

# **SANDIA REPORT**

SAND 2013-8417

Unlimited Release

Printed October 2013

## **Sandia National Laboratories, California Proposed CREATE Facility Environmental Baseline Survey**

Christopher S. Catechis

Prepared by  
Sandia National Laboratories  
Albuquerque, New Mexico 87185 and Livermore, California 94550

Sandia National Laboratories is a multi-program laboratory managed and operated by Sandia Corporation, a wholly owned subsidiary of Lockheed Martin Corporation, for the U.S. Department of Energy's National Nuclear Security Administration under contract DE-AC04-94AL85000.

Approved for public release; further dissemination unlimited.



**Sandia National Laboratories**

Issued by Sandia National Laboratories, operated for the United States Department of Energy by Sandia Corporation.

**NOTICE:** This report was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government, nor any agency thereof, nor any of their employees, nor any of their contractors, subcontractors, or their employees, make any warranty, express or implied, or assume any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represent that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise, does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government, any agency thereof, or any of their contractors or subcontractors. The views and opinions expressed herein do not necessarily state or reflect those of the United States Government, any agency thereof, or any of their contractors.

Printed in the United States of America. This report has been reproduced directly from the best available copy.

Available to DOE and DOE contractors from

U.S. Department of Energy  
Office of Scientific and Technical Information  
P.O. Box 62  
Oak Ridge, TN 37831

Telephone: (865) 576-8401  
Facsimile: (865) 576-5728  
E-Mail: [reports@adonis.osti.gov](mailto:reports@adonis.osti.gov)  
Online ordering: <http://www.osti.gov/bridge>

Available to the public from

U.S. Department of Commerce  
National Technical Information Service  
5285 Port Royal Rd.  
Springfield, VA 22161

Telephone: (800) 553-6847  
Facsimile: (703) 605-6900  
E-Mail: [orders@ntis.fedworld.gov](mailto:orders@ntis.fedworld.gov)  
Online order: <http://www.ntis.gov/help/ordermethods.asp?loc=7-4-0#online>



SAND 2013-8417  
Unlimited Release  
Printed October 2013

# **Sandia National Laboratories, California Proposed CREATE Facility Environmental Baseline Survey**

Christopher S. Catechis  
Physical Operations, Planning & Studies  
Sandia National Laboratories  
P.O. Box 5800  
Albuquerque, New Mexico 87185-MS0729

## **Abstract**

Sandia National Laboratories, Environmental Programs completed an environmental baseline survey (EBS) of 12.6 acres located at Sandia National Laboratories/California (SNL/CA) in support of the proposed Collaboration in Research and Engineering for Advanced Technology and Education (CREATE) Facility. The survey area is comprised of several parcels of land within SNL/CA, County of Alameda, California. The survey area is located within T 3S, R 2E, Section 13. The purpose of this EBS is to document the nature, magnitude, and extent of any environmental contamination of the property; identify potential environmental contamination liabilities associated with the property; develop sufficient information to assess the health and safety risks; and ensure adequate protection for human health and the environment related to a specific property.



## CONTENTS

1. Introduction.....	9
1.1. Purpose of the Action.....	9
1.2. Boundaries of the Property and Survey Area .....	10
2. Survey Methodology.....	11
2.1. Approach and Rationale.....	11
2.1.1. Description of Reviewed Documents .....	11
2.1.2. Property Inspections.....	11
2.1.3. Personal Interviews.....	12
3. Findings.....	13
3.1. History and Usage.....	13
3.1.1. History.....	13
3.1.2. Current and Future Use.....	13
3.1.3. Activities, Structures, and Buildings .....	13
3.2. Environmental Setting .....	13
3.2.2. Hydrology.....	15
3.2.3. Vegetation and Wildlife.....	16
3.3. Hazardous Substances.....	18
3.3.1. Hazardous Materials and Petroleum Products .....	18
3.3.2. Hazardous and Petroleum Waste .....	18
3.4. Environmental Restoration (ER) Program Contamination.....	18
3.5. Storage Tanks.....	20
3.5.1. Aboveground Storage Tanks.....	21
3.5.2. Underground Storage Tanks .....	21
3.5.3. Pipelines, Hydrant Fueling, and Transfer System .....	21
3.6. Oil/Water Separators (O/WS).....	21
3.7. Pesticides.....	21
3.8. Medical or Biohazardous Waste .....	21
3.9. Energetic Material.....	21
3.10. Radioactive Waste .....	21
3.11. Solid Waste .....	22
3.12. Groundwater .....	22
3.13. Wastewater Treatment, Collection, and Discharge.....	22
3.14. Drinking Water Quality .....	22
3.15. Asbestos .....	22
3.16. Polychlorinated Biphenyls (PCBs).....	22
3.17. Radon .....	23
3.18. Lead-Based Paint .....	23
4. Findings for Adjacent Properties .....	25
4.1. Land Uses.....	25
4.2. Surveyed Properties .....	25
5. Applicable Regulatory Compliance Issues.....	27

5.1.	List of Compliance Issues .....	27
5.2.	Description of Corrective Actions .....	27
5.3.	Estimates of Various Alternatives .....	27
5.4.	Other Alternatives .....	27
6.	Conclusions .....	29
6.1.	Facility Matrix .....	29
6.2.	Property Categories Map .....	29
6.3.	Resources Map.....	29
6.4.	Data Gaps.....	29
7.	Certification.....	31
	List of Appendices .....	33
	Appendix A Survey Area Location Map and Historic Site Photographs.....	33
	Appendix B Site Inspection Photographs.....	33
	Appendix C References .....	33
	Appendix D Personal Interviews.....	33
	Appendix A: Survey Area Location Map and Historic Site Photographs .....	35
	Appendix B: Site Inspection Photographs .....	49
	Appendix C: References .....	53
	Appendix D: Personal Interviews .....	55
	Distribution .....	57

## NOMENCLATURE

ACM	Asbestos Containing Material
AFI	Air Force Instruction
AST	Aboveground Storage Tank
ASTM	American Society for Testing and Materials
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CDHS	California Department of Health Services
CRD	Catalytic Reductive Dehalogenation
CREATE	Collaboration in Research and Engineering for Advanced Technology and Education
DOE	Department of Energy
D&D	decommissioned and demolished
EBS	Environmental Baseline Survey
EPA	Environmental Protection Agency
ER	Environmental Restoration
ft	feet
in.	inches
IC	Institutional Controls
LLNL	Lawrence Livermore National Laboratory
LVOC	Livermore Valley Open Campus
NIF	National Ignition Facility
NEPA	National Environmental Policy Act
O/WS	Oil/water separators
PCBs	Polychlorinated Biphenyls
pCi/g	picocuries per gram
PTU	Portable Treatment Units
RCRA	Resource, Conservation, and Recovery Act
sf	square feet
SWMU	Solid Waste Management Unit
SNL/CA	Sandia National Laboratories/California
SVE	Soil Vapor Extraction
U.S.	United States
U.S.C.	United States Code
UST	Underground Storage Tank
VOC	Volatile Organic Compounds



## 1. INTRODUCTION

### 1.1. Purpose of the Action

This Phase I Environmental Baseline Survey (EBS) provides the findings of a survey and assessment for the proposed Collaboration in Research and Engineering for Advanced Technology and Education (CREATE) facility at Sandia National Laboratories/California (SNL/CA) Livermore, California. The purpose of this document is to provide information regarding baseline environmental conditions of an area 12.6 acres in size. The survey area includes several potential construction sites within the Livermore Valley Open Campus (LVOC) at SNL/CA. Final site selection will be determined as part of the acquisition strategy and alternatives analysis process. This document was prepared in accordance with Air Force Instruction (AFI) 32-7066, *Environmental Baseline Surveys in Real Estate Transactions* (1994), as supplemented by the Headquarters Air Force Materiel Command memorandum *HQ AFMC Supplemental Guidance for the Environmental Impact Analysis Process and Environmental Baseline Surveys*, dated 11 April 2011, the standard used by Sandia National Laboratories. To ensure that all site conditions are addressed, the American Society for Testing and Materials (ASTM) Standard E1527-05, 2005, “Practice for Environmental Site Assessments: Phase I Site Assessments”; E1528-06, 2006, “Standard Practice for Limited Environmental Due Diligence: Transaction Screen Process”; and ASTM Standard D6008-96, Reapproved 2005, “Standard Practice for Conducting Environmental Baseline Surveys” are also followed. In accordance with these guidance, this Phase I EBS will provide some of the information needed for the following objectives:

- Document the nature, magnitude, and extent of any environmental contamination of the survey area.
- Identify potential environmental contamination liabilities associated with the survey area.
- Develop sufficient information to assess the health and safety risks and to ensure adequate protection for human health and the environment related to the survey area.
- Provide the basis for notice, when required under Section 120(h)(1) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 United States Code (U.S.C.) 9620 (h)(1), of the disposal of a hazardous substance on the survey area.

The preparation of this document is limited to existing information that can be garnered through records searches, reviews of historical photographs, interviews, or field observations of the survey area. Field activities (e.g. trenching, drilling, or sample collection) would have to be used to quantify and confirm possible contamination and would need to be conducted under a Phase II EBS.

This document does not address possible effects on property valuation from discovered contamination; effects on property valuation can only be effectively evaluated after the nature and extent of contamination are fully understood.

## **1.2. Boundaries of the Property and Survey Area**

The survey area is 12.6 acres and is comprised of several parcels of land within SNL/CA, County of Alameda, California. The site is located within T 3S, R 2E, Section 13 being described by a location map (see Appendix A of this document).

## 2. SURVEY METHODOLOGY

### 2.1. Approach and Rationale

The approach for this EBS is to perform a document search and preliminary site investigation in order to identify potential environmental contamination associated with the survey area. The EBS process involved the review of records compiled for the area. The records reviewed included information on environmental restoration activities, testing activities (e.g., Safety Assessments), and the results of regulatory reports, and investigations (e.g., biological, cultural/archaeological) relevant to the survey area. A thorough review of reasonably obtainable state, federal, and local government records has been performed as part of this EBS. Additionally, Interviews were held with Sandia National Laboratories personnel to further discuss the history and surroundings, underground storage tanks, releases or spills, and permit and enforcement history. The information collected is presented in this EBS Phase I Environmental Site Assessment.

#### 2.1.1. Description of Reviewed Documents

The following documents were reviewed in preparation of this EBS:

- United States Department of Energy Sandia National Laboratories *RCRA Facility Assessment*, prepared for U.S. EPA, Region IX and California Environmental Protection Agency Department of Toxic Substances Control Region 2, March 1992.
- Sandia National Laboratories Livermore California SAND Report, *Sandia National Laboratories/California Environmental Information Document*, SAND 2002-8053, March 2002, Sandia National Laboratories, Livermore California.
- Site Environmental Report for 2012 Sandia National Laboratories, California; SAND 2013-3735, Printed June 2013.
- Environmental Assessment. *Environmental Remarks on Proposed Additional Land Purchase at Sandia National Laboratories Livermore, Livermore, California*. Prepared for United States Department of Energy under Contract No. AT-(29-1)-789; May 19, 1978.
- Memorandum: *Request for approval for Albuquerque Operations Office to acquire additional land for use by Sandia National Laboratories, Livermore, CA*. From D. Smith, Director of Administration United States Energy Research and Development Administration to Bob Johnsen, Sandia Livermore Laboratory; May 11, 1978.
- Real Property Inventory for Sandia National Laboratories Livermore. Prepared by Robert H. Johnsen; May 12, 1980.

#### 2.1.2. Property Inspections

A Sandia National Laboratories Environmental Technical Professional conducted a visual and physical walk-through inspection of the survey area on June 19, 2013. No environmental concerns or issues were observed: no odors; pools of liquid; drums; hazardous substance and petroleum product containers; potential asbestos-containing material (ACM); polychlorinated biphenyl (PCB)-containing electrical equipment; drains and sumps; pits, ponds, and lagoons;

stained soil or pavement; stressed vegetation; wastewater; or dead or diseased wildlife. No concerns relating to the health and safety of individuals or local flora or fauna, such as stains or leaks, were observed (See Appendix B for site photographs).

### *2.1.3. Personal Interviews*

The following personnel were interviewed in preparation of this document:

- A Sandia National Laboratories Environmental Technical Professional working in the Occupational Health, Safety and Environmental Management Organization 08516 was interviewed on June 19, 2013.
- A Sandia National Laboratories Environmental Restoration and Biologist Subject Matter Expert working in the Occupational Health, Safety and Environmental Management Organization 08516 was interviewed on June 19, 2013.
- A Sandia National Laboratories Strategic Planner working in the Physical Operations Planning & Studies Organization 08512 was interviewed on June 19, 2013.
- A Sandia National Laboratories Facilities Technologist working in the Operations Organization 085154 was interviewed on June 19, 2013.
- Sandia National Laboratories Corporate Historian, working in the Recorded Information Management Organization 09532 was interviewed on August 13, 2013.

## 3. FINDINGS

### 3.1. History and Usage

#### 3.1.1. History

Previous to SNL/CA the site was relatively undisturbed and likely utilized for livestock grazing. SNL/CA was established in 1956 by Sandia Corporation to provide a closer relationship with Lawrence Livermore National Laboratory (LLNL) and their nuclear weapons design work. The SNL/CA facility evolved into an engineering research and development laboratory by the early 1960s and into a multi-program engineering and science laboratory during the 1970s. Construction of 3 modular buildings (C920, C921, and C922) were completed in 1977 to be used as office space along with parking lots at the survey area. A portion of the survey area remained under private ownership until 1979 and was utilized for agricultural purposes. In 1979 the Department of Energy acquired an additional 23.64 acres of land for use by SNL/CA. Aside from the expansion of an approximately 2 acre parking lot; this 23.64 acre area has remained mostly undisturbed. Buildings C920, C921, and C922 were decommissioned and demolished (D&D) between 2007 and 2009.

#### 3.1.2. Current and Future Use

The survey area is located within the LVOC and currently consists of parking lots, fields, and an area for the SNL/CA Growers Market and general display area. As envisioned, the proposed CREATE Facility would be an 86,000 square foot (sf), multi-story facility. It would house new and expanded programs in hydrogen science, cyber security, engineering sciences / environments, and translational biomedicine. CREATE would also include mission support functionality that supports programmatic needs. These would include research and development collaboration zones, badging and entry, business office, and technical library.

#### 3.1.3. Activities, Structures, and Buildings

The only existing structures in the survey area are two, two-acre parking lots and the concrete slab which was formerly associated with Building C921.

### 3.2. Environmental Setting

The survey area is located at SNL/CA, which is situated in the California Coast Ranges geologic province in the southeastern portion of the Livermore Valley. The Livermore Valley is an east-west oriented topographic and structural depression, approximately 16 miles long by 7 miles wide.

The SNL/CA site lies at the western base of the Altamont Hills and is situated on relatively flat foothills that have low relief and that slope gently northwest and north. Slopes at the SNL/CA site range from 1 to 3 degrees. The topography is generally characterized by relatively flat areas at the northern portion of SNL/CA, hills to the south, and steep banks along the Arroyo Seco.

The elevations at the site range from 615-849 feet above sea level. The survey area is situated in the northeastern portion of SNL/CA on flat terrain.

The climate at SNL/CA is typical of the Mediterranean conditions in the San Francisco Bay region where cool, wet winters and hot, dry summers are normal. In the summer, inland valleys, such as the Livermore Valley, generally experience more sunshine and higher temperatures than the coastal areas. In the winter, temperatures in the valley are usually cooler than at the coast. The average yearly rainfall is 14.48 inches (in).

(SNL/CA, 2002) (LLNL, 2013)

### 3.2.1. Geology

The geology of SNL/CA consists of three general groupings: a complex of igneous and metamorphic rocks (Jurassic and Cretaceous); a sequence of primarily marine, sedimentary rocks (Cretaceous through late Tertiary); and primarily continental rocks and alluvial deposits (late Tertiary through Holocene).

SNL/CA is underlain by a thick sequence of late Tertiary to Holocene alluvial deposits and poorly lithified rocks of predominantly continental origin. The alluvial deposits consist of interstratified and interfingering gravels, sands, silts, and clay generally occurring adjacent to the former natural channels of the Arroyo Seco.

The soils beneath SNL/CA are formed primarily upon sediments deposited by local streams. Most of the deposits in the eastern part of the valley are relatively young, and thus soils are only moderately developed. These soils (generally loam) have minimal horizon, or development of layers, and can be several meters thick locally. Three soils cover most of the SNL/CA site: Rincon clay loam, Positas gravelly loam, and Livermore gravelly loam. Other soils on the site include Pleasanton gravelly loam, Shedd silt loam, and Zamora silty clay loam.

(SNL/CA, 2002)

SNL/CA is located in a seismically active region. The major fault systems in the area are the San Andreas Fault system and the much older Coast Range thrust fault system. The upper plate of the Coast Range thrust formed the northwest trending Coast Range, including the Altamont Hills. Any seismic activity in the Livermore Valley would probably result from movement on the San Andreas Fault, a right-lateral strike-slip fault system trending northwest-southeast, extending from Point Arena to the Gulf of California. The regional faults closest to SNL/CA, the Hayward, Calaveras, Greenville, and Tesla faults follow this trend, and have been seismically active in the historic past. A magnitude 5.8 earthquake on the Greenville fault in 1980 caused minor damage at SNL/CA and in the Livermore Valley. The Las Positas fault crossing SNL/CA is a transverse fault, at right angles to the Greenville fault, and was active during this earthquake. The Verona fault is a low angle thrust fault, dissimilar to the regional faulting, and probably not connecting with either the Calaveras or Las Positas faults. Only microseismicity was recorded on the Verona fault in 1980.

(SNL/CA, 2013)

### 3.2.2. Hydrology

The majority of Livermore Valley sediment is water bearing and transmits groundwater in varying degrees. In contrast, the uplands generally do not yield groundwater in sufficient quantities to constitute a groundwater resource. The Livermore Valley has been divided into 12 groundwater sub-basins on the basis of the location of faults, topography, and other hydrogeological barriers that affect groundwater occurrence, movement, and quality.

The SNL/CA site is situated primarily within the Spring and Mocho I sub-basins. The waterbearing sediments in the Livermore Valley include late-Pleistocene to Holocene-age alluvial sediments, generally less than 200 feet (ft) thick, which overlie Plio-Pleistocene alluvial and lacustrine Livermore Formation sediments up to 4,000 ft. thick. The Livermore Formation consists of beds of gravel, sand, silt, and clay of varying permeabilities. Sandy gravelly layers alternate with fine-grained, relatively impermeable layers and groundwater can be both confined and semi-confined.

The Livermore Valley groundwater basin is recharged from natural stream percolation; artificial stream percolation; aquifer storage; and recovery well, rainfall, applied water, and subsurface groundwater inflow from adjacent groundwater basins. Stream recharge (natural and artificial) may contribute up to 65 percent by volume of recharge to the basin. Locally, treated groundwater infiltration recharges the groundwater basin. Recharge occurs primarily in uplands east and southeast of the SNL/CA site.

In general, most groundwater in the basin flows toward the west central portions of the valley. Groundwater generally moves east to west within the Livermore Valley; groundwater near the center of the valley moves toward the Amador sub-basin and terminates in a large groundwater depression near gravel mining areas west of the city of Livermore. This depression is created by extraction of groundwater for drinking water use and dewatering for gravel mining. Vertical gradients within the Livermore basin are generally downward, with lower hydraulic head in deeper sediments. Vertical gradients are typically less than 0.05 feet per foot except in areas of significant pumping.

Pumping groundwater for agricultural uses has historically accounted for the major withdrawal of groundwater from the Livermore Valley basin. As the valley has become increasingly urbanized, the amount of pumping for municipal use and gravel quarrying has exceeded agricultural withdrawals. Municipal use accounts for approximately 46 percent of the groundwater demand, and gravel quarrying accounts for approximately 52 percent.

Water-bearing units beneath SNL/CA are composed of shallow heterogeneous, unconsolidated alluvium and deep fluvial and lacustrine sediments. The permeable sediments are separated by low-permeability silt and clay layers, generally 15-60 ft. thick. These silt and clay layers may constitute a regional confining layer. The confining layer slopes westward and varies in depth from about 60 ft. to 400 ft.

A shallow groundwater aquifer is located in a layer of sand, silt, and gravel at a depth of about 98-112 ft. beneath the central developed portion of SNL/CA. This aquifer is continuous throughout the site and has a saturated thickness of about 6-8 ft. Beneath this layer of sand, silt, and gravel is about 12-18 ft. of stiff clay that acts as an aquiclude (a formation that contains water but cannot transmit it rapidly enough to furnish a significant supply). Below this aquifer are two other water-bearing units that are probably local and not part of the underlying aquifer.

The general direction of groundwater flow in the shallow aquifer is from the southeast to the northwest, with a hydraulic gradient of about 0.005 ft. per ft, a hydraulic conductivity of 0.4-14.9 ft. per day and a porosity of about 0.30.

(SNL/CA, 2002)

The reported depth to groundwater at the survey area is approximately 117.7 ft, which was recorded for the nearby LLNL groundwater monitoring well GSW-442 on April 10, 2013.

There are no perennial streams or natural surface water bodies at SNL/CA. The Arroyo Seco, an ephemeral and intermittent stream, diagonally traverses the site from southeast to northwest. The arroyo typically flows only in very wet years, and for short periods of time during heavy storms. A seasonal wetland that is wet well into June, and sometimes July, is located in the streambed along the eastern part of the arroyo. Storm water runoff at SNL/CA is conveyed to Arroyo Seco through a system of storm drains and channels. Arroyo Seco does not cross the survey area but would receive runoff from facilities constructed within the LVOC.

(SNL/CA, 2013)

### 3.2.3 Vegetation and Wildlife

The plant community at SNL/CA is typical of the surrounding region, consisting primarily of grassland. Localized areas of coyote brush scrub, willow riparian woodland, and wetland habitat are also present. Areas developed and disturbed by SNL operations constitute an additional habitat type, designated altered habitat. No threatened, endangered, proposed, or candidate plant species are present on-site. The survey area is situated within the altered and grassland habitats.

A variety of wildlife species live and forage at SNL/CA. The following provides a list of animals frequently seen at SNL/CA:

<b>Birds</b>			
American crow	<i>Corvus brachyrhynchos</i>	Northern mockingbird	<i>Mimus polyglottos</i>
American kestrel	<i>Falco sparverius</i>	Nuttall's woodpecker	<i>Picoides nuttallii</i>
American robin	<i>Turdus migratorius</i>	Red-tailed hawk	<i>Buteo jamaicensis</i>
Anna's	<i>Calypte anna</i>	Turkey vulture	<i>Cathartes aura</i>

hummingbird			
Barn owl	<i>Tyto alba</i>	Western kingbird	<i>Tyrannus verticalis</i>
Bushtit	<i>Psaltriparus minimus</i>	Western meadowlark	<i>Sturnella neglecta</i>
California towhee	<i>Pipilo crissalis</i>	Western scrub jay	<i>Aphelocoma californica</i>
Golden-crowned sparrow	<i>Zonotrichia atricapilla</i>	White-crowned sparrow	<i>Zonotrichia leucophrys</i>
Kildeer	<i>Charadrius vociferous</i>	White-tailed kite	<i>Elanus leucurus</i>
Northern flicker	<i>Colaptes auratus</i>	Yellow-rumped warbler	<i>Dendroica coronata</i>
<b>Mammals</b>			
Bobcat	<i>Lynx rufus</i>	Fox squirrel	<i>Sciurus niger</i>
California ground squirrel	<i>Spermophilus beecheyii</i>	Raccoon	<i>Procyon lotor</i>
Coyote	<i>Canis latrans</i>	Red fox	<i>Vulpes vulpes</i>
Desert cottontail	<i>Sylvilagus audubonii</i>	Striped skunk	<i>Mephitis mephitis</i>
<b>Reptiles and Amphibians</b>			
Pacific chorus frog	<i>Pseudacris regilla</i>	Western fence lizard	<i>Sceloporus occidentalis</i>
Pacific gopher snake	<i>Pituophis catenifer catenifer</i>	Western toad	<i>Bufo boreas</i>

SNL/CA is located within the range of the mountain lion (*Puma concolor*), a “specially protected mammal” under California law. There have been no recent reports of a mountain lion at SNL/CA. Additionally, SNL/CA provides habitat (or potential habitat) for two threatened wildlife species, the California red-legged frog (*Rana aurora draytonii*) and the California tiger salamander (*Ambystoma californiense*). The most recent confirmed observation of a tiger salamander at SNL/CA was on December 13, 2007, when an adult salamander was found within the developed area of the SNL/CA campus. The first confirmed observation of California red-legged frogs at SNL/CA occurred in April 2004 when several individuals were found on the eastern portion of the SNL/CA site in shallow water contained within the Arroyo Seco. The most recent observation of red-legged frogs at SNL/CA was in 2010. Monitoring for California red-legged frogs is conducted annually, but none were observed within the past year.

(SNL/CA, 2013)

### **3.3. Hazardous Substances**

The information in Sections 3.3 through 3.18 is based upon personnel interviews and the preliminary site inspection.

#### *3.3.1. Hazardous Materials and Petroleum Products*

Records search and site investigations revealed there is no evidence that hazardous materials or petroleum products have been generated, stored, or released within the boundaries of the survey area.

#### *3.3.2. Hazardous and Petroleum Waste*

Records search and site investigations revealed there is no evidence that hazardous materials or petroleum waste has been generated, stored, or released within the boundaries of the survey area.

### **3.4. Environmental Restoration (ER) Program Contamination**

In 1992, a DOE Resource Conservation and Recovery Act (RCRA) Facility Assessment identified the following 23 Solid Waste Management Units (SWMUs) at SNL/CA:

- SWMU 1: Fuel Oil Spill Area
- SWMU 2: Arroyo Seco
- SWMU 3: Navy Landfill
- SWMU 4: Former Trash Dump Adjacent to Arroyo Seco
- SWMU 5: Fire Extinguishing Training Area
- SWMU 6: Explosive Test Area
- SWMU 7: Storage Areas Building 918 and 961
- SWMU 8: Burn Pit
- SWMU 9: Monitoring Pits and Tanks
- SWMU 10: Building 913
- SWMU 11: Research Labs Building 916
- SWMU 12: Solvent Tank Building 963
- SWMU 13: Tritium Research Laboratory Building 968
- SWMU 14: Navy Public Works Yard
- SWMU 15: Navy Supply Department - Paint and Drum Storage Area
- SWMU 16: Sewer System
- SWMU 17: Gasoline Storage and Dispensing Facilities
- SWMU 18: Incinerator Fuel Tank
- SWMU 19: Bayco Reclamation Furnace (Incinerator)
- SWMU 20: Cooling Towers
- SWMU 21: Trudell Auto Repair Shop
- SWMU 22: Hazardous Waste Storage Facility Building 962-2
- SWMU 23: Pesticide Storage Area Building 962

(DOE, 1992)

All SNL/CA SWMUs have been designated with a “No Further Action” status due to site remediation having been completed. Only sites 1-3 have established Institutional Controls. No SNL/CA SWMUs are located within or adjacent to the survey area.

Review of the California State Water Resources Control Board “Geotracker” database and the U.S. Environmental Protection Agency Region 9 database indicated that no active ER Sites are located within the boundaries of the survey area and 1 active ER site is located within ½ mile of the survey area boundaries at LLNL. The following provides the current status of the one active ER site located within ½ mile of the survey area boundaries:

**Lawrence Livermore National Laboratory, Main Site (USDOE); EPA # CA2890012584:**

The one-square-mile LLNL site is an active multi-program research laboratory operated by Lawrence Livermore National Security, LLC for the U.S. Department of Energy. A number of research and support operations at LLNL handle, generate, or manage hazardous materials that include radioactive wastes. Hazardous waste treatment activities are carried out on site. The site first was used as a Naval Air Station in the 1940s. In 1951, it was transferred to the U.S. Atomic Energy Commission and was established as a nuclear weapons and magnetic fusion energy research facility. In 1984, the California Department of Health Services (CDHS) issued an Order for Compliance to LLNL to provide alternative water supplies to residents west of the facility, whose wells had been contaminated by hazardous substances from LLNL. There are approximately 50,000 people living within a 2-mile radius of the main Livermore site. It is located about 45 miles east of San Francisco. Groundwater about 2 miles west of the site in downtown Livermore is used as a municipal drinking water source.

Both on- and off-site groundwater have been contaminated with volatile organic compounds (VOCs) and chromium. Fuel hydrocarbons including benzene and ethylene dibromide, the heavy metal lead, and tritium appear only in wells on site. Soil excavated from the site was contaminated with solvents, radioactive wastes, heavy metals, PCBs, and fuel hydrocarbons. Soils remaining on site contain VOCs, tritium, PCBs, fuel hydrocarbons, and inorganic substances.

Initial actions included the excavation and removal of 4,000 cubic yards of contaminated soil from several waste disposal pits to certified off-site disposal sites and closure of an inactive landfill, with subsequent removal of approximately 14,000 cubic yards of contaminated soil. LLNL also provided alternative water supplies to residents with wells affected by contamination. Over the past several years, LLNL constructed several treatment plants for groundwater pumping and treatment and for soil vapor extraction (SVE). These systems will continue to operate until cleanup standards are achieved.

Innovative technologies have played an important role in the remediation of soil and groundwater at the LLNL site. The majority of a 10,000 gallon gasoline spill was remediated within 2 years by using a dynamic underground steam stripping system. Three dimensional

characterization of the subsurface and the use of Portable Treatment Units (PTUs) have allowed engineers to address water bearing units for easier plume capture through targeted pump and treat. Advanced vadose zone modeling has helped improve mass removal rates of soil contamination by increasing the effectiveness of the SVE system. Catalytic reductive dehalogenation (CRD) units are used in a closed loop system to treat VOCs in groundwater that is also contaminated with tritium. The tritiated groundwater remains in the subsurface and undergoes natural radioactive decay. In 2007 LLNL began an optimization phase for groundwater cleanup. Technologies are being evaluated to speed the cleanup of VOCs, augment the existing extraction and treatment facilities, as well as to isolate the tritium.

In 2008, DOE shut down or failed to repair 28 groundwater and soil vapor treatment facilities due to budget cuts. On January 6, 2009, EPA took an enforcement action against DOE which was settled in March 2009. During 2009, DOE brought the shuttered facilities back into operational status. In 2010, DOE began a Focused Feasibility Study (ongoing) to determine the best way to treat and dispose of groundwater with both hazardous and radioactive contaminants (mixed waste). In the summer of 2012, DOE constructed a pipeline to transport groundwater from an offsite plume which is not currently being captured back to a treatment facility onsite.

The removal of contaminated soil, provision of alternate drinking water supplies, and use of groundwater and soil vapor treatment systems have reduced the potential of exposure to contaminated materials at the LLNL main site while studies continue and cleanup activities are being conducted.

A small quantity of soil (about 16 cubic ft.) containing plutonium that barely exceeded EPA action levels of 10 pico-curies-per-gram (pCi/g) was also removed in early 1996.

An emergency response removal action for PCB-contaminated soils was conducted in September 1997. This was in an area of construction at the National Ignition Facility (NIF) where potential worker exposure was an issue. An Action Memorandum followed and was expected to be finalized in February 1998. A time-critical removal action for PCB-contaminated soils in the East Traffic Circle was conducted in 1999. This Site reached Construction Completion in 2007. The remedy will continue to operate until cleanup standards are achieved.

(U.S. EPA, 2013)

### **3.5. Storage Tanks**

A review of the Sandia National Laboratories/California and State of California Environmental Protection Agency State Water Resources Control Board underground storage tank (UST) and aboveground storage tank (AST) database found no tanks associated with the survey area. Furthermore, no active or abandoned pipelines, hydrant fueling, or transfer systems were associated with the area outside of existing potable water and sewage lines.

### *3.5.1. Aboveground Storage Tanks*

This topic is not applicable to the survey area.

### *3.5.2. Underground Storage Tanks*

This topic is not applicable to the survey area.

### *3.5.3. Pipelines, Hydrant Fueling, and Transfer System*

There no underground water supply pipelines outside of existing potable water and sewage lines associated with the survey area. No other known pipelines, hydrant fueling, or transfer systems are associated with this area except for the existing water delivery system pipeline.

## **3.6. Oil/Water Separators (O/WS)**

There are no oil/water separators associated with the survey area. No preexisting facilities of this nature are known to have existed within this area.

## **3.7. Pesticides**

Records review, interviews, and site inspections revealed no evidence that pesticides or herbicides have resulted in any contamination within the proposed survey area. The SNL/CA Facilities Maintenance group provides regular inspections and maintenance for the control of wildlife, pests, and weeds. Typical chemicals approved for modern use, such as Monsanto Roundup, are used for controlling weeds. Rodenticides with chlorophacinone and diphacinone in tamper-proof bait boxes are approved for pest control. All pesticide and herbicide use is managed in accordance with SNL/CA requirements.

## **3.8. Medical or Biohazardous Waste**

Records review and site inspections revealed there is no known medical or biohazardous waste associated with the survey area.

## **3.9. Energetic Material**

Records review and site inspections revealed there has been no production or storage of any ordnance or explosive wastes at the survey area. Site inspections revealed no visible ordnance.

## **3.10. Radioactive Waste**

Records review and site inspections revealed that there has been no generation or storage of radioactive materials or waste at the survey area.

### **3.11. Solid Waste**

Records review and site inspections revealed that general solid waste from office type activities was generated historically from activities in buildings C920, C921, and C922. Currently, a small amount of solid waste is generated at the site from activities associated with the SNL/CA Growers Market and general display area. All solid waste generated is disposed of in an approved licensed landfill. No concerns relating to the health and safety of individuals or local fauna or flora, such as stains or leaks, were observed. Personnel did not observe discolored soil or stressed vegetation at the subject site during the site inspection.

### **3.12. Groundwater**

Records review and site inspections revealed that there are no known groundwater impacts from SNL/CA operations associated with the survey area. Depth to groundwater at the site is approximately 117 ft below ground level.

### **3.13. Wastewater Treatment, Collection, and Discharge**

Records review and site inspections revealed that there are no wastewater treatment, collection, and discharge requirements or facilities associated with the survey area.

### **3.14. Drinking Water Quality**

Potable water used at SNL/CA is purchased from LLNL, which is supplied by the San Francisco Water District through the Hetch Hetchy Aqueduct. Additionally, the Alameda County Flood Control and Water Conservation District, Zone 7, supplements this primary water source as needed. Sandia's water use at SNL/CA is metered by LLNL as it enters the site. In fiscal year 2012, 45.04 million gallons of water were used at SNL/CA, a decrease of 22.7 percent (13.27 million gallons) from water used in fiscal year 2011. The site discharged approximately 5.0 million gallons of wastewater during the calendar year. Water loss, or the difference between water use and wastewater discharge, is attributed to irrigation, cooling towers, water tank releases, evaporative losses, eyewash and safety shower testing, and fire system testing.

(SNL/CA, 2013)

### **3.15. Asbestos**

Records review and site inspections revealed that there is no asbestos contamination associated with the survey area.

### **3.16. Polychlorinated Biphenyls (PCBs)**

Records review and site inspections revealed that there are no known PCB impacts associated with the survey area.

### **3.17. Radon**

Records review and site inspections revealed that there are no known radon impacts associated with the survey area; as such, sampling for radon was not conducted as part of this Phase I investigation.

### **3.18. Lead-Based Paint**

Records review and site inspections revealed that there are no lead-based paint issues associated with the survey area.



## **4. FINDINGS FOR ADJACENT PROPERTIES**

### **4.1. Land Uses**

Adjacent properties to the survey area include SNL/CA buildings C925 Medical, C927 warehouse, C915 Distributed Information Systems Laboratory, and C903, which is part of the Combustion Research Facility.

### **4.2 Surveyed Properties**

Adjacent areas (within 1/2 mile) have been evaluated for the presence of ER Sites. See Section 3.4 of this document for further information regarding ER Sites.



## **5. APPLICABLE REGULATORY COMPLIANCE ISSUES**

This section presents the findings of the EBS as they relate to the environmental regulatory compliance issues identified during the assessment of the survey area that could pose either a risk of liability or a risk to human health or the environment.

### **5.1. List of Compliance Issues**

There are no compliance issues identified during assessment of the survey area that might pose either a risk of liability or risk to human health or the environment. Sandia has responsibility for remediation of ER sites at SNL/CA.

### **5.2. Description of Corrective Actions**

This topic is not applicable to the survey area.

### **5.3. Estimates of Various Alternatives**

#### **Proposed Action:**

This topic is not applicable to the survey area.

### **5.4. Other Alternatives**

#### **No Action Alternative:**

This topic is not applicable to the survey area.



## **6. CONCLUSIONS**

To the best of the author's knowledge there are no known or undisclosed environmental impacts at the survey area, unless otherwise noted within this document.

### **6.1. Facility Matrix**

Category 1 – No storage, release or disposal has occurred. Property where no hazardous substances or petroleum products or their derivatives were stored, released into the environment or structures, or disposed on the subject property and where no migration from adjacent areas has occurred.

### **6.2. Property Categories Map**

This topic is not applicable to the survey area.

### **6.3. Resources Map**

This topic is not applicable to the survey area.

### **6.4. Data Gaps**

There appears to be sufficient information to categorize the survey area and no further effort needs to be made to obtain additional information.



## 7. CERTIFICATION

“I have conducted this Environmental Baseline Survey in accordance with the requirements contained in Air Force Instruction 32-7066, *Environmental Baseline Surveys in Real Estate Transactions*, the standard used by Sandia National Laboratories. I have reviewed all reasonably obtainable records and conducted visual site inspections of the selected facilities following an analysis of information during the record search. The information contained within the survey report is based on records made available and, to the best of my knowledge, is correct and current as of September 18, 2013.”

Certified by:

\_\_\_\_\_  
Christopher S. Catechis,  
Sandia National Laboratories

\_\_\_\_\_  
Date:

Approved by:

\_\_\_\_\_  
Susan Lacy  
Department of Energy  
Sandia Field Office (SFO)

\_\_\_\_\_  
Date:



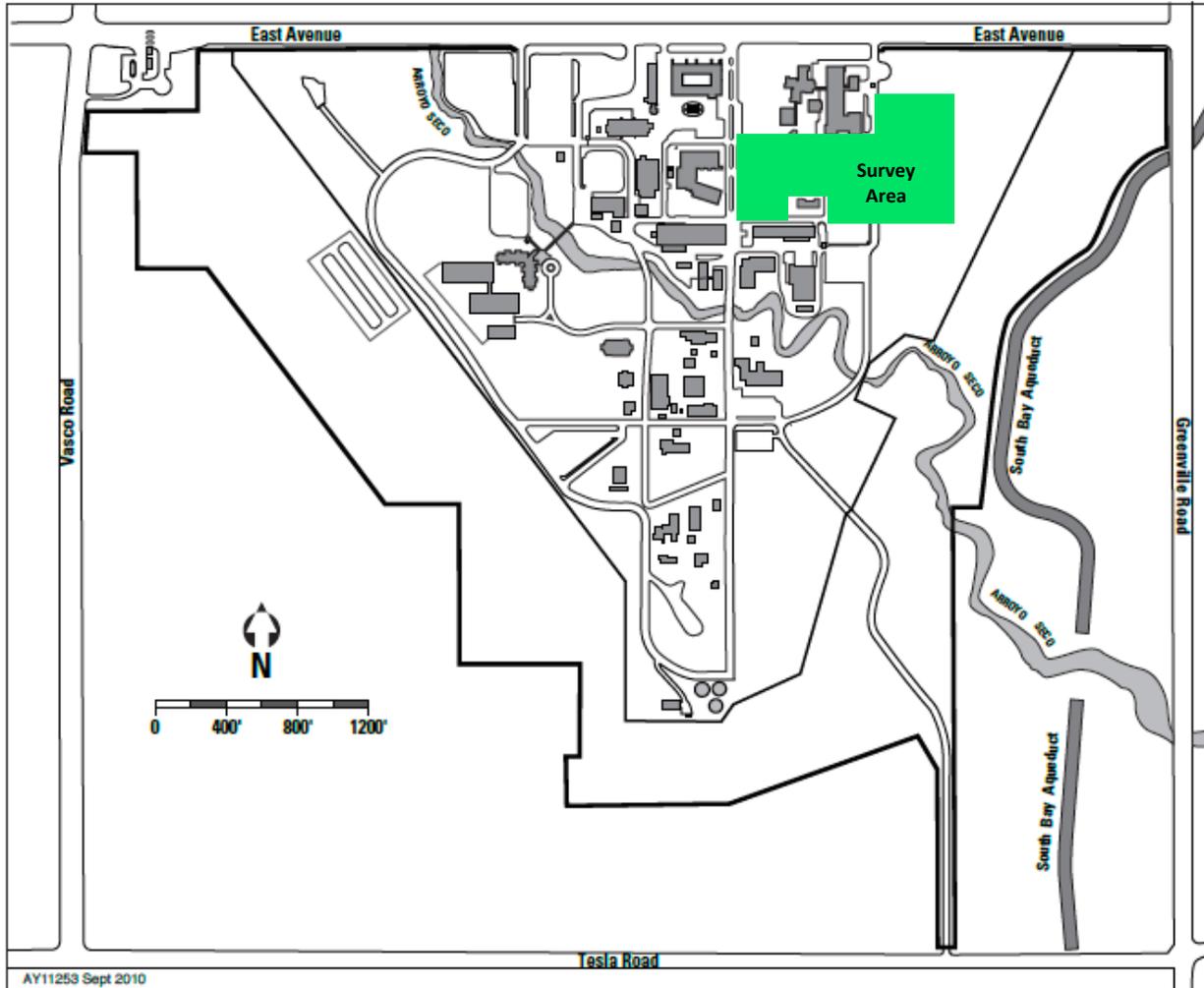
## **LIST OF APPENDICES**

- Appendix A      Survey Area Location Map and Historic Site Photographs**
- Appendix B      Site Inspection Photographs**
- Appendix C      References**
- Appendix D      Personal Interviews**



## APPENDIX A: SURVEY AREA LOCATION MAP AND HISTORIC SITE PHOTOGRAPHS

Survey Area Location Map 2013





SNL/CA Aerial Site Photograph 1956



1956



SNL/CA Aerial Site Photograph 1964



1964



SNL/CA Aerial Site Photograph 1970



1970



SNL/CA Aerial Site Photograph 1976





SNL/CA Aerial Site Photograph 1984



MAY, 1984

SNLL 2-4



SNL/CA Aerial Site Photograph 2001





## APPENDIX B: SITE INSPECTION PHOTOGRAPHS



Photograph B-1. West end of site, looking north toward East Avenue.



Photograph B-2. West end of site, looking northeast.





**Photograph B-3. East end of site, looking west.**



**Photograph B-4. East end of site, looking south.**



## APPENDIX C: REFERENCES

- CSWRCB, 2013 California State Water Resources Control Board “Geotracker” database available online <https://geotracker.waterboards.ca.gov/> Accessed August 19, 2013.
- DOE, 1992 RCRA Facility Assessment. United States Department of Energy Sandia National Laboratories; March 1992.
- SNL/CA, 2002 Sandia National Laboratories Livermore California SAND Report, *Sandia National Laboratories/California Environmental Information Document*, SAND 2002-8053, March 2002, Sandia National Laboratories, Livermore, California.
- SNL/CA, 2013 Site Environmental Report for 2012 Sandia National Laboratories, California; SAND 2013-3735, Printed June 2013.
- LLNL, 2013 Lawrence Livermore National Laboratory Weather. Available online <http://www-metdat.llnl.gov/cgi-pub/index.pl> Accessed on June 12, 2013.
- U.S. EPA, 2013 United States Environmental Protection Agency, Region 9 Cleanup Sites in California. Available online <http://www.epa.gov/region9/cleanup/california.html> Accessed on August 19, 2013.



## APPENDIX D: PERSONAL INTERVIEWS

- A Sandia National Laboratories Environmental Technical Professional working in the Occupational Health, Safety and Environmental Management Organization 08516 was interviewed on June 19, 2013. The discussion involved the survey area boundaries, past history of the area, current and future use of the survey area.
- A Sandia National Laboratories Environmental Restoration and Biologist Subject Matter Expert working in the Occupational Health, Safety and Environmental Management Organization 08516 was interviewed on June 19, 2013. The discussion involved SNL/CA history, ER site information for SNL/CA, USTs and ASTs, oil water separators and historic site photographs.
- A Sandia National Laboratories Strategic Planner working in the Physical Operations Planning & Studies Organization 08512 was interviewed on June 19, 2013. The discussion involved historic real estate files for the survey area and access to those files.
- A Sandia National Laboratories Facilities Technologist working in the Operations Organization 085154 was interviewed on June 19, 2013. The discussion involved inquiry into historic site photographs and their availability for the EBS.
- Sandia National Laboratories Corporate Historian, working in the Recorded Information Management Organization 09532 was interviewed on August 13, 2013. The discussion involved the history of buildings C920, C921, and C922. This included information regarding their construction, operations, and D&D.



## DISTRIBUTION

### U.S. Department of Energy:

U.S. Department of Energy  
National Nuclear Security Administration  
Sandia Field Office (SFO)  
Office of Environment, Safety and Health  
P.O. Box 5400, MS 0184  
Albuquerque, NM 87185-5400

<u>Mail Stop</u>	<u>Name</u>
MS 0184	Lacy, Susan

### NNSA:

Jane Cooper  
National Nuclear Security Administration Service Center  
Routing: NA-161  
P.O. Box 5400  
Albuquerque, NM 87185-5400

### Sandia National Laboratories:

MS 0899	Technical Library	09536
MS 1043	Mayeux, Lucie	04135
MS 1464	Stogsdill, Cindy	04853
MS 9902	Larsen, Barbara	08516

