

# Environmental Community Letter

## Lawrence Livermore National Laboratory

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### **1998 Environmental Report shows little impact of LLNL operations on public or environment**

The Executive Summary in the 1998 SAER concludes that radiological doses to the public caused by LLNL operations are about one-half of one percent of current regulatory standards. This is about 6,000 times smaller than the average dose received by U.S. citizens from background radiation each year.

The analytical results generally show continuing low contaminant levels. This reflects both decreased operations at the Laboratory and its increasing control of emissions and pollutants.

Environmental compliance activities in 1998 had significant achievements:

- Livermore site ground water remediation activities continued to reduce the concentration and length of contaminant plumes migrating westward offsite.
- Site 300 ground water remediation activities continued to reduce the concentration and length of contaminant plumes migrating eastward offsite.
- Sanitary sewer discharges were 100% compliant with the City of Livermore's Water Reclamation Plant standards.
- Tritium discharges were reduced 50% over those from last year.

**In summary, the 1998 Site Annual Environmental Report documents that the environmental impacts of LLNL operations are minimal and pose no threat to public health or the environment.**

### **LLNL: WHO WE ARE, WHAT WE DO**

Lawrence Livermore National Laboratory (LLNL) is a U.S. Department of Energy (DOE) facility operated by the University of California. It serves as a national resource of scientific, technical, and engineering capabilities. The Laboratory's mission focuses primarily on nuclear weapons and national security, but also includes research into areas such as strategic defense, energy, the environment, biomedicine, technology transfer, the economy, and education.

The Laboratory carries out this mission in compliance with local, state, and federal environmental regulatory requirements. It does so with the support of the Environmental Protection Department, which is responsible for environmental monitoring and analysis, hazardous waste management, environmental restoration, and assisting Laboratory organizations in ensuring compliance with environmental laws and regulations.

LLNL comprises two sites: the Livermore site and Site 300. The Livermore site occupies an area of 3.28 square kilometers on the eastern edge of Livermore, California. Site 300, LLNL's experimental testing site, is located 24 kilometers to the east in the Altamont Hills, and occupies an area of 30.3 square kilometers. Environmental monitoring activities are conducted at both sites as well as surrounding areas.

### **Specific monitoring activities**

#### ***Air monitored for plutonium, tritium, and other radionuclides***

Air is monitored at various locations on the Livermore site and Site 300, throughout the Livermore Valley, and in the Tracy area. Concentrations of all monitored radionuclides and beryllium at all locations were well below levels that would endanger the environment or public health.

For example, the highest median concentration of plutonium for sampling locations in Livermore Valley was 0.0021% of the federal standard. The highest median concentration of tritium for the Livermore Valley was 0.007% of the federal standard. Similar results were found at air sampling locations in areas around Site 300. Federal radioactivity exposure standards are highly protective of the public and limit the annual dose an individual can receive. LLNL has never come close to exceeding the federal standards for the public.

#### ***Air effluent monitoring for tritium and radioactive particulates***

In 1998, LLNL operated 101 samplers at eight facilities to measure any radioactivity in effluent air generated from Lab operations. Radionuclide emissions from all monitored facilities remain very low.

Emissions of nonradioactive hazardous and toxic air pollutants from Laboratory operations in 1998 were low. For example, total nitrogen oxide emissions from the Livermore site were approximately 56 kilograms per day. This is about 0.006% of the amount released daily from all sources in the Bay Area. 25 kilograms of reactive organic compounds were emitted per day. This is approximately one ten-thousandth of the total Bay Area emission of that pollutant.

Approximately 100 kilograms a day of criteria air pollutants (including nitrogen oxides, volatile organics, sulfur oxides, particulate matter, carbon dioxide, and lead) are emitted per day from the Livermore site and about 4 kilograms are emitted from Site 300. These releases from the LLNL sites are a small fraction of the total daily emissions in the entire Bay Area.

#### ***Waste water monitoring for radioactive and other hazardous materials***

The Livermore site discharges almost a million liters of waste water daily to the City of Livermore sewer system (approximately 4.0% of the total flow to the system). The sewage flow from LLNL to the Livermore Water Reclamation Plant (LWRP) is monitored continuously. If any significant releases of radioactivity, metals, or high or low pH water are detected, the waste water is redirected to a LLNL sewer diversion system before it leaves the LLNL site. It is then treated and disposed of appropriately.

In 1998, LLNL achieved 100% compliance with LWRP permit limits. The City did not issue any notices of violation and no sewer releases exceeded discharge limits for radioactive materials.

#### ***Water monitoring for radionuclides and other contaminants***

In 1998, the maximum tritium activities measured in surface and drinking water were 4% and 1%, respectively, of the regulatory maximum contaminant level (MCL). No sample was above the MCL. Gross alpha and gross beta radioactivity measurements were also far below regulatory levels of concern.

In the Livermore Valley, no monitored radioactive or inorganic nonradioactive constituent was found to exceed primary drinking water MCLs in any off-site well. In Livermore on-site wells, chromium and nitrates have been detected above the primary MCL, but these constituents have not migrated off site. The shallow ground water beneath Site 300 contains volatile organic compounds (VOCs), tritium, nitrates, Freon, and depleted uranium, but presents no current health risks because this contaminated water is not used as a potable domestic, livestock, or industrial water supply and presents no other pathways to environmental receptors.

#### ***Soil and sediment monitored for plutonium and other radionuclides***

Most analyses of 1998 on-site sediment samples simply could not detect any nonradiological contaminants labeled as "constituents of concern." A few analyses detected either trace amounts of contaminants, or higher than average naturally occurring background concentrations. Radiological results

were unchanged from previous years. Elevated concentrations of depleted uranium were found near two Site 300 firing tables.

All soil samples taken in the City of Livermore's Big Trees Park in 1998 yielded results well below levels of regulatory concern. A few of the examples were considered to contain elevated levels of plutonium.

Further analysis of these samples indicated that the source of the plutonium in the park is from sewage sludge applied to ornamental trees several decades ago. The source of the sewage sludge plutonium was LLNL releases to the Livermore sanitary sewer in the 1960s.

### ***Vegetation and foodstuff monitoring for tritium***

For 1998, the highest detected value for tritium in a single vegetation sample was 1.1% of the amount California allows in drinking water. In general, monitoring showed values not significantly different from the past few years.

As usual, there was slightly more tritium near the Livermore site than was found at more distant locations. Potential ingestion dose estimates were well below levels of regulatory concern, even when organically bound tritium was taken into account.

### ***Radiological dose assessment***

Every year a theoretical dose to the public is calculated based upon what an individual would receive if he/she lived for a year on the laboratory perimeter where the highest radiation dose would be seen. For Livermore that dose is 0.049 millirem. That is approximately 50% of last year's dose. For Site 300 it is 0.024. These values are well within those estimated over the past decade.

The average annual exposure for the United States public from all sources in daily life (medical, dental, radon gas, cosmic radiation, etc.) is 350 millirem.

The Laboratory contributes about 1/6000th of the estimated exposure individuals receive from the environment. Most of this radiation comes from the sun and surrounding soil and rock.

### ***Ground Water Remediation***

In 1998, treatment facilities at the Livermore site processed almost one billion liters of ground water.

Nearly 150 kilograms of VOCs were removed during treatment.

More than 22 kilograms of VOCs were removed from the soil and groundwater in four treatment areas at Site 300. These efforts reduced the length of the trichlorethene plume in one area by 1,400 meters; it now extends only 30 meters beyond the site boundary.

### ***Waste Minimization and Pollution Prevention***

Waste generation at LLNL continues to drop dramatically. There were reductions in three categories: radioactive, hazardous, and sanitary. Mixed waste (radioactive and hazardous waste combined) did not diminish. Total LLNL waste diverted from landfills in 1998 was 30,000 tons. Almost 90% of nonhazardous waste was recycled.

### ***Special Status Species***

In 1998, biological assessment surveys were performed for special-status species at 51 LLNL project construction areas. No active San Joaquin kit fox dens were discovered. Four occupied American badger dens were found. Twelve active burrowing owl dens and a population of California tiger salamanders were discovered at Site 300.

A new population of the red-legged frog, which is classified as a threatened species by the federal government, was identified on the Livermore site. Measures to mitigate the potential for future impacts to the frogs were developed with the U.S. Fish and Wildlife Service.

Six separate pairs of white-tailed kites, a state-protected raptor, successfully nested and fledged 14 young at the Livermore site.

Two of the three natural populations of the large-flowered fiddleneck, a plant on the federal endangered species list, occur at site 300. A portion of the site has been designated as critical habitat for the plant.

Monitoring of the big tarplant, a California Native Plant Society "rare" plant and the large-flowered fiddleneck continued in 1998. In addition, 26 diamond-petaled poppy plants were located. The poppy has not been seen elsewhere in California since 1950.

## WHAT IS A SITE ANNUAL ENVIRONMENTAL REPORT, OR SAER, AND HOW DO I GET ONE?

Each year Lawrence Livermore National Laboratory (LLNL) is required to produce hundreds of different reports for the agencies in charge of regulating the Lab. A few of such agencies charged with protecting public health and the environment are: the U.S. Environmental Protection Agency, regional air and water boards, and the California Department of Toxic Substances Control.

These agencies, as well as the Department of Energy and the University of California, which manages the Laboratory for the U.S. Department of Energy (DOE), oversee Lab operations and monitor any impact that LLNL operations may have on the public or the environment.

The DOE requires each DOE facility to publish an annual report that summarizes its regulatory compliance status as well as report the results of environmental monitoring done during the year. The 1998 Site Annual Environmental Report (SAER) is the LLNL response to DOE's requirement. This document represents the collection of over 15,000 environmental monitoring samples from the air, water, vegetation, and soil surrounding the LLNL site and Site 300 and assessment of over 244,000 different characteristics from these samples. Some ground water samples may be tested to determine the amount of as many as 19 different compounds. All the data collected, collated, and reviewed, and the related modeling, analysis, and conclusions are presented annually not only to regulatory agencies, but are also shared with the public through the SAER. You will find volumes of the 1998 SAER in the LLNL Environmental Repositories at the Livermore and Tracy libraries and the LLNL Visitors Center. The documents are also available on the Web at: <http://www.llnl.gov/saer>.

This letter features an abbreviated version of the Executive Summary from the 1998 SAER. The complete document is available by calling Bert Heffner at (925) 424-4026.



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