous geophysical surveys.

### 2.1.6.3 Summary of MEC and MC

Based on the available information, the types of MEC associated with the Buried Trench Area may include: pyrotechnics, propellants, and excess powder.

MC associated with this site may include:

- Aluminum
- Aluminum Powder
- Ammonium Nitrate
- Ammonium Perchlorate
- Barium Nitrate
- Brass
- Cellulose Nitrate
- Diazodinitrophenol
- Diphenylamine
- DNT
- Ethyl Centralite
- Hexachloroethane
- HMX
- Lead Azide
- Lead Styphnate
- Lead Thiocyanate (in primer mix for simulator)
- Lead-Sodium Dinitro Ortho
- Magnesium Powder
- NC
- NG
- Nitrocellulose
- NG
- NQ
- PETN
- Phosphorus
- Potassium Chlorate
- Potassium Nitrate
- Potassium Perchlorate
- RDX
- Red Phosphorus (part of simulator)
- Sodium Nitrate
- Sodium Nitrate
- Strontium Nitrate
- Sulfur
- Tetranitrocarbazole
- Tetryl
- TNT
- Zinc Oxide
- Zirconium Hydride

### 2.1.7 Building 349-Satellite Drum Accumulation Pad

The Building 349-Satellite Drum Accumulation Pad site (also known as SWMU #32), is located approximately 750 feet south-southeast of Hansen's Hole and east of the LBA near the southeastern corner of the UBG. Building 349 also lays approximately 750 feet west of the eastern UBG boundary. According to Ms. Holliday, Building 349 is referred to as the Break Building, a Quonset hut that is used for personnel breaks.

#### 2.1.7.1 Site History of Building 349

SWMU #32 is a RCRA-regulated area referred to in the 1988 RFA as an active Accumulation Pad adjacent to Building 349. The 1988 RFA described the area as containing wooden pallets on open ground where 55-gallon drums of munitions-related waste propellant and soiled rags were stored. Munitions-related waste materials were periodically taken to the Outdoor Hazardous Waste Storage Facility. The area was used to manage propellant and munitions residues that may have contained explosives and organic materials, depending on the completeness of the burn. The area was active during the production of the 1988 RFA, but the date of initial start-up is unknown. The building is visible in the 1984 aerial photographs evaluated by TEC. It is not possible to determine if it is present in earlier photographs due to the quality of the images. It was noted that the potential for generation of subsurface gas was low due to the nonvolatile

nature of the wastes managed and their containment in closed drums. Although propellant was stored here, there is no current evidence to indicate UXO, DMM, or MC. No records of sampling at this site were located.

There have been no previous investigations at this site.

#### **2.1.7.2 Summary of MEC and MC**

The pad was used for the storage of munitions-related waste propellant and munitions residues.

MC associated with this site may include:

- Ammonium Perchlorate
- Barium Nitrate
- Diphenylamine
- Ethyl Centralite
- NC
- NG
- NQ

#### **2.1.8 Remaining Areas within the UBG**

Although specific information is not known about the use of the area surrounding the AOIs identified in the preceding sections, the property is still part of the UBG MR Site and will be addressed under this SI Work Plan. The munitions in this area may include items that were kicked-out during the OB/OD activities discussed above and will not be specifically listed here.

There have been no previous investigations at this site.

### **2.2 BLM-ADMINISTERED PUBLIC LAND**

This site is located adjacent to the eastern boundary of the UBG and encompasses approximately 1,773 acres (Figure 2-3). The property is administered by BLM and was open to the public until 1990, when unexploded anti-personnel bombs were discovered at the site.

#### **2.2.1 Site History of the BLM-Administered Public Land**

Although SIAD operations in the area are unknown, during the first week of July 1990, BLM fire crews discovered unexploded anti-personnel bombs on BLM-Administered Public Land while suppressing a fire near SIAD. The BLM wrote a letter to the Eagle Lake Resource Area Manager on September 13, 1990, that described an intensive search and cleanup effort conducted by the Army on public lands where the bombs might be located, but noted that the Army could not certify that the land was 100 percent clean.

Therefore, the BLM indefinitely closed public access to the area on September 16, 1990. 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 potentially dangerous.

In November 1994, following a Cadastral survey, SIAD produced an Environmental Assessment (EA) that proposed to restrict public access to the area and recommended erecting a four-strand wire fence around the restricted land in 1991.

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

### **2.2.2 Previous Investigations at BLM-Public Administered Land**

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 SIAD Ammunition Destroyers destroyed the larger cluster bombs at the UBG. Previous clearance activity did not completely address the MEC issues and no testing was conducted for MC. This site has not been included in any IRP project and is eligible for the MMRP.

### **2.2.3 BLM-Administered Public Land Site Characteristics**

The following sections include a description of the site and its environment that is based on existing knowledge.

#### **2.2.3.1 Security, Buildings, Utilities, and Other Structures**

A fence surrounds a 1,328 acre portion of BLM-Administered Public Land with safety signs labeled “Danger, Explosion Hazard-Keep Out/Peligro, Riesgo De Explosion, Estensen Afuera.” There are no known structures or utilities at the site.

#### **2.2.3.2 Land Use**

The property comprising this site is administered by BLM. Most of these lands are part of the Skedaddle Mountain WSA, where land uses are extremely limited. BLM policies, for example, indicate that "permitted activities in WSAs (except grandfathered and valid existing rights) are temporary uses that create no new surface disturbance, nor involve permanent placement of structures." Therefore, activities such as building homes and off-road driving are prohibited in the WSA.

#### **2.2.3.3 Cultural, Natural, and Archaeological Resources**

No cultural, archaeological, or historical resources are currently known to be associated with the BLM site. The EA documented the land withdrawal area as a major corridor for

migrating and as a kidding area for pronghorn antelope. The fence was constructed to allow access to big-game and to protect the public. The Skedaddle Planning Department determined that the area is also range for mule deer, East Lassen deer, and raptors, as well as a wild horse management area.

#### **2.2.3.4 Summary of MEC and MC**

Based on the available information, the types of MEC associated with the BLM site may include: Anti-personnel bomblets from cluster bombs BLU-26 series, BLU-36 series, BLU-59 series, or similar bomblets (2.5 inches in diameter).

MC associated with this site may include:

- Aluminum
- Antimony Sulfide
- Barium Nitrate
- Brass
- C4
- Copper
- Dioctylphthalate
- Iron
- Lead Azide
- Lead Styphnate
- Magnesium
- PETN
- Potassium Chlorate
- RDX
- Sodium Nitrate
- Silicon
- Tetracene
- TNT
- Zinc

### **2.3 GRAVEL PIT (STACY)**

This approximately 41 acre site is located southwest of the UBG and east from the main installation. It is two miles north of the abandoned town of Stacy, California. The site is bisected by County Road 320 on privately owned property. There are unnamed dirt roads in the area and Skedaddle Creek is near the site (Figure 2-3).

#### **2.3.1 Site History of Gravel Pit (Stacy)**

During the early 1950s, an abandoned gravel pit located two miles north of Stacy, California and five miles northeast of the Batann gate (also referred to as Gate 4) on Skedaddle creek was used for the demolition of munitions. The size of the site is estimated at 41 acres. In the Standing Operating Procedure (SOP) for the destruction of WP loaded projectiles, rocket heads, rifle grenades and mortars, all calibers by detonation, it was directed that the demolition of WP be performed at the Stacy site. A November 15, 1951, SOP directed the demolition of FS (sulfur trioxide-chlorosulfonic acid) smoke 4.5-inch rockets at the gravel pit, with an alternate site of Honey Lake. Other items included cluster fragmentation bombs and M112 photoflash cartridges. The gravel pit was one of three options listed in a November 21, 1951, SOP for the destruction of bulk propellant, bulk high explosive, ballistite, and propelling charges. It was also listed as one of two options for the destruction of “Jato units” and 500 pound aimable cluster bombs, 60mm, 81mm, 105mm, and 155mm illuminating shells, and black powder spotting charges in 1951.

The specific dates of demolition operations at the Gravel Pit are unknown. No SOPs were located for dates prior to 1951 and SOPs from 1954 reference a “burning ground” rather than a gravel pit.

The area described above matches with the location of a gravel pit depicted on U.S. Geologic Services (USGS) topographic maps.

There have been no known previous investigations at this site.

### **2.3.2 Gravel Pit (Stacy) Site Characteristics**

The following sections include a description of the site and its environment that is based on existing knowledge.

#### **2.3.2.1 Security, Buildings, Utilities, and Other Structures**

This is an open area on privately owned property. There are no known buildings, utilities, or other structures at the site. The site is not fenced.

#### **2.3.2.2 Land Use**

The property is depicted as a gravel pit on the most recent topographic maps created by the USGS. The property for this site is privately owned. It is not known if this site is currently used as a gravel pit. Most of the lands surrounding the site are part of the Skedaddle Mountain Wilderness Study Area, where land uses are extremely limited. BLM policies, for example, indicate that "permitted activities in WSAs (except grandfathered and valid existing rights) are temporary uses that create no new surface disturbance, nor involve permanent placement of structures". Therefore, activities such as building homes and off-road driving are prohibited in the WSA.

#### **2.3.2.3 Summary of MEC and MC**

Based on the available information, the types of MEC associated with the Gravel Pit (Stacy) MR site may include:

- White Phosphorous loaded projectiles, rocket heads, rifle grenades and mortars, all calibers
- FS smoke 4.5-inch rockets
- Cluster fragmentation bombs
- M112 photoflash cartridges
- Bulk propellant
- Bulk high explosive
- Ballistite
- Propelling charges
- “Jato units”
- 500 pound aimable cluster bombs

- 60mm, 81mm, 105mm, and 155mm illuminating shells, and black powder spotting charges

MC associated with this site may include:

- |                     |                         |                      |
|---------------------|-------------------------|----------------------|
| • Aluminum Powder   | • Diazodinitrophenel    | • Potassium Sulfate  |
| • Amatol            | • Diethylphthalate      | • RDX                |
| • Ammonium Picrate  | • Dinitrotoluene        | • Red Lead Oxide     |
| • Antimony Sulfide  | • Dethylenedinitramine  | • Sodium Nitrate     |
| • B Amorphous 90/92 | • Haleite               | • Stearic Acid       |
| • Barium Chromate   | • HMX                   | • Strontium Nitrate  |
| • Barium Nitrate    | • Iron                  | • Strontium Oxalate  |
| • Barium Peroxide   | • Lead                  | • Strontium Peroxide |
| • Barium Stearate   | • Magnesium             | • Sulfur             |
| • Beryllium         | • Manganese             | • Tetracene          |
| • Boron             | • Mercury Fulminate     | • Tetryl             |
| • Cadmium           | • NC                    | • Titanium Powder    |
| • Calcium Resinate  | • NG                    | • TNT                |
| • Calcium Stearate  | • NQ                    | • Tungsten Powder    |
| • Composition A-5   | • PETN                  | • White Phosphorous  |
| • Composition B     | • Picric acid           | • Zinc Chromate      |
| • Composition C4    | • Potassium Nitrate     | • Zinc Phosphate     |
| • Copper            | • Potassium Perchlorate | • Zirconium          |

## 2.4 AREAS OF INTEREST IDENTIFIED IN AERIAL PHOTOGRAPHS

TEC completed an analysis of aerial photographs of the UBG from 1949 to 1990 and the text below provides a description of the sites identified and approximate dates (Figure 2-3). Some of the areas noted are actually located outside of the UBG, to the west, between the UBG and a gravel pit. These significant areas will be investigated in the course of field activities. Although the aerial photographs do depict the AIOs identified in Section 2.1, they are not discussed below, as they are included with the site specific text provided in Section 2.1.

The UBG changed drastically during the period between 1951 and 1954 with numerous additional roads being added. The majority of the features that are of interest correlate with these roadways and in many cases, the intersections of these roads.

Due to the large number of features identified throughout the site, TLI has highlighted the most significant areas on a 1990 aerial. These features were either identified by TEC or as a result of analysis of additional imagery by TLI. The features identified on the 1990 photograph do not include all areas of ground scarring noted throughout the images (Figure 2-7).

#### 2.4.1 Aerial Photographs Provided by TEC

**Area West of the UBG** – As of 1949, there were numerous disturbances in this area including, trenches, excavations, circular features, linear features, and berms. Some of these are included within an area designated as a gravel pit, but the majority are east of the gravel pit, between the pit and the UBG. Although the UBG was reportedly in operation during the 1940s, it is unclear at this time if the features relate to military activity (Figure 2-3). This area will be ground truthed during the field activities to determine if the disturbances were the result of military activity.

**Trenches** – In 1954, there are four trenches oriented in an east-west direction located west of the EOD Range. There is no indication as to the use of these trenches. By 1970, ground scarring is still present; however, it appears that the trenches may have been filled in and the area leveled. In 1984, faint ground scars are still present. As of 1990, the former trenches are now included as part of a larger area that has been graded (Figure 2-3).

**Western Area** – Beginning in 1954, there is evidence of ground scarring, berms, and a possible pit near the western boundary of the UBG, roughly parallel with the Upper Burning Area. It was noted by TEC that this area might have been used as a gravel pit. In the 1970s, the area of disturbance expanded and TEC indicated that the disturbance was caused by excavation. By 1984, the boundaries for the areas of disturbance previously identified on the 1970 photograph had changed. The areas previously described as being caused by excavation appear smaller and areas identified as linear features and ground scars have been added. The ground still appears to be disturbed in 1990 (Figure 2-3).

**HC Smokes/Possible Demolition Area** – There are areas identified on aerial photographs as a possible impact crater, a berm, and a trench located east of the Upper Burning Area and north of Hansen's Hole. A figure from 1951 indicates that the area near these disturbances was a proposed demolition area. No records were located indicating whether the proposed demolition area was completed. The ground disturbance is still present. TEC indicated that it might have been caused by excavation. The 1970 photograph reflects three dark colored linear features in this area. These features are currently of unknown origin. The ground scars are still visible in 1984 (Figure 2-3).

**South of Hansen's Hole** – In 1954, there is a large area with pits that is listed as a possible mine. There are two disturbed areas to the east of the UBG boundary visible in the photograph. It is unclear at this time if the features relate to military activity. This area was described as a disturbed area, possibly created by excavation. By 1970, the area had expanded to the south, beyond the installation boundary, but it does not appear that the area outside the boundary actually has much evidence of scarring. This area will be ground truthed during the field activities to determine if the disturbances were the result of military activity.

**Area West of the UBG** – In 1970, only one small area of ground scarring is indicated in this area. In 1984, the small area of ground scarring is still present and there are additional linear features in the area. In 1990, the ground still appears to be disturbed (Figure 2-3).

### 3.0 PROJECT OBJECTIVES

The following project objectives have been identified for the MR sites at SIAD. These objectives were discussed with the SIAD stakeholders during the Technical Project Planning Meeting held on November 15, 2006. A summary of this meeting is included as Appendix B to this Work Plan.

Primary Objective - Collect an appropriate amount of information necessary to determine whether further investigation (e.g., RI/FS, Engineering Evaluation/Cost Analysis (EE/CA), etc.) will be needed; whether an immediate response is needed; or whether the sites qualify for no further action by DoD. This objective will consist of the following tasks:

- Determine whether there is enough evidence to indicate that MEC hazards are present at the sites including UXO, DMM, and MC. Identification of a single MEC hazard will be sufficient to prompt further investigation of the site. For this project it will not be necessary to confirm all types of MEC present, determine MEC densities or locations, or to define the exact limits of the problem.
- Perform the appropriate Hazardous and Toxic Waste (HTW) field activities (soil sampling) to determine if MC contamination is present on site. Should MEC other than small arms be located, ordnance avoidance techniques as discussed in the Accident Prevention Plan (Appendix C) will be utilized. Primarily, samples collected at the site will be analyzed for Target Compound List (TCL) explosives and Target Analyte List (TAL) metals. In general, any contaminant of concern that exceeds the U.S. Environmental Protection Agency (USEPA) Region 9 Preliminary Remediation Goals (PRGs), in combination with other site specific health risk assessment considerations for those contaminants of concern (COCs) for which a PRG has not been established, will prompt the initiation of further studies at the sites. If a site is recommended for No Further Action (NFA), the California Human Health Screening Levels (CHHSLs) will be used in place of the PRGs as the determining screening levels for the contaminants of concern. For this project it will not be necessary to determine the nature and extent of contamination or to provide sufficient information to perform a baseline risk assessment. An ambient/background study is beyond the scope of this SI; however, available background data provided by the installation will be used to assist in the evaluation of analytical results. Specific concentration based action levels are presented as Table 3-2 of the Field Sampling Plan (FSP) (Appendix A).

Secondary Objective - Collect information to develop better cost to complete (CTC) estimates for the MMRP and complete the MRS Prioritization Protocol at each site. However, this objective will not be met at the risk of jeopardizing the primary objective of the program; or from meeting the primary project objectives in a timely and cost effective manner.

Information obtained through site-specific inspections may include but not be limited to: