



# Site Management and Long-Term Surveillance and Maintenance Plan for the U.S. Department of Energy Laboratory for Energy-Related Health Research Federal Facility, Davis, California

October 2005



U.S. Department  
of Energy

## Office of Legacy Management

**U.S. Department of Energy  
Office of Legacy Management**

**Site Management and  
Long-Term Surveillance and Maintenance Plan  
for the  
U.S. Department of Energy  
Laboratory for Energy-Related Health Research Federal Facility,  
Davis, California**

October 2005

Work Performed by S.M. Stoller Corporation under DOE Contract No. DE-AC01-02GJ79491  
for the U.S. Department of Energy Office of Legacy Management, Grand Junction, Colorado

# Contents

Acronyms and Abbreviations .....	v
1.0 Purpose and Scope .....	1-1
1.1 Objectives of the Site Management and LTS&M Plan .....	1-1
1.2 Scope of Site Management and LTS&M at the LEHR Federal Facility .....	1-1
1.3 Organization of the Site Management and LTS&M Plan .....	1-4
2.0 Site Background .....	2-1
2.1 Site Physical Characteristics.....	2-1
2.1.1 Geology and Hydrology.....	2-1
2.1.2 Demography and Land Use .....	2-1
2.2 Site Operational History .....	2-2
2.3 Remedial Program Activities and Status .....	2-2
2.3.1 Risk Assessment and Removal Actions.....	2-3
2.3.2 Radium/Strontium Treatment Systems .....	2-3
2.3.3 Domestic Septic Systems.....	2-4
2.3.4 Western Dog Pens.....	2-4
2.3.5 Eastern Dog Pens .....	2-4
2.3.6 Southwest Trenches .....	2-4
2.3.7 DOE Disposal Box.....	2-5
2.4 Ongoing Remedial Work.....	2-5
3.0 Regulatory Framework.....	3-1
3.1 Legal and Regulatory Requirements .....	3-1
3.2 Role of DOE .....	3-1
3.3 Role of Other Organizations.....	3-1
3.3.1 Federal Facilities Agreement .....	3-1
3.3.2 Memorandum of Agreement.....	3-2
4.0 Site Management and Long-Term Surveillance and Maintenance .....	4-1
4.1 Site Management and LTS&M Overview .....	4-1
4.2 Five-Year Review .....	4-1
4.3 Partial Delisting .....	4-1
4.4 Environmental Monitoring .....	4-2
4.5 Inspections and Maintenance.....	4-2
4.6 Institutional Controls .....	4-2
4.7 Reporting .....	4-2
4.8 Permit and License Administration .....	4-2
4.9 Public Participation and Communication .....	4-3
4.9.1 Meetings.....	4-3
4.9.2 Documents for Public Review and Comment.....	4-3
4.9.3 Administrative Record and Public Reading Room.....	4-3
4.9.4 Internet Website .....	4-4
4.9.5 Information Contacts .....	4-4
4.10 Records and Data Management.....	4-4
5.0 References .....	5-1

## Figures

Figure 1–1. Location of the LEHR Site, UC Davis, California.....	1–2
Figure 1–2. Site Features and Storm Water Monitoring Location.....	1–3

## Appendixes

Appendix A—Contacts List

## Acronyms and Abbreviations

ARAR	applicable or relevant and appropriate requirement
ASER	Annual Site Environmental Report
bgs	below ground surface
CHE	Center for Health and the Environment
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act of 1980 ( <i>42 United States Code</i> [U.S.C.] 9601, <i>et seq.</i> )
D&D	Decontamination and Decommissioning
DOE	U.S. Department of Energy
DSS	Domestic Septic System
EDP	Eastern Dog Pens
EM	Environmental Management
EPA	U.S. Environmental Protection Agency
FFA	Federal Facility Agreement
FS	Feasibility Study
ft	feet (foot)
HSU	hydrostratigraphic unit
LEHR	Laboratory for Energy-Related Health Research
LM	Legacy Management
LTS&M	Long-Term Surveillance and Maintenance
MOA	Memorandum of Agreement
NARA	National Archives and Records Administration
NPL	National Priorities List
RA	removal action
RBAS	risk-based action standard
RI	Remedial Investigation
ROD	Record of Decision
SWRA	Site Wide Risk Assessment
SWT	Southwest Trenches
UC	University of California
WDP	Western Dog Pens

End of current text

## 1.0 Purpose and Scope

U.S. Department of Energy (DOE)-sponsored research was conducted at the former Laboratory for Energy-Related Health Research (LEHR) at the University of California, Davis (UC Davis), from the early 1950s until 1988. Decontamination and decommissioning (D&D) of the facility was begun in 1992 by DOE's Office of Environmental Management (DOE-EM); the site was included on the U.S. Environmental Protection Agency's (EPA's) National Priorities List (NPL) in May 1994 as the LEHR/South Campus Disposal site. DOE shares remediation responsibilities for this site with UC Davis, the property owners. Consistent with the remedial investigation (RI) completed for the site (WA 2003), the term LEHR Federal Facility refers to the portion of the site for which DOE has remediation responsibility. The LEHR Site refers to the entire facility listed on the NPL. The term "LEHR" refers to the land and improvements located within the site boundary (Figure 1-1 and Figure 1-2). The LEHR/South Campus Disposal site extends beyond the fence line shown on Figure 1-2 to include all of UC Davis Landfill #1 and includes UC Davis Landfill #3 (not shown).

UC Davis is responsible for remedial activities associated with three landfills located on the site as well as ground water beneath the site. DOE's management responsibility for the LEHR Federal Facility was transferred from DOE-EM to DOE's Office of Legacy Management (DOE-LM) on October 1, 2005. This Site Management and Long-Term Surveillance and Maintenance (LTS&M) Plan addresses DOE-LM responsibilities required under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) to complete site remediation activities and long-term responsibilities required after deletion of the site from the NPL.

### 1.1 Objectives of the Site Management and LTS&M Plan

The objectives of this plan are to detail DOE-LM responsibilities required in accordance with CERCLA and DOE policy and guidance to arrive at a determination that remediation is complete and no further action is required. Additional activities will support EPA's eventual deletion of the site from the NPL. In addition, site records will need to be maintained for the foreseeable future. Because final remediation of the site has not yet been completed, this plan includes both pre- and post-closure activities. Upon final remediation, the plan will be revised to reflect only post-closure requirements.

### 1.2 Scope of Site Management and LTS&M at the LEHR Federal Facility

The scope of site management and LTS&M required at the DOE portion of the LEHR Site is limited. Remediation of the site involved off-site disposal of wastes; a limited amount of residual subsurface soil contamination remains. However, no long-term on-site waste management by DOE is required. DOE-EM has been conducting limited storm water monitoring at the site. DOE is in the process of completing a feasibility study (FS) for the DOE areas of the site; a Site Wide Risk Assessment (SWRA) is also in preparation, which will encompass both the DOE and UC Davis areas. Depending on the outcome of these two evaluations, DOE may be required to complete some additional remedial activities in the DOE areas. These activities will be documented in the Record of Decision (ROD).



M:\LTS\111\0074\01\S01780\S0178000.mxd carverh 5/5/2005 5:00:08 PM

Figure 1-1. Location of the LEHR Site, UC Davis, California



Figure 1-2. Site Features and Storm Water Monitoring Location

It is anticipated that once a ROD is finalized for the site and remediation is deemed complete, future monitoring activities will be conducted by UC Davis, as the current site occupant. DOE-LM is in the process of updating an agreement with UC Davis that details responsibilities of each party (see Section 3). It is also anticipated that, as the landowner, UC Davis will also have responsibility for enforcing any institutional controls required at the site. DOE anticipates completing the first five-year review for the LEHR Federal Facility in coordination with the UC Davis five-year review. Future five-year reviews of the LEHR NPL Site will be the responsibility of UC Davis when the LEHR Federal Facility is removed from the NPL.

Pending completion of the SWRA of the LEHR Site and the LEHR Federal Facility FS, it is anticipated that the ROD would require only limited remedial activities beyond the completed removal actions (RAs). The process for obtaining an approved ROD under CERCLA will be followed, including requirements for public notification and involvement. Upon ROD approval, DOE will complete any additional remedial activities that are required. At that time, it is anticipated that the Federal Facility portion of the LEHR Site will be eligible for partial deletion from the NPL. This plan will be updated and revised as the LTS&M requirements for the site change.

### **1.3 Organization of the Site Management and LTS&M Plan**

This plan provides a brief site background and a description of operational and remedial activities. The regulatory framework is described, including roles and responsibilities of different organizations involved in site management and LTS&M activities. Specific DOE-LM site management and LTS&M requirements are then detailed. References where more detailed site information can be obtained are also provided.

## 2.0 Site Background

The LEHR Site is located in Solano County, California, in the southeast quarter of Section 21, Township 8 North, Range 2 East, Mount Diablo Base and Meridian (Figure 1–1). The facility is approximately 1.5 miles south of the town of Davis and is surrounded by UC Davis research facilities, farmland, and the South Fork of Putah Creek.

The LEHR Site is located about 50 feet (ft) above mean sea level and has a gently sloping surface. The climate is temperate, with mild winters and long warm summers. The average annual precipitation at Davis is a little over 17 inches (WA 2003), and the prevailing wind direction is from the south.

### 2.1 Site Physical Characteristics

#### 2.1.1 Geology and Hydrology

The South Fork of Putah Creek forms the southern boundary of the site. Flow in the creek is regulated by releases from two dams located about 18 and 14 miles upstream (west) of the site (WA 2003). The creek also receives discharge from the UC Davis Wastewater Treatment Plant. According to the RI completed for the site (WA 2003), Putah Creek is a losing stream, thereby providing recharge to the ground water.

The LEHR Site is underlain by a series of nearly flat-lying sedimentary layers composed of materials ranging from clays to cobbles. These approximately 180-ft-thick sediments overlie the Tehama Formation, which is the principal water-bearing unit on the west side of the Sacramento Valley. Both unconfined and confined freshwater aquifers are present in the sedimentary deposits in the uppermost 3,000 ft of the valley subsurface (WA 2003).

Five hydrostratigraphic units (HSUs) have been identified beneath the LEHR Site: the vadose zone and HSUs 1 through 4. Depth to ground water at the site has ranged from 15 to 65 ft below ground surface (bgs). The base of HSU 1 extends to a depth of approximately 76 to 88 ft bgs (WA 2003). The base of HSU-2 extends from 114 to 130 ft bgs; HSU 3 and HSU 4 extend to approximately 250 and 282 ft bgs, respectively. HSUs 1 and 2 make up the uppermost aquifer beneath the site and have been affected by site-related contaminants. Site-related contaminants include chloroform, carbon-14, and tritium. Regional water quality has also been affected by nitrates from agricultural sources and hexavalent chromium attributed to natural sources (WA 2003). UC Davis started an interim removal action pump and treat for the chloroform ground water plume in 1998 (EPA Region 9 fact sheet).

#### 2.1.2 Demography and Land Use

LEHR is part of the Davis/UC Davis community. UC Davis has a student population of approximately 26,094 and employs approximately 16,773 full-time faculty and staff based on 2000 figures (WA 2003). The current population of Davis is approximately 60,308 (WA 2003). Many of the buildings formerly used for DOE-funded research activities at LEHR are currently occupied by the Center for Health and the Environment (CHE) program. CHE has 14 resident and 13 affiliate faculty members with 9 support staff and houses the Division of Reproductive Biology, UC Agricultural Health and Safety Center, and IR-4 research programs (WA 2003).

LEHR is designated as “Urban and Built-Up Land” by the State of California Department of Conservation for Yolo and Solano Counties Important Farmlands Maps (WA 2003). Specific land uses for LEHR and the immediately adjacent areas are consistent with the UC Davis long-range development plans and are under control of UC Davis (WA 2003). Land in the immediate vicinity of LEHR is either part of the UC Davis campus (and used primarily for research) or is used for agriculture. LEHR will most likely remain research-oriented for the foreseeable future (WA 2003).

LEHR Site ground water is not currently used for drinking water or other direct human use. Drinking water is supplied to LEHR by the campus water system drawing from five deep wells. The nearest well is approximately 400 ft north of LEHR and has a screened interval from 1,120 to 1,400 ft bgs—well below the depth of contamination of the LEHR Site and geologically isolated from site ground water contamination.

## **2.2 Site Operational History**

The U.S. Atomic Energy Commission (DOE’s predecessor agency) began conducting radiological studies on laboratory animals, particularly beagles, at LEHR in the early 1950s. Initial studies were carried out on the main UC Davis campus and involved the irradiation of beagles. Research activities began at LEHR in 1958. DOE funded research activities at LEHR through the mid-1980s and focused on the health effects from chronic exposure to radionuclides, primarily strontium-90 and radium-226. Other research involved use of a cobalt-60 irradiator facility as well as the use of americium-241 and plutonium-241.

UC Davis operated two landfills within the boundaries of LEHR: Landfill Disposal Unit 1 from the early 1940s through mid-1950s and Landfill Disposal Unit 2 from 1956 through 1967. Those units were used exclusively for the disposal of UC Davis waste (WA 2003). Site features are shown on Figure 1–2.

All DOE-funded research activities at LEHR had ended by 1988. Environmental investigations commenced in 1984. D&D of buildings began in 1992, and CERCLA remedial activities began in 1996.

## **2.3 Remedial Program Activities and Status**

The LEHR Federal Facility is defined in the Federal Facility Agreement (FFA) as the following areas at the site: “Maintenance Shop (H-212); Main Building (H-213); location of the former Imhoff Building (H-214); Reproductive Biology Laboratory (H-215); Specimen Storage (H-216); Inter-regional Project No. 4 (H-217); Animal Hospital No. 2 (H-218); Animal Hospital No. 1 (H-219); Co-60 Building (H-229); Occupational and Environmental Medicine Building (H-289); Co-60 Annex (H-290); Geriatrics Building No. 1 (H-292); Geriatrics Building No. 2 (H-293); Cellular Biology Laboratory (H-294); Small Animal Housing (H-296); Toxic Pollutant Health Research Laboratory (H-299); Storage Space (H-300); cobalt-60 irradiation field; southwest trenches; the strontium-90 and radium leach fields and the radium-226 waste tanks; the former dog pen areas and associated soils and gravels; the seven septic tanks; the Imhoff storage tanks; the DOE disposal box; and areas where contamination originating from the areas listed above have come to be located, excluding areas assigned to the University of California...”

Ground water has been monitored at the site since 1987. DOE originally conducted monitoring activities. However, the 1997 Memorandum of Agreement (MOA) between DOE and UC Davis states UC Davis is solely responsible for investigating, monitoring, or remediating affected ground water. DOE is responsible for storm water monitoring until DOE completes its remedial activities. UC Davis has been operating the interim removal action ground water pump-and-treat system since 1998.

Studies to characterize the nature and extent of chemical and radiological contamination at the areas of the LEHR Site used for DOE-sponsored research began as early as 1984. DOE commenced transferring occupancy rights to DOE buildings once the research mission ended. Buildings or portions of buildings not transferred in the beginning were those that were contaminated or were needed to support the DOE restoration program. DOE maintained a portion of one of the four buildings that was D&D until 2005. Ownership of all buildings was transferred in 2005. The CERCLA RI was conducted concurrently with RAs, which began in 1996 (WA 2003). Six major source areas were addressed: Radium/Strontium (Ra/Sr) Treatment System, Domestic Septic Systems 1 through 7 (DSSs 1–7), Western Dog Pens (WDPs), Eastern Dog Pens (EDPs), Southwest Trenches (SWTs), and the DOE Box (Figure 1–2).

### **2.3.1 Risk Assessment and Removal Actions**

Through the RA process, contaminated materials were removed and disposed of off site. Pre-removal characterization data were used to identify soils at each DOE area that contained constituents in concentrations statistically above background. Constituents above background were considered to be contaminants of concern (COCs) for that DOE area. COC concentrations were compared to risk-based screening levels to identify “driver COCs” for each area that were used to guide the removal process. Risk-based remediation goals were established for each COC on the basis of probable future site use as a research or industrial facility. Screening samples were collected as the removal process progressed and were used by remedial project managers to determine when the removals were complete. Before the excavations were backfilled, confirmation sampling was performed in accordance with *Statistical Methods for Evaluating the Attainment of Cleanup Standards* (EPA 1994) for cleanups with the goal of achieving near-background conditions. Excavations were then backfilled with clean fill and graded.

Sections 2.3.2 through 2.3.7 provide a brief description of each source area and summarize removal activities. More detailed descriptions are provided in the RI (WA 2003).

### **2.3.2 Radium/Strontium Treatment Systems**

Beagles involved in Sr-90 and Ra-226 experiments were housed in two animal hospitals AH-1 and AH-2. Wastewater from the dog cages at AH-1 and AH-2 was treated by the Sr-90 and Ra-226 treatment systems, respectively. Treated water was discharged to a leach field; sludges accumulated in tanks. The removal action consisted of removal of the treatment system tanks and piping and contaminated surrounding soils. Radioactive liquid and sludges were solidified and packed in drums. Wastes were shipped off site for disposal. Following removal of subsurface structures and surrounding soils, confirmation samples were collected. The area was then backfilled with clean fill and graded. There are no additional remedial actions expected for this area.

### **2.3.3 Domestic Septic Systems**

Seven known DSSs were located throughout the site and served LEHR offices and laboratories. A typical system consisted of a tank, leach field, and interconnected piping. However, DSS 1 and 5 discharged to dry wells (i.e., Dry Wells A–E) rather than a leach field. It was reported that DSS 7 was never used and there was no evidence that a leach field existed. The tank appears to have been destroyed when the sewer line was installed (WA 2003). The DSSs operated starting in 1958 until the site was connected to the Waste Water Treatment Plant in 1971. Based on characterization results, it was determined that removal actions were only appropriate for DSSs 2, 3, and 6; the other DSSs had concentrations below risk-based action standards (RBASs). The removal actions consisted of removal of the tanks, piping, and surrounding soils with off-site disposal of materials. Clean fill was placed in excavated areas. Some soil removal was also conducted in associated leach fields based on characterization and comparison with RBASs. Those soils were also disposed of off site. No additional remedial actions are anticipated for the DSSs, though some type of infiltration control may be needed depending on the outcome of the FS. DOE would be responsible for inspection and maintenance for these controls for as long as they are required.

### **2.3.4 Western Dog Pens**

The dog pen areas provided outdoor housing for irradiated beagles. Feces were removed from each pen daily, but urine percolated into the gravel floor of the pens (WA 2003). The gravel was periodically removed for disposal in the SWT and possibly off site (WA 2003). Chlordane was also used for a period of time to control fleas. It was sprayed in and around the dog pens. From 1960 to 1968, it was routine practice to dip the dogs in chlordane. Asphalt and concrete curbs also existed in the vicinity of the dog pens.

Characterization data showed that RBASs were not exceeded for soils in the WDP area. Characterization of asphalt, concrete, and gravel was inconclusive. The RA consisted of removing the dog pens, gravel, asphalt, and concrete curbs in the area. Six inches of soil underlying the asphalt was also removed as a conservative measure. Materials were shipped off site for disposal. No additional remediation is expected in this area as a result of the SWRA. However, DOE is still responsible for backfilling a portion of the WDP area to prevent ponding. SWT overburden is stockpiled in the WDP and clean fill is stockpiled adjacent to the WDP for use for backfill.

### **2.3.5 Eastern Dog Pens**

The EDPs overlie UC Davis Landfill Disposal Unit 2. Operation of the dog pens was discussed in Section 2.3.4. The remediation performed for the EDPs consisted only of removal of the dog pens and an interior chain link fence. Gravel, asphalt, concrete, and subsurface soils have not been disturbed because of the presence of the landfill. DOE anticipates negotiating an agreement with UC Davis to include EDP gravels, asphalt, and concrete as part of the Landfill Disposal Unit 2 final cover.

### **2.3.6 Southwest Trenches**

The SWTs were shallow pits and trenches used for disposal of LEHR-generated low-level radioactive waste, fecal material, and laboratory wastes. Disposal consisted of excavation of a

shallow trench with placement of laboratory waste, dog pen gravel, and soil. Lab waste consisted of vials, syringes, glass jars with unknown liquids and solids, animal bones, and other materials (WA 2003). The trenches were then covered with native soils. Part of the SWT area was also used for treating dogs with chlordane. The RA consisted of excavation of materials from the trench areas for off-site disposal and backfilling excavations with clean fill. Some residual contaminated soil was left in place at the SWT area. Depending on the outcome of the FS, some type of infiltration control may be needed for the SWTs. DOE would be responsible for inspection and maintenance of these controls for as long as they are required.

### **2.3.7 DOE Disposal Box**

The DOE Disposal Box was a 36-ft by 9-ft by 10-ft plywood-lined trench that was used for disposal of low-level radioactive waste. Wastes consisted of bottles, syringes, vials, and gravels. A time-critical RA was performed in this area, which resulted in the removal of 110 cubic yards of waste. The waste was containerized and shipped off site for disposal. The excavation was lined with a synthetic liner and backfilled with clean fill. No additional remedial actions are anticipated for the DOE Disposal Box area.

## **2.4 Ongoing Remedial Work**

Removal actions were conducted as part of the remedial investigations. CERCLA documentation must now be completed to determine if any additional remediation is required and to establish LTS&M requirements. DOE is currently preparing a Feasibility Study (FS). The FS will identify any risks that need to be addressed through final remedial action and evaluate options for managing risks. A Proposed Plan (PP) will be prepared describing the final proposed actions. The public will have an opportunity in the spring of 2007 to comment on both the FS and PP. Following the Final Proposed Plan, a Record of Decision (ROD) will be prepared to document the final remedy. A Remedial Action Work Plan will be prepared to implement the remedial actions, if necessary.

As noted, buildings on the site were decommissioned and ownership transferred to UC Davis for continued use. Except for the EDP area, most contaminated soil was removed from the source areas for off-site disposal. Excavations were backfilled with clean fill. Therefore, only clean soil is present at the ground surface.

Based on confirmatory soil sampling, risks were calculated for specific exposure scenarios for residual soil contamination and compared with remedial action objectives for the DOE areas. These objectives were to reduce risk below  $10E^{-6}$  for continued use of the site for research. The risk evaluation indicated that the goal for carcinogens was achieved at all DOE areas. The goals for noncarcinogens were generally achieved as well, with the exception of mercury in a few instances. However, whenever calculated risks exceeded remedial action objectives, it was always by less than an order of magnitude. Because of the conservative nature of the exposure assumptions, it is likely that the calculated risks are overestimates. Additionally, the clean fill placed in the excavations has effectively severed any potential surface exposure pathways.

Designated level modeling, a one-dimensional ground water model, was used as a screening tool to evaluate potential impacts of residual contamination on ground water (WA 2003). Modeling results indicate that residual subsurface contamination at some source areas could eventually

affect ground water. In most cases, the impact of residual contamination is expected to be minimal and will require no further remedial activities except for ground water monitoring. However, for the SWTs and DSSs, potential impacts may be great enough to require the installation of some type of infiltration control. Currently, the SWT area is covered with black plastic to minimize infiltration.

In the dog pen areas, the WDP area has been remediated to levels for unrestricted release. An ecological concern remains until DOE backfills the area to prevent ponding. The EDP area gravel and concrete curbs will remain and be incorporated into the cover for the UC Davis Land Disposal Unit 2. DOE anticipates negotiating with UC Davis for the incremental cover costs as a result of the curbs.

. Upon completion of all remaining CERCLA-required activities, this plan will be revised and incorporate by reference appropriate closeout documentation that reflects the final conditions of the site, including quantities and concentrations of any residual contamination, and to define long term stewardship requirements.

## **3.0 Regulatory Framework**

### **3.1 Legal and Regulatory Requirements**

The primary regulatory driver at the LEHR Federal Facility is CERCLA. During preparation of the CERCLA FS, all other applicable or relevant and appropriate requirements (ARARs) must be identified. A draft of the ARARs for the LEHR Federal Facility has been compiled (WA 2004) and will be incorporated into the FS and subsequent ROD.

The key requirements and responsibilities for investigations and response actions under CERCLA are contained in the FFA for the site and in the MOA with UC Davis. The FFA includes requirements specific to the LEHR Federal Facility, and the MOA defines responsibilities for the entire LEHR NPL Site. There have been three MOAs (1988, 1990, and 1997) to reflect the changing understanding of the LEHR Site and the roles of DOE and UC Davis; when defined, an updated agreement will be prepared between DOE and UC Davis that will address long-term surveillance and maintenance issues. The FFA will also be revised as necessary to incorporate long-term management.

### **3.2 Role of DOE**

In 1989, DOE-EM established the Long-Term Surveillance and Maintenance Program for the long-term surveillance and maintenance of all DOE remedial action sites, disposal sites, and other sites, as assigned, that (1) have no ongoing DOE mission and (2) are not part of a larger DOE facility.

In 2003, DOE established the Office of Legacy Management (LM), to manage the department's post-closure responsibilities and ensure the future protection of human health and the environment. This office has control and custody for legacy land, structures, and facilities and is responsible for maintaining them at levels suitable for their long-term use. DOE-LM is responsible for the implementation and revision of the LEHR Federal Facility Site Management and LTS&M Plan.

### **3.3 Role of Other Organizations**

A number of other organizations play a role in the remediation and long-term surveillance and maintenance of the LEHR Site. As noted above, these roles are spelled out in two separate site agreements—the FFA and the MOA for the LEHR Site. The roles and responsibilities addressed in these two agreements are summarized below.

#### **3.3.1 Federal Facilities Agreement**

The parties to the FFA include DOE, EPA Region 9, California Department of Toxic Substances Control, Central Valley Regional Water Quality Control Board, and California Department of Health Services. EPA has the primary regulatory authority under CERCLA, with other agencies providing active oversight with respect to state programs and regulations. According to the FFA, all agencies have the opportunity to review and comment on remediation-related documents produced by DOE, and may request document modification based on information that they may have. All parties participate in regular meetings and participated in project planning and

prioritization. Agencies are also supposed to help in obtaining permits, as needed, and provide general regulatory assistance. All parties to the agreement share data that they have collected with the other participants. The FFA also provides a schedule for CERCLA primary and secondary document preparation. Although UC Davis is not a party to the agreement, the FFA does provide for integration of DOE and UC Davis data.

### **3.3.2 Memorandum of Agreement**

An MOA between DOE and UC Davis was first drawn up in 1988 and new MOAs have been negotiated in 1990 and 1997 to reflect the changing nature of site activities and party responsibilities. The agreement will be revised to define the new points of contact. UC Davis is the property owner of the LEHR Federal Facility and is responsible for most activities associated with the site. DOE conducted surveys on its buildings and following release of the buildings for unrestricted use; ownership was transferred to UC Davis. UC Davis is responsible for their maintenance, demolition and any contamination they caused from their use. DOE still has a liability if DOE contamination is found later, per CERCLA property transfer requirements. Until the ROD for the LEHR Federal Facility is finalized, DOE will continue its current site activities, as discussed in Section 4. Upon completion of all remedial activities at the LEHR Federal Facility, it is likely that DOE can terminate monitoring activities. All on-site DOE activities will likely cease after completion of the first five-year review for the site.

## **4.0 Site Management and Long-Term Surveillance and Maintenance**

### **4.1 Site Management and LTS&M Overview**

DOE-LM's responsibilities at the LEHR Federal Facility fall into two categories: pre-ROD and post-ROD. The pre-ROD requirements are the continuation of DOE-EM's monitoring activities and completion of CERCLA site closeout requirements. Once the ROD is approved and remediation is deemed complete, this Site Management and LTS&M Plan will be revised to define post-ROD LTS&M activities.

Pre-ROD activities consist of continued storm water monitoring, preparation of the Annual Site Environmental Report (ASER), compliance with National Emission Standards for Hazardous Air Pollutants reporting requirements, and recordkeeping. CERCLA requirements include completion of the FS and preparation of the Proposed Plan and associated activities leading to the ROD. After issuing the ROD, DOE will be responsible for completing any required remedial activities as well as preparing remaining closeout documentation to support partial delisting requirements. Maintenance of the current Administrative Record for the LEHR Federal Facility will also be required.

After approval of the ROD, completion of remedial activities, and partial delisting of the site, it is anticipated that a single five-year review will be required and that all monitoring responsibilities will be transferred to UC Davis. DOE's on-site activities would then be completed, and the only long-term activities would be maintenance of historical and current site records and responding to stakeholder inquiries.

DOE will continue to review monitoring data to ensure residual contamination is not impacting ground water.

### **4.2 Five-Year Review**

Because some residual contamination was left in place following completion of RAs at the LEHR Federal Facility that does not permit unrestricted use, a five-year review must be conducted for the site after remedial action completion. Reviews would be conducted in a manner consistent with EPA guidance (EPA 2001). It is anticipated that the review will confirm conclusions reached in the RI that the residual contamination does not pose a significant threat to ground water.

### **4.3 Partial Delisting**

As noted in EPA guidance (EPA 2001), five-year reviews and site delisting are independent of one another. Deletion can begin once EPA has made, in consultation with the State, a determination that no further remedial action is required for a site. Partial deletion can take place before remediation is complete for the UC Davis portion of the site as long as UC Davis activities would not affect the status of the LEHR Federal Facility. EPA has responsibility for the delisting process; DOE will provide any information needed to support this process.

## **4.4 Environmental Monitoring**

Pre-ROD environmental monitoring will consist of twice per year storm water monitoring from the lift station at location LS-1 (Figure 1–2). As is currently being done, one sample will be collected in the fall or early winter after the first large precipitation event, and a second will be collected after a large mid- to late-winter precipitation event. UC Davis issues an annual water monitoring report that incorporates DOE storm water data. The 1997 MOA states that DOE no longer needs to perform storm water monitoring after all remedial actions have been implemented. After approval of the ROD and completion of remediation, any DOE monitoring will be addressed in the LTS&M Plan.

Storm water samples are analyzed for the following constituents: tritium, carbon-14, strontium-90, radium-226, metals, hexavalent chromium, nitrate, low-level mercury, acute aquatic toxicity, alkalinity, other cations and anions, volatile organic compounds, chloroform, semivolatile organic compounds, pesticides, polychlorinated biphenyls, total oil and grease, suspended and dissolved solids, and total organic carbon.

## **4.5 Inspections and Maintenance**

This Plan will be revised following completion of the remedial action to address post ROD LTS&M requirements.

## **4.6 Institutional Controls**

This site is being cleaned up to be consistent with the UC Davis Long-Range Development Plan. Land use controls are anticipated because the cleanup goals did not allow unrestricted use (WA 2003). UC Davis has three landfills on site that will also need land use controls. Final determination of land use controls will be contained in the DOE ROD and implementation of these controls will be addressed in the post ROD LTS&M Plan.

## **4.7 Reporting**

According to the MOA, the handling, storage, and disposal of any wastes generated by DOE through its activities at the site are the sole responsibility of DOE. DOE is responsible for filing annual reports with the State of California for the management of hazardous and radioactive mixed wastes generated by or associated with DOE's activities. DOE has submitted Department of Toxic Substances Control Form 1358 requesting inactivation of the DOE LEHR ID No. CAD982469702. Input into DOE's RCRA 3016 report is required every 2 years. DOE's activities have also been reported in an ASER every year. In addition to reporting DOE's waste management activities, the ASER also describes environmental data collected by DOE and references the UC Davis Annual Water Monitoring Report. The ASER is provided to the public for information. After DOE activities are completed for the LEHR Federal Facility, it is assumed that DOE environmental monitoring will cease and that the ASER will no longer be required.

## **4.8 Permit and License Administration**

There are no permits or licenses issued to DOE for the LEHR Federal Facility. DOE has no responsibility for permits or licenses issued to UC Davis for their operations.

## **4.9 Public Participation and Communication**

Promoting public involvement in the surveillance and maintenance process at the LEHR Site ensures that citizens' concerns are addressed and that relevant public information is provided. Active citizen involvement also promotes understanding of, and encourages informed participation in, the project by the general public. DOE encourages public participation by providing site information through public and DOE contacts, providing documents to the public for comment, and holding public meetings. According to the MOA, UC Davis in coordination with DOE shall take the lead in working with the public.

### **4.9.1 Meetings**

DOE provides briefings and presentations describing on-site activities in a variety of public forums. Because of limited post-ROD requirements, DOE anticipates holding public meetings in accordance with CERCLA requirements, as appropriate, depending on stakeholder interest.

#### **4.9.1.1 Annual Meetings**

The Davis South Campus Superfund Oversight Committee usually hosts a public meeting each fall. In addition, DOE-LM will hold a public meeting annually or as circumstances dictate to address issues of importance to stakeholders. These meetings will provide information about long-term surveillance and maintenance activities being conducted at the site and will present the results of annual site inspections.

#### **4.9.1.2 Additional Meetings**

DOE-LM will host a public meeting to coincide with the release of the CERCLA five-year Review report. DOE will hold additional public meetings as needed.

### **4.9.2 Documents for Public Review and Comment**

A formal public involvement process for decision documents is an important part of the CERCLA process and is in place to ensure that stakeholders have the opportunity to comment on cleanup and closure decisions at the site. DOE releases a draft copy of all decision documents for regulatory review and comment. After regulator comments have been addressed, the document is released for public comment and can be viewed in the Public Reading Room (see Section 4.9.3). A copy of the approved document and response to comments are placed in the Administrative Record.

### **4.9.3 Administrative Record and Public Reading Room**

DOE has established a Public Reading Room at the Davis Branch of the Yolo County Library in Davis, California, which contains documents and information related to the LEHR Federal Facility. Copies of key documents, including the CERCLA Administrative Record and Information Repository, are kept in the Public Reading Room. The Administrative Record and Information Repository are updated as new documents are created, and an index of documents in the complete collections accompanies each update. Stakeholders are notified through public notices when a document is available for public comment, and review copies are placed in the reading room. The reading room address and hours of operation are as follows:

Davis Branch Library  
315 E 14th Street  
Davis, California 95616  
(530) 757-5593

Hours:

1:00 p.m. – 9:00 p.m. Monday  
10:00 a.m. – 9:00 p.m. Tuesday through Thursday  
10:00 a.m. – 5:30 p.m. Friday and Saturday  
1:00 p.m. – 5:00 p.m. Sunday

#### 4.9.4 Internet Website

Copies of key LEHR Federal Facility documents, including the CERCLA Administrative Record index, will be available on the DOE-LM website at <http://www.lm.doe.gov>.

#### 4.9.5 Information Contacts

The purpose of the contact effort is to ensure that public and key community leaders, including federal, state, and local government officials, are kept informed of site activities and status changes. Contact information is maintained for the following:

- Legislative and executive branch officials (federal, state, and local).
- EPA.
- State regulators.
- UC Davis.
- Interest groups and interested citizens.

The information contacts for the LEHR Site are listed in [Appendix A](#).

#### 4.10 Records and Data Management

The National Archives and Records Administration (NARA) Regional Records Center in San Bruno, California, is currently the designated facility for archived LEHR Federal Facility records. DOE-LM will retain custody of the records sent to the NARA facility and will be responsible for their destruction at the end of their approved retention periods. All records with permanent value will be transferred to and will be the responsibility of NARA, Pacific Region, San Francisco, California. All records inherited or created by DOE-LM will be managed in accordance with Title 36 *Code of Federal Regulations*, “Agency Records Management Program,” Parts 1220–1236.

DOE-LM will maintain active records until no longer needed. Active records contain information essential to the long-term care and custody of the site pursuant to applicable laws and regulations. In general, these records include site characterization reports, remedial action plans, National Environmental Policy Act documents, engineering design and construction documents, as-built drawings, results of ground water monitoring, and annual inspection reports.

## 5.0 References

Federal Facilities Agreement for the Laboratory for Energy-Related Health Research, 1999.

Memorandum of Agreement between the United States Department of Energy and the Regents of the University of California Regarding the Investigation and Remediation of the Laboratory for Energy Related Health Research at the University of California, Davis, June, 1997.

UC Davis, 2002. *UC Davis 2003 Long Range Development Plan*, October.

EPA (U.S. Environmental Protection Agency), 1994. *Statistical Methods for Evaluating the Attainment of Cleanup Standards, Vol. 3: Reference-Based Standards for Soils and Solid Media*, EPA/230-R-94-004, June.

EPA, 2000. *Closeout Procedures for National Priorities List Sites*, EPA 540-R-98-016, OSWER Directive 9320.2-09A-P, January.

EPA, 2001. *Comprehensive Five-Year Review Guidance*, EPA 540-R-01-007, OWSER No. 9355.7-03B-P, June.

EPA, Region 9, undated. *LEHR/Old Campus Landfill (USDOE) Laboratory for Energy-Related Health Research (USDOE and UC Davis)*, NPL Fact Sheet, <http://www.epa.gov/superfund/sites/nplfs/fs0904786.pdf>.

WA (Weiss Associates), 2001. *Final Engineering Evaluation/Cost Analysis for the Western and Eastern Dog Pens at the Laboratory for Energy-Related Health Research, University of California, Davis*, February.

WA 2003. *DOE Areas Remedial Investigation Report for the Laboratory for Energy-Related Health Research, University of California, Davis*, September.

WA 2004. Draft DOE Areas Feasibility Study, in prep.

End of current text

**Appendix A**  
**Contacts List**

<b><i>U.S. Department of Energy (DOE)</i></b>	
<b>DOE Office of Legacy Management</b>	
Vijendra (Vijay) Kothari, DOE-LM Project Manager MS-K09, PO Box 880 3610 Collins Ferry Road Morgantown, WV 26507 (304) 285-4579 vijendra.kothari@netl.doe.gov	Madhav Ghate Office of Legacy Management Stakeholder Relations U.S. Department of Energy P.O. Box 880 Morgantown, WV 26507-0880 (304) 285-4135 Email: mghate@netl.doe.gov
Ray Plieness DOE-LM Director 2597 B 3/4 Road Grand Junction, CO 81503 (970) 248-6091 Ray.Plieness@gjo.doe.gov	
<b>DOE Office of Environmental Management</b>	
Jay Tomlin U.S. Department of Energy Oakland Environmental Programs 1301 Clay Street, P.O. Box 54 Oakland, CA 94612-5208 (510) 637-1637 Email: jtomlin@oak.doe.gov	John Wood U.S. Department of Energy Oakland Environmental Programs 1301 Clay Street, P.O. Box 54 Oakland, CA 94612-5208 (510) 637-1640 Email: john.wood@oak.doe.gov
<b><i>U.S. Environmental Protection Agency</i></b>	
Patti Collins, Lead for UC Davis Superfund Remedial Project Manager U.S. Environmental Protection Agency Region 9 Superfund Division–Air Force and Navy 75 Hawthorne Street, SAD-8-1 San Francisco, CA 94105-3910 (415) 972-3156 Email: collins.patti@epa.gov	Kathy Setian, Lead for DOE U.S. Environmental Protection Agency 75 Hawthorne Street, SAD-7-2 San Francisco, CA 94105 (415) 972-3180 Email: setian.kathy@epa.gov

<b><i>California Environmental Protection Agency</i></b>	
<p>Steven Ross Department of Toxic Substances Control, California EPA 8800 Cal Center Drive Sacramento, CA 95826 (916) 255-3694 Email: sross@dtsc.ca.gov</p>	<p>Susan Timm CVRWQCB, California EPA 11020 Sun Center Drive #200 Rancho Cordova, CA 95670-6114 Phone: (916) 464-4657 Email: stimm@waterboards.ca.gov</p>
<p>Stephen Pay DHS/RHB California Department of Health Services Radiologic Health Branch, MS 7610 P.O. Box 997414 Sacramento, CA 95889-7414 (916) 440-7966 (916) 440-7900 spay@dhs.ca.gov</p>	
<b><i>Federal Elected Officials</i></b>	
<p>The Honorable Diane Feinstein Senator United States Senate 331 Hart Senate Office Building Washington, DC 20510-0504 (202) 224-3841</p>	<p>The Honorable Barbara Boxer Senator United States Senate 112 Hart Senate Office Building Washington, DC 20510-0505 (202) 224-3553</p>
<p>The Honorable Mike Thompson Representative U.S. House of Representatives 231 Canon House Office Building Washington, DC 20515-0501 (202) 225-3311</p>	
<b><i>State Elected Officials</i></b>	
<p>The Honorable Michael Machado Senator State Capitol Room 5066 Sacramento, CA 95814 (916) 445-2407 Email: senator.machado@sen.ca.gov</p>	<p>The Honorable Lois Wolk Assemblymember State Capitol Room 6012 Sacramento, CA 94249-0008 (916) 319-2008 Email: assemblymember.wolk@assembly.ca.gov</p>
<p>The Honorable Doug LaMalfa Assemblymember State Capitol Room 4177 Sacramento, CA 94249-0002 (916) 319-2002 Email: assemblymember.lamalfa@assembly.ca.gov</p>	

<i>Local Elected Officials</i>	
Mayor Ruth Asmundson City of Davis 23 Russell Boulevard Davis, CA 95616 (530) 753-7884 <b>Email: rasmundson@ci.davis.ca.us</b>	Jim Antonen City Manager City of Davis 23 Russell Boulevard Davis, CA 95616 (530) 757-5602 Email: jantonen@ci.davis.ca.us
<i>University of California, Davis</i>	
Christine Judal University of California, Davis Environmental Health & Safety One Shields Avenue Davis, CA 95616 (530) 752-9591 <b>Email: cjudal@ucdavis.edu</b>	Jim Aborn University of California, Davis Environmental Health & Safety EH&S 6410 One Shields Avenue Davis, CA 95616 (530) 752-8589 Email: cjforeman@ucdavis.edu
<i>Environmental/Interest Groups</i>	
<b>Davis South Campus Superfund Oversight Committee</b> Julie Roth Executive Director Route 2, Box 2879 Old Davis Road Davis, CA 95616 (530) 753-9446 (530) 753-8220 fax Email: jroth916@aol.com	G. Fred Lee G. Fed Lee and Associates Technical Advisor for DSCSOC 27298 E. El Macero Drive El Macero, CS 95618-1005 (530) 753-9630 (530) 753-9956 gfredlee@aol.com

End of current text