



Safety Services

LEHR Newsletter

April 1996

Welcome

This newsletter aims to keep the University of California, Davis (UC Davis) faculty, staff, students, and neighbors informed of the status of activities at the former Laboratory for Energy-related Health Research (LEHR). Since investigation and cleanup of the LEHR began in 1990, a great deal of progress has been made. In addition to monthly meetings with regulatory agencies and representatives of an interested citizens group, we thought this publication might be helpful in keeping up to date on the work at LEHR.

Announcement

There will be a LEHR Public Meeting, sponsored by the U.S. Department of Energy (DOE) and UC Davis at 6:00 p.m. on May 23, 1996. The meeting will be held at the Rec Pool Lodge, off LaRue Road and Extension Center Drive, on the UC Davis campus. The focus of the meeting will be an update on the status of the investigation of the site, including a review of recent soil and groundwater sampling data. Discussions will be limited to issues involving the LEHR site. If you would like more information about other environmental programs at UC Davis, please contact Julie McNeal at (916) 752-5536.

History

For over 30 years, LEHR was the site of studies on the long-term health effects of low-level radiation on laboratory animals. The research projects at LEHR were primarily funded by the U.S. Department of Energy (DOE). Investigation of the site has found soil and groundwater contamination from chemical and radioactive wastes resulting from the disposal of laboratory and campus wastes on-site. Also near the site are three inactive landfill areas that were used for disposal of UC Davis campus wastes.

The LEHR/Old Campus Landfill site was placed on the National Priorities List (Superfund) by the U.S. Environmental Protection Agency (EPA) in May 1994, because of the possibility of contaminants in the groundwater. DOE and UC Davis are currently working with representatives of the U.S. EPA, and State of California agencies including the Regional Water Quality Control Board, Department of Toxic Substances Control (DTSC) and Department of Health Services (DHS) on the investigation and cleanup of the site.

LEHR is located approximately 1 mile south of the UC Davis Central Campus and occupies about 15 acres. LEHR is surrounded by rural campus property and private land, and borders the South Fork of Putah Creek. Most of the buildings formerly occupied by LEHR are now part of the Institute of Toxicology and Environmental Health (ITEH), an active research program at UC Davis.

Superfund Process

For Superfund sites, a Remedial Investigation (RI) is performed to assess the nature and extent

of contamination and the associated risks to human health and the environment. The LEHR site is currently at the RI stage of the Superfund process. The RI stage is often very time-consuming since the parties involved need to be certain that they have sufficiently identified contamination at a site and have thoroughly considered the risks presented by the contamination. The next step is a Feasibility Study (FS), where cleanup alternatives are developed and analyzed.

Progress Report

During previous phases of the decontamination and decommissioning of the LEHR facility, DOE has accomplished the following actions: 1) removal and offsite shipment of over 100 drums of radioactive bioparts, 2) removal, solidification and offsite shipment of about 40,000 gallons of radioactive waste sludge, 3) removal and offsite shipment of several radioactive sources, including a large cobalt-60 source, 4) removal and offsite shipment of a radioactivity-contaminated tanker trailer, 5) demolition of a former waste treatment facility (Imhoff), and 6) decontamination and survey of four on-site buildings with radioactive contamination.

As part of the Remedial Investigation, DOE and UC Davis have continued to assess the soil and groundwater at the site. The following activities have occurred in the past year:

Groundwater

- A plume of chloroform-contaminated groundwater was identified migrating northeast from the LEHR property. UC Davis has presented a conceptual plan to start removing the chloroform, thought to be emanating from waste disposed on-site. The plan will be reviewed by the regulators and presented to the public in the next few months.
- Five new groundwater monitoring wells were installed in Fall 1995, making a total of 23 monitoring wells which are regularly sampled on and around the site. These wells were constructed to better define the extent of groundwater contamination at LEHR.
- Groundwater monitoring wells have been sampled quarterly to determine contaminant levels and trends. Volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), pesticides, metals, radionuclide compounds and nitrate have been detected in groundwater beneath the site. In over five years of on-site monitoring, VOCs (particularly chloroform), hexavalent chromium, tritium and nitrate are compounds that have been found above drinking water standards in several on-site monitoring wells.
- Private domestic and irrigation wells at neighboring properties have been sampled on a quarterly basis to determine if LEHR-derived chemicals have contaminated nearby wells. While several wells have been found to contain elevated levels of nitrate or chromium, these findings do not appear to be attributable to LEHR. Chloroform has been detected in some private agricultural supply wells located immediately to the east of LEHR.
- The sampling program is currently being updated to provide better information for the LEHR investigation. Some wells that have been tested for a long time without showing evidence of contamination from LEHR will be eliminated from the program, while other wells will be added. In addition, chloroform has been added to the list of analyses due to findings of chloroform in some neighboring wells. Radiological compounds will no longer be monitored, since the results of previous sampling have not indicated the presence of these contaminants.
- A study by the State Water Resources Control Board confirmed that shallow groundwater in the area around LEHR flows to the east-northeast. However, the direction of flow can vary, due to domestic and agricultural pumping of groundwater during the irrigation season. This study also reported that Putah Creek recharges groundwater in the area, meaning that water from the creek seeps into groundwater, not vice-versa.

Soil

- Soil samples have been collected on-site to investigate areas believed to contain buried debris or waste materials. Soil samples were collected near the surface, from backhoe trenches, or from soil borings. Several metals, a few organic compounds and four radionuclides were found on-site at levels exceeding EPA Preliminary Remediation Goals.
- A waste burial site known as the "DOE Box" was investigated by digging with a backhoe to uncover the buried waste and collecting samples of the waste material and the soil beneath the waste. The findings show very little contamination and DOE is planning to remove the buried wastes for off-site disposal.
- Trenches in the two Animal Hospital buildings were backfilled with imported soil. These trenches were dug to remove piping that carried wastes from animal cages to an on-site treatment system. Soil sampling performed by DOE beneath the piping showed no residual contamination. These results were confirmed by independent sampling by the California Department of Health Services, and then the trenches were backfilled.

Air

- A year-long air monitoring program was initiated in August 1995. This program consists of three on-site sampling stations, one off-site background station and a meteorological station. Air is pumped through several different filters, which are sent to a laboratory for analysis. The program was designed to determine if LEHR is producing any air emissions which could affect on-site personnel, visitors, or neighbors. The results of this study will be presented later this year.

Waste

- Recent LEHR waste management achievements include significant reductions in waste volume prior to disposal and the recycling of radioactive sources that are no longer needed. These achievements were the result of the LEHR Waste Minimization Program, a component of overall program management that continuously seeks ways to minimize the amounts of waste generated during the cleanup project and to reuse material whenever possible.
- Waste from the demolition of the LEHR Imhoff radioactive waste treatment building was sent to a private contractor to undergo supercompaction prior to disposal as low-level radioactive waste at the Westinghouse Hanford site in Washington. The volume of waste was reduced by 80% using these techniques, resulting in large cost savings for the disposal, and, as importantly, helping to conserve disposal capacity at Hanford.
- In September of 1995, 16 drums of mixed waste (waste containing both radioactive and chemical constituents) were sent to a private facility in Tennessee to be incinerated. Incineration destroys the hazardous component of this problematic waste, allowing the waste to then be disposed of as low-level radioactive waste.
- In February and March of 1996, two radioactive sources were transferred to a certified laboratory to be recycled for use in scientific and industrial applications. These sources, which were left over from DOE-funded research, were previously slated for disposal. LEHR staff successfully found a useful home for these sources. It is anticipated that this strategy may prove effective for other sources still in storage at LEHR.

Future Plans

- DOE, UC Davis and the regulatory agencies have agreed on a phased plan of action to collect additional soil and groundwater samples and to gather the additional data needed to complete the Remedial Investigation. Under this plan, DOE and UC Davis will

drill up to 56 soil borings and dig 21 exploratory trenches to collect soil samples. Analysis of the samples will help to identify the wastes buried on-site and to determine which wastes may have migrated or are likely to cause pollution of groundwater. Following this sampling and analysis, modeling will be done to assess possible risks presented by each of the waste units on-site. Sampling to date has focused on identifying areas of concern at the site. This additional sampling will now allow the study to develop more information on specific areas and determine risks and selection of cleanup strategies.

- UC Davis has initiated an evaluation of treatment options for contaminated groundwater at the site. After consultation with the regulatory agencies and the public, UC Davis hopes to propose a plan of action for groundwater treatment in the next several months.

Questions & Answers

This section is intended to answer some common questions about the LEHR site or the Remedial Investigation.

How far has groundwater contamination spread?

Investigation activities to date have not fully defined the extent of groundwater contamination. Groundwater monitoring wells to the north, west and south appear to define the extent of the plume in those directions, however, planned additional monitoring wells are needed to the east. Hydropunch sampling has been used to help define the plume and the information gathered through Hydropunch will be used to determine the appropriate locations for new monitoring wells. Some members of the public have stated that, based on estimates of groundwater flow rates, the contamination may have been transported 5 to 10 miles from LEHR. Evidence from the site and from neighboring wells does not support this claim. Due to the complex properties of the soil and groundwater beneath the site and the chemicals of concern, it is estimated that it would take 25 years just for contamination to reach the principal groundwater aquifer beneath the site. Independent sampling of private domestic and irrigation wells by a representative of the State Water Resources Control Board indicated that LEHR-derived contaminants were in fact found in some off-site irrigation wells, however the extent of this impact appears to be limited to approximately 1/2 mile east of LEHR. Additional work is planned to investigate groundwater east of LEHR.

Why do DOE and UC Davis often re-test wells?

Groundwater samples are occasionally re-tested when a review of the results shows that a particular result is not following an established trend. Since groundwater monitoring at the site has been going on for over 6 years, a large amount of sample data exists. When a sample result is not consistent with historical data, two possibilities exist: 1) the result is in error, or 2) the result does not follow the trend, indicating a change in conditions. In this case, a well may be re-tested to confirm the unexpected result.

What are the levels of groundwater contamination?

The primary groundwater contaminants identified at LEHR are volatile organic compounds (particularly chloroform), hexavalent chromium, tritium and nitrate. Chloroform has been shown to have spread widely across the site, and recent data indicate that the chloroform plume extends to the east off UC Davis property. In 1995, on-site chloroform concentrations have ranged from non-detectable in several wells to 5,800 micrograms per liter (ug/L) in well UCD-12. Preliminary Hydropunch sampling has indicated chloroform concentrations of 12 to

68 ug/L at the UC Davis property boundary. These levels are similar to chloroform levels in many public drinking water supplies that use chlorine as a disinfectant. On-site concentrations of hexavalent chromium have ranged from non-detectable to 310 ug/L and nitrate has ranged from non-detectable to 72 mg/L. However, concentrations of nitrate and chromium appear to be elevated in the region, not just at LEHR. During 1995, the highest detected tritium concentration at LEHR was 19,600 picoCuries per liter (pCi/L), which is just below the drinking water standard of 20,000 pCi/L. Tritium contamination is localized around two monitoring wells in the southern portion of the site and does not appear to have spread significantly.

How deep is the groundwater at LEHR?

The monitoring wells around LEHR are constructed to draw water from the shallow aquifer, about 40 to 130 feet below ground surface. Beneath the shallow aquifer is a clay layer estimated to be about 90 feet thick. Beneath the clay layer is a second aquifer. Groundwater investigation at LEHR has focused on the shallow aquifer, so there is little information on the deeper groundwater zones beneath the site.

What is Hydropunch and why is it used?

During fall of 1995 and the early part of 1996, Hydropunch sampling was used to collect groundwater samples. Hydro-punch is a sampling method where a hollow steel pipe is hydraulically driven into the ground, and then partially retracted to expose a slotted water accumulation chamber. Water is allowed to fill the chamber and then a bailer is lowered down through the pipe to retrieve a sample. These tests allowed the collection of groundwater samples without having to construct traditional monitoring wells. This allows DOE's contractor to collect a large number of samples in a short time. Onsite analysis of samples for chloroform allows the geologist to redirect the sampling effort daily to better define boundaries of the chloroform plume in groundwater. While this work was not meant to be a substitute for construction of additional monitoring wells, the data gathered by the Hydro-punch technique will be used to determine the location of future monitoring wells.