

2. Compliance Summary



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Introduction

During 1994, Lawrence Livermore National Laboratory (LLNL) participated in numerous environmental activities to comply with regulatory and internal requirements and Department of Energy (DOE) orders. Activities related to waste, water, air, waste reduction, community “right to know,” and other environmental issues were addressed at both the Livermore site and Site 300. Documents addressing these and other environmental issues are available for public viewing at the LLNL Visitors Center and the Livermore Public Library. A summary of the permit activity related to these environmental activities for the calendar year 1994 is presented in **Table 2-1**.

Department of Energy Tiger Team and Tiger Team Progress Assessment

DOE conducted a Tiger Team Assessment of LLNL environmental, safety, and health (ES&H) programs in 1990. In November 1992, DOE conducted a follow-up Tiger Team Progress Assessment, concluding that, “LLNL management recognizes the importance that the Secretary of Energy places on ES&H excellence and has responded with improvements in all ES&H areas.” Although work remains to be done to address concerns in several areas, these concerns do not diminish the significance of the progress made since the 1990 Tiger Team Assessment.

In July 1993, LLNL submitted a Draft Action Plan to DOE in response to the Tiger Team Progress Assessment; this plan is still under review. Once the action plan is approved, the actions may be incorporated as an addendum to the original Tiger Team Action Plan.

LLNL continues to undertake those activities identified in its original seven-year Tiger Team Action Plan, and significant progress has been made towards the 581 subtasks identified in it. Action items have been prioritized and are funded within budget constraints. As of December 31, 1994, 84% of these subtasks have been completed, 1% are on schedule, and 8% are considered late; 38 low-priority subtasks (the remaining 7%) have not been funded. The majority of the late subtasks are late because of funding limitations. LLNL is also working with DOE to close those open action items that have been preempted by new and different requirements.

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Table 2-1. Summary of permits.

Type of Permit	Livermore Site	Site 300
Air	164 permits (various equipment)	39 permits (various equipment)
Water	<p>WDR Order No. 88-075</p> <p>WDR Order No. 91-091, NPDES Permit No. CA0029289</p> <p>WDR Order No. 91-13-DWQ (as amended by Order No. 92-12-DWQ) NPDES General Permit No. CAS000001</p> <p>WDR Order No. 92-08-DWQ NPDES General Permit No. CAS000002 Site ID No. Bldg. 132 2015300881</p>	<p>WDR Order No. 93-100 (amended 80-184)</p> <p>WDR Order No. 94-131 NPDES Permit No. CA0081396 (amended WDR Order No. 82-105 and replaced WDR Order No. 91-13-DWQ as amended by WDR Order No. 92-12-DWQ, NPDES General Permit No. CAS000001)</p> <p>WDR Order No. 85-188 NPDES Permit No. CA0082651</p> <p>WDR Order No. 92-08-DWQ NPDES General Permit No. CAS000002 Site ID No. 5B39S303589 Doall Road Construction Project</p>
Hazardous waste	<p>ISD CA2890012584</p> <p>DTSC Permit No. 2-13640 for disposal of extremely hazardous waste</p> <p>Authorization to perform Waste Resin Mixing in Unit CE231-1 and Unit CE443-1 under Condition Exemption tier</p>	<p>Part B CA2890090002</p> <p>Docket HWCA 92/93-031 Open Burning of Explosives Waste</p>
Sewer	Discharge Permit Nos. 1250 (94-95), 1508G (94-95), and 1510G (94-95)	
Tanks	Fees paid for 28 tanks	Fees paid for 7 tanks
Other	FFA, ground water investigation/remediation; ACEHS medical waste permits for treatment and storage	FAA ground water investigation/remediation

Permit numbers are based on actual permitted units maintained and renewed by LLNL during 1994.



Comprehensive Environmental Response, Compensation and Liability Act/Superfund Amendment and Reauthorization Act, Title I

LLNL has several projects that are under the jurisdiction of Comprehensive Environmental Response, Compensation and Liability Act (CERCLA)/Superfund Amendment and Reauthorization Act (SARA), Title 1. These include the Livermore Site Ground Water Project, the Site 300 Environmental Restoration Program, and community relations.

Livermore-Site Ground Water Project

The Ground Water Project (GWP) complies with provisions specified in a Federal Facility Agreement entered into by the Environmental Protection Agency (EPA), DOE, the California EPA's Department of Toxic Substances Control (DTSC), and the San Francisco Bay Regional Water Quality Control Board (RWQCB). As required by the agreement, the project addresses compliance issues through investigations of potential contamination source areas (such as suspected old release sites, solvent handling areas, and leaking underground tank systems), continued monitoring of ground water, and remediation.

Required Documentation

In 1994, DOE/LLNL submitted 19 CERCLA documents for the Livermore site and conducted community activities. Recipients of these CERCLA documents included EPA, RWQCB, DTSC, Community Work Group Information Repositories, and Tri-Valley Citizens Against a Radioactive Environment (CAREs). The final version of *Remedial Design Report No. 3 for Treatment Facilities C and F* (Berg et al. 1994a) was issued on March 1, 1994, according to the revised schedule presented in the *Remedial Action Implementation Plan* (Dresen et al. 1993). With regulatory and community concurrence, the *Remedial Action Implementation Plan* schedule was revised on July 20, 1994, to add Remedial Design Report No. 6 (for the Building 518 vadose zone), and change the issue dates for Remedial Design Reports Nos. 4 and 5. In conjunction with the revised *Remedial Action Implementation Plan* schedule, a consensus statement was signed by the LLNL Livermore Site Remedial Program Managers that established cleanup priorities. *Remedial Action Implementation Plan No. 6 for the Building 518 Vapor Treatment Facility* (Berg et al. 1994b) was issued on schedule on November 30, 1994. The draft version of *Remedial Action Implementation Plan No. 5 for Treatment Facilities G-1 and G-2* (Berg et al. 1995) was distributed for review on schedule to the regulatory agencies and the community on December 1, 1994. In addition, in 1994, DOE/LLNL also issued the following reports: the January through December 1994 *Ground Water Project Monthly Progress Reports*; the March, June, and September 1994 *Ground Water Project Quarterly Progress Reports* (MacDonald



et al., 1994; Hoffman et al. 1994b; Hoffman et al. 1994c, respectively); and the *LLNL Ground Water Project 1993 Annual Report* (Hoffman et al. 1994a).

Treatment Facilities

Treatment Facility A (TFA) has been operating since September 1989. TFA treated more than 87 million liters of ground water during 1994, removing and destroying approximately 5.6 kilograms (3.6 liters) of volatile organic compounds (VOCs). About 371 million liters have been treated, removing 46 kilograms (29 liters) of VOCs since TFA began operating. (See **Figure 2-1** for the locations of treatment facilities.) Treated waters from TFA are discharged into the recharge basin.

Treatment Facility B (TFB) has been operating since October 1990; TFB treated about 32 million liters of ground water in 1994, removing and destroying approximately 2.7 kilograms (1.7 liters) of VOCs. More than 87 million liters have been treated, removing 9 kilograms (5.7 liters) of VOCs since TFB began operating. TFB's treated waters are discharged into a drainage ditch feeding into Arroyo Las Positas.

Treatment Facility C (TFC) has been operating since October 1993. In 1994, a total of 1.2 kilograms (0.76 liters) of VOCs was removed from approximately 11 million liters of ground water treated at TFC. Treated waters from TFC are discharged into Arroyo Las Positas.

Ground water and vapor extracted from the Treatment Facility F (TFF) Area subsurface continued to have elevated temperatures due to the Dynamic Underground Stripping Project conducted at the site in early 1993. In December 1994, extracted ground water temperatures averaged about 48°C. TFF treated approximately 15 million liters of ground water containing a volume-weighted average concentration of fuel hydrocarbons (FHCs) of about 2,900 parts per billion (ppb). This is equivalent to about 57 liters liquid-volume-equivalent of gasoline removed. In addition, TFF extracted about 230 million liters of vapor containing a volume-weighted FHC concentration of about 210 parts per million (ppm) by volume, for about 240 liters liquid-volume-equivalent of gasoline removed. Therefore, the total liquid-volume-equivalent of gasoline removed from the TFF subsurface during 1994 was about 300 liters. The TFF gasoline removal rate has declined steadily throughout the year as recoverable gasoline in the Gasoline Spill Area is removed. Treated waters from TFF are discharged into the sanitary sewer.

Construction of Treatment Facility D (TFD) began on February 28, 1994, and was completed on July 13, 1994. TFD was activated on July 14, 1994, and operation

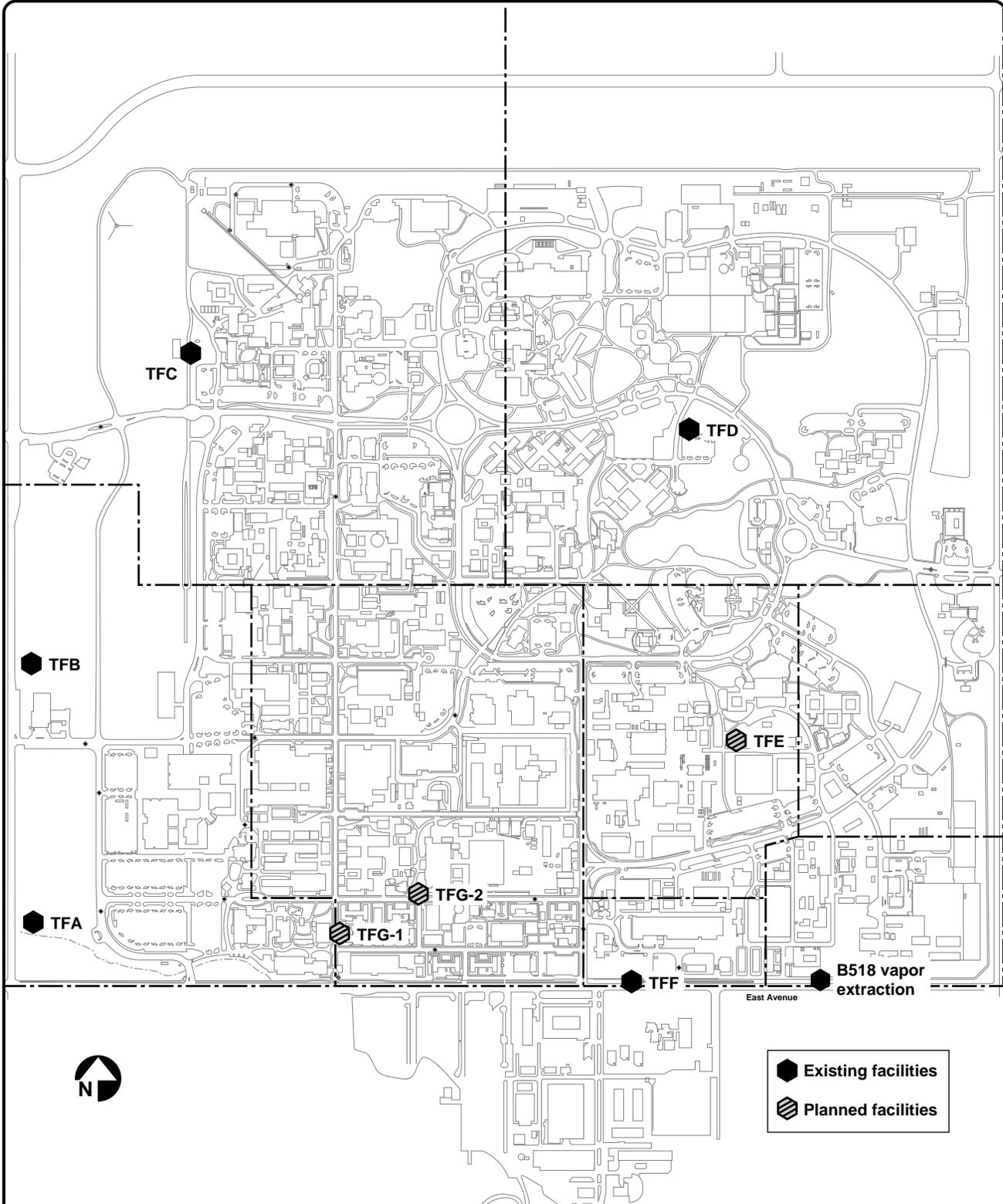


Figure 2-1. Location of existing and planned treatment facilities.



began on September 15, 1994. In 1994, TFD processed about 0.3 million liters of ground water containing about 0.3 kilograms (0.19 liters) of VOCs. The treated water was discharged to the Drainage Retention Basin.

In 1994, LLNL completed design of the vapor extraction system concrete pad for the Building 518 area. The system is scheduled to begin operation on September 29, 1995.

Community Relations

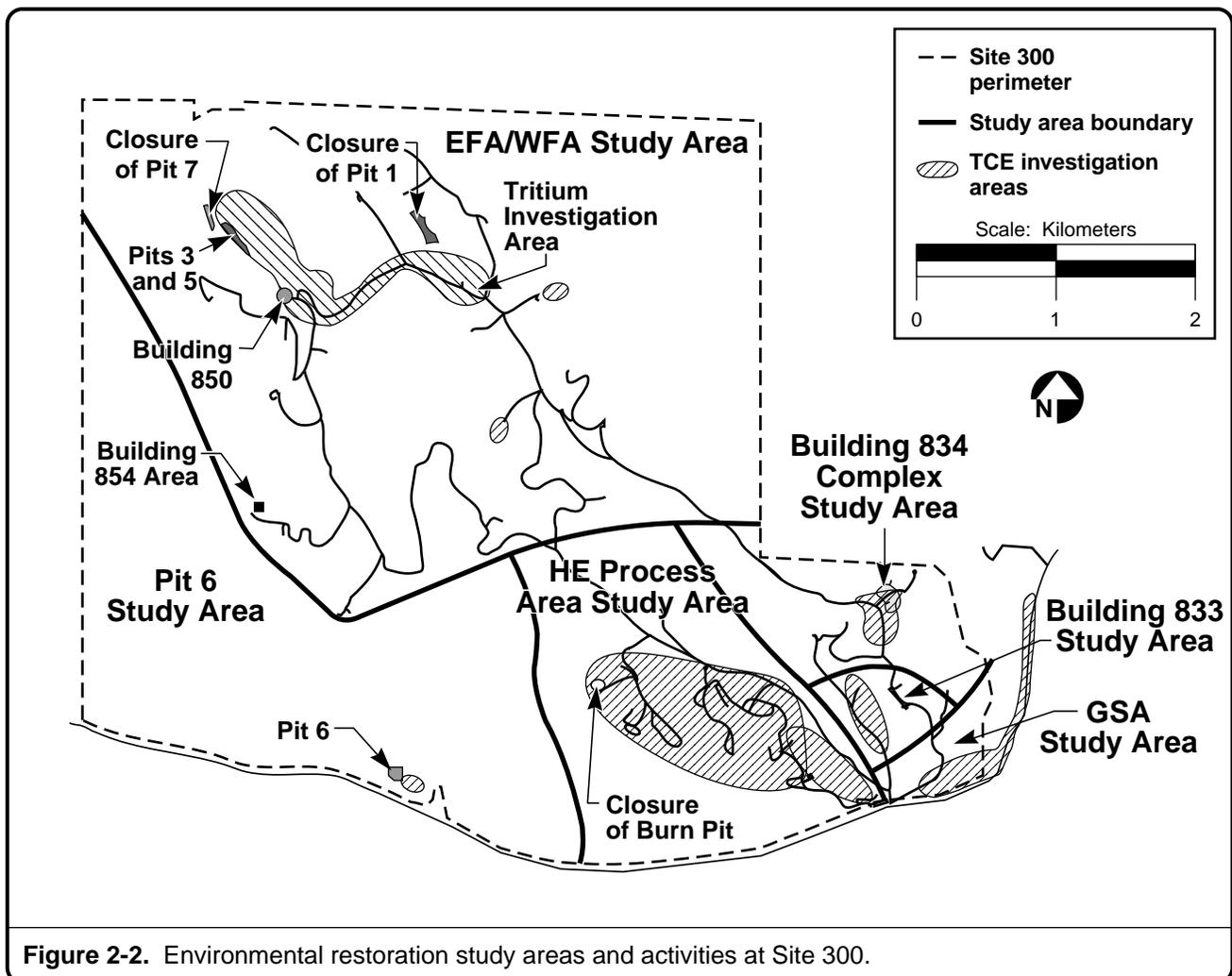
The Livermore Site Community Work Group includes representatives from the community at large, local real estate, wine growers, City of Livermore, Tri-Valley CAREs, EPA, RWQCB, and DTSC. This group met five times in 1994 to discuss topics including Remedial Design Report No. 6; the proposed Livermore Site Restoration Activities Priority List and revised Remedial Action Implementation Plan schedule; comparison of ground water treatment technologies for the Trailer 5475 Area; the baseline risk assessment in the Remedial Investigation report (Thorpe et al. 1990); DOE budget status; the Arroyo Pipeline extension; and organizational issues (e.g., the Community Work Group Operations and Mission Statement). Other community relations activities in 1994 included meeting periodically with Tri-Valley CAREs and its technical advisors, distributing the Environmental Community Letter, maintaining the Information Repositories and the Administrative Record, conducting tours of the site environmental activities, and staffing a telephone information line for public and news media inquiries. In November, a ribbon-cutting event marked the startup of TFD. The event was attended by Community Work Group representatives, a representative from Congressman Bill Baker's office, and DOE/LLNL officials and staff.

Site 300 Environmental Restoration Program

At Site 300, ongoing remedial investigations, feasibility studies, and remedial actions are being performed as a part of the Environmental Restoration Program. Site 300 investigations and remedial actions are conducted under the joint oversight of the EPA, Central Valley RWQCB, and DTSC under the authority of a Federal Facility Agreement for the site (there are separate agreements for Site 300 and the Livermore site). Ground water investigations began in 1981 under the regulatory authority of the Central Valley RWQCB. In August 1990, Site 300 was placed on EPA's National Priorities List under CERCLA. In June 1992, the DOE and LLNL negotiated a Federal Facility Agreement that describes the ground water and soil investigations to be conducted and specifies reporting due dates.

The study areas and constituents of concern at Site 300 include: (1) General Services Area (GSA)—VOCs, primarily trichloroethene (TCE), in soil, rock, and

ground water; (2) Building 834 Complex—TCE in soil, rock, and ground water; (3) High Explosives (HE) Process Area—VOCs, primarily TCE and high-explosive compounds (primarily cyclotetramethyltetramine and 1,3,5-trinitro-1,3,5-triazine in soil, rock, and ground water); (4) East and West Firing Areas—tritium, VOCs (primarily TCE), and depleted uranium in soil, rock, and ground water; (5) Pit 6 Area—VOCs, primarily TCE, in soil, rock, and ground water; and (6) Building 833 Area—TCE in soil and rock (**Figure 2-2**). These study areas roughly correspond to the programmatic areas at Site 300.



Documentation

Before Site 300 was placed on the National Priorities List, a number of draft remedial investigation and feasibility study reports were completed for the study areas. The draft remedial investigation reports include detailed discussions of the environment, geology and hydrogeology, environmental risk of any



chemicals encountered, and assessment of the potential hazard or risk to public health and safety. The draft feasibility study reports include proposals for remedial action alternatives with cost estimates under several conditions, from no action to full remediation. These reports were submitted to regulatory agencies for consideration of appropriate choices for remediation.

In mid-1991, the regulatory agencies requested that LLNL prepare a sitewide remedial investigation report to replace the previously submitted area-specific individual draft remedial investigation reports. The *Final Site-Wide Remedial Investigation Report* (Final SWRI report; Webster-Scholten 1994) was submitted to EPA, Central Valley RWQCB, and DTSC during 1994. The Final SWRI report is organized by study areas that roughly correspond to the areas covered by the individual remedial investigation reports. It is a compilation of all ground water and soil investigation information for the entire site and contains an assessment of potential human health and ecological hazards or risks resulting from contamination of soil, sediment, and ground water. New feasibility study reports have been or will be prepared for portions of the individual study areas, termed operable units, where the Final SWRI report or more recent studies indicate that unacceptable potential hazards or risks exist.

During 1994, LLNL submitted the *Final Feasibility Study Reports for the Building 834 and Pit 6 Operable Units* (Landgraf 1994; Devany et al. 1994) and the draft proposed plan for remedial actions at the Building 834 operable unit (Landgraf et al. 1994) to the regulatory agencies; the latter report describes the planned remedial strategy.

LLNL is currently working with DOE and the regulatory agencies to streamline the Site 300 CERCLA process by reducing the number of documents and by agreeing on a suitable remediation strategy for each operable unit that can be presented in an engineering evaluation/cost analysis (EE/CA) report. Each remedial action would then be performed as a removal action. The public would be able to comment at public meetings.

Although LLNL is renegotiating CERCLA deliverables and schedules to hasten cleanup, current milestone dates for draft feasibility study reports for the pertinent operable units within their respective study areas are: the GSA operable unit, May 15, 1995 (already submitted); the Building 815 operable unit (HE Process Area study area), December 1, 1995; and the Building 850/Pits 3 and 5 operable unit (East and West Firing Area study area), February 15, 1996. Additional feasibility study or EE/CA reports may be prepared if investigative activities planned at the Building 832 Canyon area (Building 833 study area) and the Building 854, Building 812, and Sandia Test Site areas (East and West Firing Area study area) indicate unacceptable risks or hazards. During 1994, LLNL



submitted characterization plans for these sites to the regulatory agencies in preparation for these investigations.

General Services Area

This study area is located in the southeastern corner of Site 300. Since 1982, LLNL has conducted an intensive investigation in the GSA and off-site areas to locate VOC release points and to define the vertical and horizontal distribution of VOCs, primarily TCE and tetrachloroethene (PCE), in the soil, rock, and ground water. According to the Final SWRI report and draft remedial investigation (McIlvride et al. 1990) reports, VOCs in excess of drinking water maximum contaminant levels (MCLs) have been identified in the shallow ground water beneath the GSA in two localities. Two small plumes occur in the central section of the study area, and one plume occurs in the eastern section in the gravels of Corral Hollow Creek. An air-sparging ground water treatment unit that removes VOCs from the eastern GSA ground water began operation in June 1991 as a CERCLA Removal Action and was operated throughout 1994. The total volume of water treated here through December 1993 was about 110 million liters; 2.8 kilograms (0.79 liters) of VOCs were removed from the water. The treated ground water was discharged off site to the Corral Hollow Stream Channel. During 1994, an additional 82 million liters of ground water in the eastern GSA were treated to remove approximately 742 grams of VOCs. Before cleanup was initiated, this plume extended about 1,200 meters off site; it now extends about 300 meters off site.

The two plumes of VOCs in ground water in the central GSA are present in alluvium and shallow bedrock and in deeper bedrock. Construction of an air-sparging ground water treatment and vapor extraction unit for a CERCLA Removal Action to remove VOCs from the central GSA ground water and soil vapor was completed in 1993. During 1993, ground water extraction and treatment began, and about 440,000 liters of ground water containing 1,700 grams (129 liters) of VOCs were treated. During 1994, an additional 463,000 liters of ground water containing 650 grams of VOCs were treated. The treated ground water was collected and discharged as a batch in a remote on-site location. Pilot soil vapor extraction and treatment of VOCs began in 1993; 2.4 kilograms (0.44 liters) of VOCs were removed. During 1994, an additional 5.7 kilograms (3.9 liters) were extracted and treated by carbon adsorption. Soil vapor extraction and treatment are ongoing.

Following additional investigations conducted during 1993–1994 to better define the extent of ground water contamination, work on the draft feasibility study report began in 1994, and was submitted to the regulatory agencies on May 15, 1995.



Building 834 Complex

The Building 834 Complex is located in the east-central portion of Site 300. An isolated, perched aquifer that contains TCE in excess of the MCL of 5 ppb has been defined and reported in the Final SWRI report, *Draft Remedial Investigation and Feasibility Study for the Lawrence Livermore National Laboratory Site 300 Building 834 Complex* (Bryn et al. 1990), and The *Final Feasibility Study Report for the Building 834 Operable Unit* (Landgraf et al. 1994). Techniques have been evaluated and pilot-tested to remove TCE vapor from the vadose zone above the water table and from the shallow perched water. Water was extracted by pumping from extraction wells and from soil vapor extraction wells under vacuum. Pilot remediation began during 1993 at the Building 834 Complex, where about 300 kilograms (200 liters) of TCE have been removed from the unsaturated sediment soil vapor and ground water by extraction and treatment. Ground water has been treated by air sparging. Vapor-phase TCE has been treated by carbon adsorption; successful experiments have been conducted at Building 834 for the breakdown of TCE with ultraviolet-light flash lamps and an electron beam accelerator. During 1993, the pilot extraction system was upgraded in preparation for a CERCLA Removal Action, which began in 1994. Proof-of-system testing was conducted during 1994.

During 1994, LLNL submitted the Final Feasibility Study Report (Landgraf et al. 1994) and the Draft Proposed Plan (LLNL 1994) for the Building 834 Complex to the regulatory agencies. The proposed remedial strategy for the operable unit is ground water and soil vapor extraction and treatment. LLNL is pursuing an interim Record of Decision (ROD) to promote the use of innovative technologies such as surfactants for enhanced removal of VOCs by soil vapor and ground water extraction.

HE Process Area

During field investigations of ground water, concentrations of TCE above MCLs and low concentrations of the high-explosive compound 1,3,5-trinitro-1,3,5-triazine were discovered in two perched water-bearing zones within the HE Process Area near Buildings 815 and 817 (Crow and Lamarre 1990; Webster-Scholten 1994). Discharges of rinse water from buildings within the HE Process Area historically have been disposed of in unlined lagoons adjacent to the processing buildings. Use of these lagoons was terminated in 1985; the lagoons were closed and capped with impermeable clay in 1989. Sporadic, but generally low, concentrations of high-explosive compounds, metals, and VOCs were identified in the vadose zone beneath some of the lagoons, but these contaminants have not migrated to the underlying ground water (Webster-Scholten 1994). During 1994, additional investigations were conducted in the study area,

and the full extent of the contamination has been determined. The feasibility study for the Building 815 operable unit has been put on hold pending renegotiation although the draft feasibility study is scheduled for submittal to the regulatory agencies on December 15, 1995.

East and West Firing Areas

Debris from explosive tests historically conducted in this study area in the northern part of Site 300 was disposed of in adjacent landfill pits; these landfill pits are designated Pits 1 and 2 in the East Firing Area (EFA), and Pits 3, 4, 5, and 7, collectively termed the Pit 7 Complex, in the West Firing Area (WFA). In 1981, the Hazardous Waste Assessment study of the hydrology, geology, and ground water chemistry associated with Site 300 landfills was initiated. As part of this project, monitoring wells were installed at the landfills, and a program of periodic ground water monitoring was initiated. In 1984, tritium activities in water from four of the wells rose above the California MCL for drinking water, which is 740 Bq/L (20,000 pCi/L).

A tritium investigation was initiated, and two areas where tritium occurs in ground water above background activities and MCLs have been delineated: (1) the Pit 7 Complex, and (2) the area of Building 850, Doall Road, and Elk Ravine in the East and West Firing Areas. **Figure 2-3** shows the distribution of tritium in ground water for October 1994. The Final SWRI report indicates that, for this second area, tritium was released to the subsurface by percolation of rainfall runoff and dust control water through contaminated Building 850 firing table gravels to ground water. In the first area, tritium was released to ground water from Pits 3 and 5 (in the Pit 7 Complex) by heavy winter rains in 1982–1983, 1986–1987, and 1991–1992 and the resulting rising water tables. Computer modeling of the transport and fate of the tritium indicates that by the time the tritiated water from sites of known ground water contamination reaches the Site 300 boundary, the tritium will have decayed to near background activities. Details of the remedial investigation for the East and West Firing Areas are discussed in the Final SWRI report.

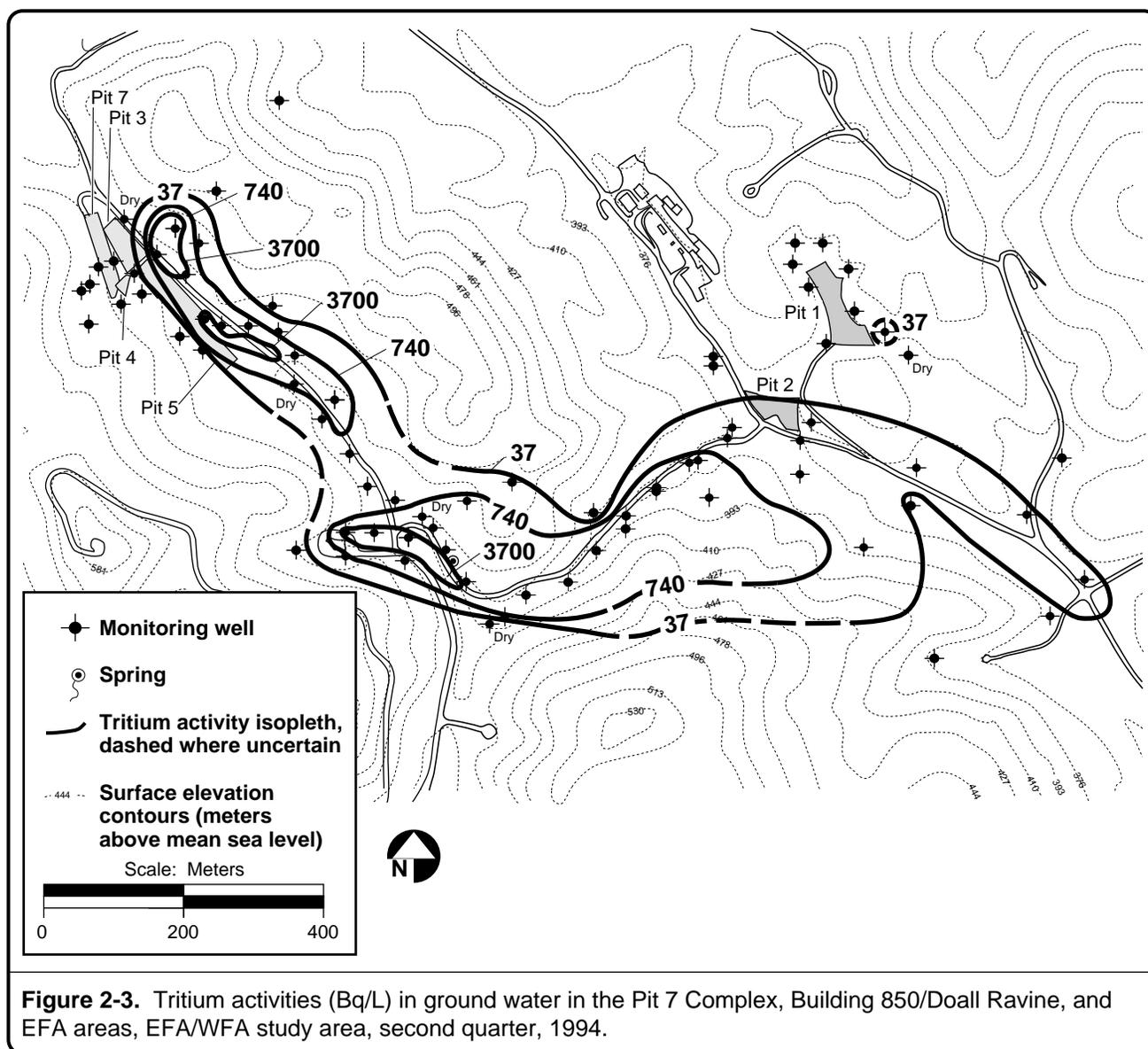
Past monitoring has also revealed trace amounts of TCE in ground water near the Pit 7 Complex (from Pit 5) and at Building 801. Freon-113 at concentrations far below the California maximum contaminant level of 1.2 ppm is present near Pit 1 and is the result of spills at Building 865 (Advanced Testing Accelerator).

During 1994, total uranium activities in excess of the state MCL of 0.74 Bq/L (20 pCi/L) continued to be measured in samples from several ground water monitoring wells at the Pit 7 Complex; several of these wells yielded samples bearing isotopic ratios indicative of depleted uranium. Conversely, samples of

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ground water from several wells in the area contain uranium activities in excess of the state MCL but bear natural uranium isotopic signatures. Analyses of ground water samples from several wells adjacent to Building 850 also indicate depleted uranium signatures; these samples are not in excess of the state MCL for uranium. Additional field work was conducted at Building 850 and Pits 3 and 5 to define the nature and extent of uranium isotopes, polychlorinated biphenyls (PCBs), dioxins and furans, and VOCs in soil, rock, and ground water. These chemical results are being integrated into the risk assessment for the operable unit. The draft final feasibility study for the Building 850/Pits 3 and 5 operable unit is on hold pending schedule negotiations but is currently scheduled for completion by February 15, 1996.





Characterization plans for the Building 854, Building 812, and Sandia Test Site portions of the East and West Firing Areas were submitted to the regulatory agencies during 1994. The characterization work outlined will be performed during 1995–1998.

During December 1992, LLNL completed the capping of landfill Pits 1 and 7. This work was conducted under an LLNL Resource Conservation and Recovery Act (RCRA) closure plan previously approved by DTSC; the legal date of closure was February 12, 1993. The primary components of the closure design are a closure cover system, surface water control system, and subsurface water control system. Quarterly and annual inspection and maintenance of the RCRA landfill caps continues.

During 1994, LLNL properly sealed and abandoned water supply Well 1, which was screened across several water-bearing zones that contained elevated tritium activities.

Pit 6 Area

The Final SWRI report and *Draft Remedial Investigation of Landfill Pit 6* (Taffet 1990) discuss the small plume of TCE (in excess of MCLs) in ground water that discharges to the surface at small springs at the southeastern edge of the Pit 6 area. The source of the plume is the Pit 6 landfill. Due to natural volatilization of affected ground water at the springs, concentrations of VOCs in the plume have been declining since 1992. The *Final Feasibility Study Report for the Pit 6 Operable Unit* (Devany et al. 1994) was released in 1994 and discusses options for remediation in this area.

Building 833 Area

Low concentrations of TCE and associated VOCs have been detected in shallow soils and sediments (to a depth of 15 meters) beneath the Building 833 Area. During the remedial investigation of the Building 833 area, VOC concentrations of up to 1,800 micrograms per liter of water were detected in ground water in two boreholes. Results of the investigation were published in the Final SWRI report and in the *Draft Remedial Investigation of the Building 833 Area* (Webster-Scholten et al. 1991). Although past investigations documented in the Final SWRI report do not indicate risk or hazard above acceptable levels, additional investigation began in 1994 at the Building 832 Canyon portion of the study area. This investigation is scheduled for completion during 1996. Remedial actions will be evaluated if unacceptable risk or hazard is indicated at the Building 832 Canyon area.



Community Relations

The Site 300 Environmental Restoration Division (ERD) CERCLA project maintains open communication with the surrounding communities of Tracy and Livermore. During September 1994, ERD distributed the second Site 300 Environmental Restoration Fact Sheet (Heffner 1994) to over 250 concerned citizens, regulatory agencies, and elected officials. The fact sheet was also distributed to LLNL main site and Site 300 employees. ERD also distributed the Environmental Community Letter to the public; this circular contains information about Site 300 investigation and cleanup activities. In April 1994, LLNL sent a letter that described the Building 834 Interim Treatment CERCLA Removal Action (ground water and soil vapor extraction and treatment) to the same 250 or so people on the community relations mailing list (Heffner 1994). Other community relations activities conducted during 1994 included beginning dialogue with Tri-Valley CAREs, maintenance of the information repositories and administrative records, Site 300 tours for scientists and students from universities and local public schools, and support for off-site private well sampling activities.

Superfund Amendment and Reauthorization Act of 1986, Title III

Title III of SARA is known as the Emergency Planning and Community Right-to-Know Act (EPCRA). It requires owners or operators of facilities that have certain hazardous chemicals on site to provide information on the storage and use of those chemicals to organizations responsible for emergency response planning. In California, chemical inventory information is provided to the California Chemical Emergency Planning and Response Commission and the local administering agency. Executive Order 12856, signed by President Clinton on August 3, 1993, directs all federal agencies not only to comply with the chemical inventory requirements of EPCRA but also to participate in the SARA 313 Toxic Release Inventory Program beginning in calendar year 1994.

LLNL's ChemTrack is an important tool for improving the overall management of hazardous materials at LLNL. It tracks chemical inventories at LLNL through the use of bar codes, laser scanners, and customized software, and enhances LLNL's ability to obtain toxic release information necessary to complete SARA 313 submittals. ChemTrack currently has an inventory of nearly 200,000 chemical containers ranging from 210-liter drums to gram-quantity vials.

ChemTrack includes a chemical locating service that allows LLNL researchers to find and share chemicals. This minimizes the purchase of new chemicals, thereby reducing procurement costs and the generation of hazardous waste. In addition, ChemTrack data is being used by various LLNL organizations to provide for improved emergency response planning and management of Material Safety Data Sheets, to more closely track specific high-hazard chemicals and other regulated substances, and as a screening tool for conducting preliminary hazard analyses of selected LLNL facilities.



Resource Conservation and Recovery Act

RCRA provides the framework at the federal level for regulating the generation and management of solid wastes, including wastes designated as hazardous. Similarly, the California Hazardous Waste Control Act (HWCA) sets requirements for managing hazardous wastes in California. RCRA and HWCA also regulate hazardous waste treatment, storage, and disposal facilities, including permit requirements.

In January 1993, the California Legislature made extensive changes in the laws governing the treatment and storage of hazardous wastes. The changes established five levels, or tiers, of permitting for hazardous waste treatment and storage activities, and they reduced the regulatory requirements for many storage and treatment activities that required a hazardous waste permit under state authorization but not under federal laws.

During 1993, LLNL continued discussions with the DTSC regarding classification of LLNL's waste accumulation areas (WAAs). These negotiations resulted in a January 1994 verbal agreement to allow the WAAs to revert to 90-day "generator" storage units provided LLNL ensures that storage in the WAAs does not exceed 90 days and that the aggregate volume in storage at any one time in the WAAs does not exceed 189,000 liters. This agreement was incorporated into the RCRA Parts A and B permit application, which was revised in March 1994 and submitted to DTSC.

Hazardous Waste Reports for 1993 and 1994

The 1993 federal report (biennial report) for both the Livermore site and Site 300 are required under 40 CFR 262.41, 264.75, and 265.75. These reports were completed and delivered to EPA on April 28, 1994, by the adjusted deadline. The annual reports, which cover 1994 waste-handling information, were completed and submitted to DTSC by their adjusted April 30, 1995, deadline. The annual reports are required under 22 CCR 66264.75.

Both reports are maintained on file at LLNL and comprise four forms. The Identification and Certification form provides general facility information, including addresses, contacts, and general waste minimization information. The Generation and Management form includes "cradle-to-grave" tracking of each waste stream category. The Waste Received form includes descriptions and quantities of wastes that were received from off-site facilities (Site 300 and the Livermore Airport), and the Process System form includes waste quantities treated by each waste management unit on site. DTSC will add two new forms to the 1994 annual report: one covering closure/post closure estimates, and another to document waste cessation within permitted facilities.

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Hazardous Waste Permits	<p>The Livermore-site hazardous waste storage and treatment management units continue to operate under interim status provisions (ISD CA2890012584). Waste management units include container storage, tank storage, and various treatment processes (e.g., wastewater filtration, blending, and size reduction).</p> <p>Because RCRA program authorization was delegated to the State of California in 1992, LLNL now works solely with DTSC in obtaining a hazardous waste permit for the Livermore site. After LLNL submitted the Part A permit application revision on December 18, 1992, and the Part B permit application revision on April 30, 1993, DTSC asked LLNL to make additional modifications to both parts of the permit application. Accordingly, newly revised applications were submitted to DTSC on March 1, 1994.</p> <p>The Site 300 Building 883 hazardous waste container storage area (CSA) continues to operate under the provisions of the Part B permit (Part B CA28990090002) issued by EPA and DTSC in November 1989. A Class 1 modification to the permit was approved in July 1994 to correct a violation noted in the March 31, 1992 Report of Violation issued by DTSC and to update the permit due to personnel changes. A permit renewal application for the Building 883 CSA was submitted in May 1994 and is still being reviewed by DTSC.</p> <p>The Building 829 Open Burn Facility for explosives waste continues to operate under an enforcement order received from DTSC in September 1993. Two new facilities have been proposed for Site 300, and Part B permit applications have been submitted for each facility. One is an explosives waste storage facility that augments the storage capability at the Building 883 CSA by providing a separate dedicated facility to store explosives waste. The other facility is a new Open Burning/Open Detonation Facility (the Explosives Waste Treatment facility, EWTF) that will replace the existing Building 829 Open Burn Facility.</p>
Extremely Hazardous Waste Permit	<hr/> <p>Permit No. 2-13640 is required, pursuant to 22 CCR 67430.1, to transport extremely hazardous waste to an off-site hazardous waste disposal facility. As a condition of the permit, LLNL must prepare a list of extremely hazardous wastes (including concentration, quantity, packaging, proposed hauler, disposal facility, and proposed method of disposal), and submit it to DTSC two weeks before shipping any such waste. This permit must be renewed annually; the application for renewal was submitted in August 1994.</p>
Hazardous Waste Transport Registration	<hr/> <p>This registration is required, pursuant to 22 CCR 66263.10, to transport hazardous wastes over public roads (e.g., from one LLNL site to another). Conditions for registration include annual inspections of transport vehicles and</p>

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trailers by the California Highway Patrol, special training and annual physical examinations for drivers, and annual submission of lists of transport vehicles and trailers to DTSC. The registration was renewed by DTSC in November 1994.

Medical Waste Permit

LLNL generates several types of medical wastes (previously identified as infectious wastes). In July 1991, LLNL registered with the Alameda County Environmental Health Services as a large-quantity generator of medical waste, and submitted an application for a medical waste treatment permit for the Livermore site. The registration and application contained detailed information concerning the management and treatment of medical wastes generated by LLNL's biomedical research, Center for Chemical Forensics, and health services facilities, as well as medical wastes generated at Site 300. The treatment permit was issued in August 1991 and is valid through July 1996. The registration is issued annually and is currently valid through July 1995.

The Alameda County Department of Environmental Health conducted an inspection of LLNL's medical waste generator and treatment facilities on August 18, 1994. No violations were noted at any of the facilities.

Inspections of Hazardous Waste Management Facilities

From May 16–18, 1994, DTSC Region 2 inspected all four Hazardous Waste Management (HWM) facilities (Areas 612, 514, 233, and 693), the Building 231 hydrogen-fluoride (HF) scrubber, 13 WAAs, three workplace accumulation areas (WPAAs), aboveground retention Tank 231-R2A1, hazardous waste storage Tank 406-R1A1, the Fleet Maintenance and Transportation Group's registered hazardous waste hauling vehicles, and two conditionally exempt (CE) resin-mixing units. Also on May 18, 1994, DTSC reviewed the following types of records: inspections, hazardous waste manifests, land disposal restriction notifications, interim status document, and conditionally exempt treatment unit operating logs, contingency plans, and training records.

On June 1, 1994, DTSC held an on-site close-out meeting and delivered a Field Report of Violation listing seven alleged violations and the Tiered Permitting Verification Inspection Report listing one alleged violation. LLNL responses to the violations include correcting an improperly marked label, remarking a hazardous waste hauling vehicle, revising the inspection form for Building 419, shipping a container to a HWM facility for storage, and ensuring an employee received his annual training. LLNL disagreed with a portion of an alleged violation requiring Land Disposal Restriction notification.

DTSC conducted an inspection of the Site 300 hazardous waste facilities on December 6–7, 1994. No violations were noted during the inspection.



Waste Accumulation Areas

In December 1994, there were 43 WAAs in operation at LLNL: 42 at the Livermore site and one at the Livermore Airport. Environmental Protection Department personnel performed over 950 WAA walkthroughs at the Livermore site and the Livermore Airport during 1994. The walkthroughs are informal checks of items such as capacity, labeling, and secondary containment; formal inspections of these items are conducted by personnel in the programs using the WAA.

There were five WAAs that were taken out of service, and one WAA was reclassified as a hazardous waste retention tank system at Site 300 during 1994. This left a total of seven operational WAAs at Site 300 in December of 1994. Environmental Protection Department personnel performed over 250 WAA walkthroughs at Site 300 during 1994.

Underground Storage Tank Management

LLNL manages its underground storage tanks (USTs) through the use of underground tank permits, tank integrity testing, closure and leak documentation, the Tank Upgrade Project, remedial activities, and inspections. Those topics are discussed in the following sections.

Underground Tank Permits

Underground tanks contain diesel fuel, gasoline, waste oil, and potentially contaminated wastewater; aboveground tanks contain diesel fuel, insulating oil, TCE, and contaminated wastewater. Some of the wastewater systems are a combination of underground storage tanks and aboveground storage tanks. **Table 2-2** tabulates tank status as of December 31, 1994.

The number of USTs requiring tank permit fees during all or part of 1994 at the Livermore site decreased by five, from 33 in 1993 to 28 in 1994. The 28 tanks for which fees were paid consisted of the 24 permitted USTs noted in the table, along with four additional tanks that were either removed or replaced with aboveground storage tanks (ASTS) in 1994. A total of 10 USTs need to be upgraded by the 1988 deadline. Four of the 24 permitted USTs consisted of diesel tanks that were replaced with double-walled underground tanks with leak detection.

At the end of 1994, Site 300 had a total of five underground petroleum product tanks in service: four diesel storage tanks and one gasoline storage tank. Eight diesel USTs were closed in 1994; five of these eight were replaced with ASTS, while one was replaced with an UST. The two remaining diesel USTs were closed without replacement. In addition, the two gasoline USTs that were removed in 1993 were replaced by a single UST in 1994. Fees were paid for seven tanks during 1994, including the five permitted USTs noted in the table and two tanks that were removed in 1994 and replaced with aboveground storage tanks.

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Table 2-2. Status of In-service tanks, December 31, 1994.

Tank Type	Livermore Site			Site 300		
	Permitted	No Permits Required	Total	Permitted	No Permits Required	Total
Underground Storage Tanks						
Petroleum						
Diesel	8	0	8	4	0	4
Gas	2	0	2	1	0	1
Oil	1	0	1	0	0	0
Wastewater	13	63	76	0	10	10
Subtotal	24	63	87	5	10	15
Aboveground Storage Tanks						
Diesel	0	27	27	0	12	12
Wastewater	7 ^(a)	87	94	0	15	15
Subtotal	7	114	121	0	27	27
TOTAL	31	177	208	5	37	42

^a These seven tanks are situated at the LLNL Treatment, Storage, and Disposal Facility and are generated under interim status as part of the RCRA Part B permit application.

Tank Integrity Testing

Under the tank leak-tightness testing program, hazardous waste and hazardous product USTs are tested to determine structural integrity in accordance with requirements established in state and federal regulations. The underground portions of tank systems are tested (as a whole or by component parts) using methods that may include precision tests, dye tests, helium-injection detection, and hydrostatic tests. All leak-tightness test results for regulated systems are provided to Alameda County Environmental Health Services or San Joaquin County Public Health Services. Two diesel fuel USTs at the Livermore site and three diesel fuel USTs at Site 300, which have capacities in excess of 7,600 liters, were tested on a monthly basis throughout the year. The results of the testing were forwarded to the respective regulatory agencies.

Seven diesel USTs at the Livermore site and four diesel USTs at Site 300 were tested in 1994 as part of the state and federal requirements for annual testing of single-walled USTs. The two gasoline USTs at Site 300 were not tested in 1994 because they were removed in March of 1994.

On December 20, 1993 at the Livermore site, holes were discovered on the top of an underground storage tank while it was being removed. Although the tank had been tested and certified to be product tight on December 8, 1993, it was determined that the holes had existed for some time and were present during the tank test. This information prompted an appraisal of the tank tester's method



and procedures. It was discovered that the tester had modified the state-certified procedure, eliminating the standpipe that is used to provide constant head pressure while testing. Upon further investigation, it was discovered that this modified procedure was used on other tanks in 1993. A total of 17 tanks were retested by another state-certified tank tester to ensure validity of all test data. The situation was reported to DOE as an off-normal occurrence. Retesting was completed on January 12, 1994, and all of the tanks that were retested were leak tight. Both the Alameda County Health Agency and San Joaquin Public Health Agency were notified of these findings.

Closure and Leak Documentation

Closure requirements for hazardous USTs include the preparation and approval of a closure plan for the system, quarterly reports if leaks have been identified, and a report upon completion of closure activities. The closure plans must include a detailed review of the uses of the tank, a sampling plan, a site plan, and other information to verify that no environmental contamination has occurred or, if it has occurred, to ensure its cleanup.

A total of 48 closure plans were prepared in 1994 for tank systems (or portions of systems) that were taken out of service, previously removed (but not officially closed), or expected to be removed from service. Thirty of these closure plans—for hazardous product, hazardous waste, or mixed-waste tank systems—were approved by regulatory agencies. The 18 remaining closure plans were prepared and approved for nonhazardous waste tank systems as a part of LLNL's best management practices.

Upon completion of closure activities, closure reports for hazardous product, hazardous waste, and mixed waste USTs must be submitted to the regulatory agencies for review and approval. Twenty-four closure reports for hazardous product USTs were submitted to regulatory agencies for review in 1994. Twenty-three of these closure reports received county approval in 1994; one is pending approval in 1995. There were two closure reports prepared in 1994 for above-ground hazardous product tanks as a part of LLNL's best management practices.

In 1994, LLNL submitted unauthorized release (leak)/contamination site reports to the regulatory agencies for 10 petroleum USTs. Unauthorized release/contamination from five diesel USTs, three located at the Livermore site and two at Site 300, were discovered based on soil sample results. The results indicated diesel contamination. Three unauthorized release reports, all at Site 300, were initiated during the actual removal of the tank. Contamination was based on both visual certification and the presence of a strong diesel odor. One unauthorized release report was initiated after a helium test indicated that a hole was present in the gasket area of the manway. This tank was replaced with an above-ground storage tank. The final unauthorized release/contamination was

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indirectly associated with the two gasoline USTs that were located at Site 300. During the excavation of these two tanks, the city water supply line was ruptured, and water filled the excavation.

Tank Upgrade Project

In fiscal year 1992, LLNL received funding for four years to upgrade or close approximately 126 tanks in accordance with existing local, state, and federal tank regulations or to decrease the potential for environmental contamination as the result of a release from a tank or its appurtenances. These tanks include wastewater retention tanks (for nonhazardous, hazardous, mixed, and radioactive waste) and product retention tanks (for petroleum products). In fiscal year 1993, additional funding was granted to provide overflow and spill protection to aboveground oil-filled electrical equipment (e.g., transformers) and additional aboveground petroleum tanks, resulting in a revised total of 214 tanks or transformers being closed or upgraded. In 1994, the remaining nonhazardous tank systems were dropped from the overall scope, reducing the number of tanks and transformers to 158. As of December 1994, construction was completed for 56 tanks, construction is in progress for 43 tanks, design was completed for 102 tanks, and design is in progress for 52 tanks.

Closure and corrective action reports were submitted to San Joaquin County in 1994 on the removal of underground fuel supply tanks at Buildings 827, 829, 834, 836, 865, 871, and 879. Cleanup of the associated contaminated gravels and soils was documented in these reports.

Remedial Activities

In 1994, data continued to be collected to evaluate the tritium activities in the Building 292 Area subsurface, where tritiated rinse water leaked from an UST. Tritium activities fluctuated between about 260 and 1,370 Bq/L (7,000 and 37,000 pCi/L) during 1994. The tritium activity trend followed the ground water elevation trend throughout the year with the tritium activity above the 740 Bq/L (20,000 pCi/L) drinking water standard.

The data collected for the Building 292 Area have been incorporated into a vadose zone computer model to provide estimates of tritiated moisture movement within the subsurface. The model has been verified with experimental results, and work is in progress to assign values to locations where there are no measured data.

Inspections

For every installation and closure of hazardous waste, mixed waste, and hazardous product USTs, there is an inspection in which a representative from Alameda County Environmental Health Services (for the Livermore site) or San Joaquin County Public Health Services (for Site 300) participates. For 1994,



there were 17 inspections by the former and 16 inspections by the latter. There were no notices of violation or notices of deficiency received as a result of any of these inspections.

In December 1994, the San Joaquin County Public Health Services performed a sitewide inspection of the five remaining in-use underground storage tanks at Site 300. All five systems are doubly contained and continuously monitored for leak tightness. All other Site 300 underground fuel storage tanks systems have been closed and not replaced, or replaced with aboveground tank systems. When the inspection was completed, LLNL received an "Underground Tank Official Inspection Report" dated December 27, 1994, indicating there were no violations.

National Environmental Policy Act

The National Environmental Policy Act (NEPA—42 U.S.C. 4321 et seq.) establishes federal policy for protecting environmental quality. The major method for achieving established NEPA goals is the requirement of an Environmental Impact Statement (EIS) for any major federal or federally funded project that may have significant impact on the quality of the human environment. If the need for an EIS is not clear, or if the project does not meet DOE's criteria for requiring an EIS, an Environmental Assessment (EA) is prepared. A Finding of No Significant Impact is issued when the EIS is determined to be unnecessary.

Certain groups of actions that do not have a significant effect on the environment either individually or cumulatively can be categorically excluded from more in-depth NEPA review (i.e., preparation of either an EA or EIS). DOE NEPA implementing procedures identify those categorical exclusions. If a proposed project does not clearly fit one of the exclusion categories, an Action Description Memorandum is prepared to determine which type of assessment document may be needed.

Environmental Assessments Submitted to DOE

In 1994, LLNL prepared 30 categorical exclusion documents for DOE review to comply with NEPA. DOE issued no Findings of No Significant Impact in 1994 for the EAs submitted earlier for DOE determination. Two draft EAs for proposed projects were submitted to DOE in 1994 for NEPA determination.

The *Draft Environmental Assessment for the Mixed Waste Management Facility (MWMF; Khan 1994)* addressed the potential impacts from construction and operation of a facility that will demonstrate potential technologies for treating DOE mixed waste on a pilot scale. Based on the results of this research, certain of the technologies may be adopted later by DOE for treatment of mixed wastes throughout DOE's facilities. DOE is currently reviewing this draft EA.

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Draft Environmental Assessment for the Site 300 Explosives Waste Treatment Facility (EWTF; McDowell 1994) addressed the potential impacts of constructing and operating up-to-date replacement facilities for treating explosives wastes and explosives-contaminated wastes at Site 300. DOE is currently reviewing this draft EA.

Floodplain Management and Wetland Protection

Executive Orders 11988 (Floodplain Management) and 11990 (Protection of Wetlands), both dated May 24, 1977, require each federal agency to issue or amend existing procedures to ensure that the agency evaluates the potential effects of any action it may take in a floodplain (Order 11988), and to consider wetland protection in its decision-making (Order 11990). DOE's policy (10 CFR 1022) is to implement these Executive Orders through existing NEPA review procedures. LLNL applies the requirements of the DOE wetlands/floodplains policy and procedures through the NEPA review process for each proposed LLNL action. In accordance with DOE policy, a separate public notice and floodplain/wetlands assessment may be required for certain proposed actions and would be prepared if no EA- or EIS-level NEPA documentation incorporating such assessments had been prepared. In 1994, there were no proposed LLNL actions that required such separate DOE assessments.

California Environmental Quality Act

The California Environmental Quality Act (CEQA—California Public Resources Code Sections 21000 et seq.) establishes state policy for protecting environmental quality. The goals of CEQA are achieved by requiring local and state agencies to assess the potential environmental impacts of proposed actions for which they may have a decision-making role. This is done through the preparation of an Initial Study, which leads to issuance of a Negative Declaration or a requirement to prepare an Environmental Impact Report (EIR). An EIR may also be prepared directly for projects that may have significant environmental impacts.

No Initial Study or EIR documents were prepared by the University of California (UC) in 1994 on proposed projects for which the UC was the decision-making or lead agency.

In November 1992, UC and LLNL made a commitment to implement 67 mitigation measures identified by the 1992 EIS/EIR (*Environmental Impact Statement and Environmental Impact Report for Continued Operation of Lawrence Livermore National Laboratory and Sandia National Laboratories, Livermore* (U.S. Department of Energy and University of California 1992a,b) and to provide annual reports on their implementation. The measures are being implemented in accordance with the approved 1992 Mitigation Monitoring and Report Program, and the first annual report was published in March 1994.



Endangered Species Acts and Sensitive Natural Resources

As a federal facility within California, LLNL must meet the requirements of both the U.S. Endangered Species Act and the California Endangered Species Act as they pertain to endangered or threatened species and other species of special concern that may exist or are known to exist at the LLNL sites. For example, in implementing the Mitigation Monitoring and Reporting Program in 1994, biological assessment surveys were performed for special-status species at 42 Site 300 project construction (ground disturbance) areas. Presence data for the San Joaquin kit fox (*Vulpes macrotis mutica*), American badger (*Taxidea taxus*), and burrowing owl (*Speotyto cunicularia*) were collected at each project location, and other applicable mitigation measures were implemented when required.

During 1994, no active San Joaquin kit fox dens were discovered, but seven potential dens were found. One occupied American badger den was discovered, and 40 unoccupied dens were identified. Five active burrowing owl dens were discovered, and two potential dens were identified. In addition, several animal species not previously observed were recorded on site, and two new blue elderberry bush locations were delineated. **Table 2-3** lists those special-status animal species previously not known to occur on LLNL property, but first observed in 1994.

Table 2-3. Additional special-status species observed in 1994 at LLNL.

Species	Location	Federal Status	State Status
Long-eared owl (<i>Asio otus</i>)	Site 300	—	Species of Special Concern
Double-crested cormorant (<i>Phalacrocorax auritus</i>)	Livermore site	—	Species of Special Concern
Ferruginous hawk (<i>Buteo regalis</i>)	Livermore site, Site 300	Candidate (II)	Species of Special Concern
Swainson's hawk (<i>Buteo swainsoni</i>)	Site 300	—	Threatened
Merlin (<i>Falco columbarius</i>)	Site 300	—	Species of Special Concern

In the fall of 1992, LLNL investigators began a project to establish two new experimental populations of the large-flowered fiddleneck (*Amsinckia grandiflora*), a federally listed endangered plant species, into a portion of its designated critical habitat at Site 300. The investigators are also studying the causes of the species decline. This work is funded through a Laboratory Directed Research and Development grant and is being conducted in collaboration with Mills College (representing the California Department of Fish and Game) and UC Davis, with the approval of the U.S. Fish and Wildlife Service.



Researchers from Mills College and UC Davis made numerous trips to Site 300 between October 1993 and May 1994 to work with LLNL personnel on both the experimental and natural populations. The natural populations are located adjacent to the Building 858 Drop Tower (known as the Drop Tower population), and at a site one canyon to the west, which is known as the Draney Canyon population. The experimental populations are located near the Drop Tower natural population. On April 7, 1994, LLNL personnel counted 1,606 mature plants in the Drop Tower population, up from the 301 plants observed in 1993. This increase is a direct result of the use of grass-selective herbicides to reduce competition from the exotic grasses in the area. On April 19, 1994, LLNL personnel counted 16 mature plants in the Draney Canyon population.

The census information was provided to the California Department of Fish and Game. Only one of the two experimental populations contained adult plants. This population had a total of 248 mature plants; however, this was primarily a result of additional seeding and transplantation. Work on this experimental population will continue through 1995, at which point it will be allowed to naturally rejuvenate.

National Historic Preservation Act

The National Historic Preservation Act, as amended through 1992, contains two primary sections that apply to federally operated and funded installations such as LLNL; Sections 110 and 106. Section 110 sets forth the broad affirmative responsibilities for balancing agency missions with cultural values. Its purpose is to ensure that historic preservation is fully integrated into federal agency programs. Section 106 (36 CFR 800) requires federal agencies to take into account the effects their projects may have on "historic properties" (cultural resources), and they must allow a reasonable time period for the Advisory Council on Historic Preservation to comment.

Consultation with the State Historic Preservation Office began in 1994 with an immediate goal of developing an interim programmatic agreement. This document will enable DOE/OAK and LLNL to implement temporary compliance measures for federal cultural resource management while the Cultural Resource Management Plan is developed. Overview documentation of past cultural resource management activities was also submitted to the DOE Oakland Operations Office and the State Historic Preservation Office. In the interim, cultural resource management reviews of project activities are conducted in accordance with federal and state standards, and the LLNL archaeologist performs surveys on a project-by-project basis.



LLNL participated in the following activities and initiatives in 1994:

- Performed the Shovel Test Project for the residential portion of the Carnegie Site at Site 300.
- Established an Archaeological Laboratory that contains facilities for mapping, photography, program and project electronic database management, artifact accessioning, and archival storage.
- Prepared an archival slide presentation on the 1890–1918 historic period of Corral Hollow Canyon for public outreach.
- Conducted a meeting between research-oriented archaeologists and Laboratory scientists on April 26, 1994, to present research investigations and explore common areas and mutual interests with a view towards future partnerships.

Clean Water Act and State Programs—Waste Discharge Requirements

Preserving clean water is the subject of local, state, and federal regulations. The National Pollutant Discharge Elimination System (NPDES) under the Federal Clean Water Act establishes permit requirements for discharges into navigable waterways. In addition, the State of California requires permits, known as Waste Discharge Requirements (WDR) for any discharges of wastes that could adversely affect the beneficial uses of waters of the state. The RWQCBs are responsible for issuing and enforcing both permit types. The Livermore Water Reclamation Plant requires permits for wastewater discharges to the city sanitary sewer system. Finally, the California Department of Fish and Game requires streambed alteration agreements for any work that may disturb or impact rivers, streams, or lakes.

LLNL does not currently have any projects subject to permitting under Section 404 (wetlands) of the Clean Water Act, administered by the Army Corps of Engineers.

Ground Water and Surface Water Discharge Permits

WDR Order No. 88-075, issued by the San Francisco Bay RWQCB, pertains to activities undertaken to investigate and remediate contaminants in ground water at the Livermore site. The order allows treated ground water that meets specified standards to be discharged to specified areas on DOE property. LLNL also holds an NPDES permit (CA0029289, WDR Order No. 91-091) for treated ground water discharged to the ground, storm drains, arroyos, injection wells, and infiltration trenches at the Livermore site. The treated ground water is from ground water investigation monitoring wells and ground water treatment facilities. As adopted into the CERCLA Record of Decision, LLNL follows the substantive requirements of CA0029289 as applicable, relevant, and appropriate requirements. The administrative requirements of this permit are no longer



followed, including reporting, payment of fees, and permit renewal. The self-monitoring programs required by this permit and the CERCLA Record of Decision are described in Chapter 13 on Compliance Self-Monitoring. Analytical results are presented in the *LLNL Ground Water Project 1993 Annual Report* (Hoffman et al. 1994a) submitted under CERCLA.

The Livermore site also discharges storm water associated with industrial activities under the California General Industrial Storm Water Activity NPDES Permit issued by the State Water Resources Control Board and implemented by the RWQCBs. On March 27, 1992, LLNL submitted a Notice of Intent to the State Water Resources Control Board, applying for coverage to discharge storm water associated with industrial activity under the General Industrial Activity permit. The general industrial activity permit became effective October 1, 1992. In addition, LLNL continued construction operations for the Building 132 project at the Livermore site and applied for coverage of this activity under the California General Construction Activity Storm Water NPDES Permit. The Notice of Intent for this project was submitted to the State Water Resources Control Board on September 30, 1992. The self-monitoring programs required by these permits and associated analytical results are detailed in Chapters 6 and 13, and are submitted annually to the San Francisco Bay RWQCB.

Storm water from LLNL's Central Drainage Basin is discharged under the authority of the CERCLA Record of Decision through the reference to WDR Order No. 91-091. The self-monitoring agreement submitted to the San Francisco Bay RWQCB for discharges from the Central Drainage Basin and associated analytical results are discussed in Chapter 13.

Site 300 discharges storm water associated with industrial activity, routine blow-down water from three cooling towers, and emergency blowdown water from 14 additional cooling towers under NPDES Permit No. CA0081396, WDR Order No. 94-131. WDR Order No. 82-105 for discharges from cooling towers was rescinded, and coverage of storm water discharges associated with industrial activities, excluding construction activities under WDR Order No. 91-13-DWQ (California General Industrial Storm Water Activity NPDES Permit), was replaced with the adoption of this order renewing and amending CA0081936. Routine cooling tower blowdown discharges from the 14 cooling towers were engineered to percolation pits and discharge to these pits under a Waiver of Waste Discharge Requirements issued by the Central Valley RWQCB on February 6, 1995. The self-monitoring program for storm water discharges and associated analytical results are detailed in Chapters 6 and 13. The cooling tower self-monitoring program and associated analytical results are detailed in Chapter 13. Analytical data for this permit for both storm water and cooling tower discharges are reported annually to the Central Valley RWQCB.



Notices of termination of coverage under the general construction activity permits were submitted to the Central Valley RWQCB for the Site 300 Roadway Improvement Project and closure of landfill Pits 1 and 7. A notice of termination was also submitted to the Central Valley RWQCB for coverage of Site 300 under the general industrial activity storm water permit. LLNL submitted a Notice of Intent for coverage under the general construction activity storm water permit for the Site 300 Doall Road Project on June 17, 1994. Construction was completed, and the site stabilized on December 29, 1994. The Notice of Termination of coverage for this project under the general construction activity permit was submitted to the Central Valley RWQCB on February 8, 1995.

Site 300 operates under three additional permits and two substantive requirement agreements issued by the Central Valley RWQCB: WDR Order No. 93-100 pertains to ongoing post-closure monitoring requirements for landfill Pits 1 and 7; WDR Order No. 85-188 is a permit for operation of the domestic sewer lagoon, domestic septic tanks and associated leach fields, and the Class II surface impoundments for high-explosives rinse waters, chemistry building wastewaters, and photo process rinse waters. A revised report of waste discharge to update WDR Order No. 85-188 was submitted at the request of the Central Valley RWQCB on June 29, 1994. The Central Valley RWQCB is reviewing the permit application and should issue new waste discharge requirements in 1995. The self-monitoring programs for WDR Order Nos. 93-100 and 85-188 and associated analytical results are described in Chapter 7, Routine Ground Water Monitoring, and reported to the Central Valley RWQCB in quarterly and annual reports.

WDR Order No. 91-052 (NPDES Permit No. CA0082651) is a permit to discharge treated ground water from the eastern GSA ground water treatment facility to Corral Hollow Creek. Two ground water treatment facilities at Site 300 (central GSA and Building 834) operate under substantive requirements issued by the Central Valley RWQCB and agreed to by LLNL as part of the CERCLA process. The substantive requirements for these facilities include proof-of-system and full-scale operation evaluations of the hardware, monitoring of physical properties in the subsurface and influent and effluent chemical concentrations, and regular reporting to the regulatory agencies. The self-monitoring programs for the ground water treatment permit and substantive requirements are also discussed in Chapter 13. Analytical results are reported quarterly to the Central Valley RWQCB in the LLNL Site 300 ground water program reports.

Both the Livermore site and Site 300 are implementing Storm Water Pollution Prevention Plans that were adopted in May 1994. The Storm Water Monitoring Programs were implemented by January 1, 1993, as required by the California General Industrial Activity Permit. The Site 300 Storm Water Monitoring Program was updated July 1994 as required in WDR Order No. 94-131. LLNL



submitted a technical report to the Central Valley RWQCB to obtain coverage of nonstorm water discharges under an NPDES permit for discharges discovered during LLNL's investigation of drain connections. A permit application is being prepared for nonstorm water discharges at the Livermore site for 1995 submittal to the San Francisco Bay RWQCB. This is necessary to meet Storm Water Pollution Prevention Plans certification requirements for both the Livermore site and Site 300.

Inspections

The San Francisco Bay RWQCB inspected the Livermore site on October 20, 1994, for compliance with the Construction and Industrial Storm Water programs. There were no findings of violations resulting from this inspection. The Central Valley RWQCB met with LLNL staff on October 12, 1994, to gain a better understanding of discharges for which permit applications had been submitted, as well as to view the area of cooling tower sludge deposition near Building 865.

Wastewater Permits

A Wastewater Discharge Permit from the Livermore Water Reclamation Plant (LWRP) provides for the continued discharge of LLNL sanitary and industrial effluent to the city sewer system. Permit No. 1250 (93-94) was in effect from September 1993 through September 1994, and renewal Permit No. 1250 (94-95) is effective from September 1994 to September 1995. Under the provisions of this permit, LLNL conducts a self-monitoring program at its outfall into the Livermore sewer system. Daily and monthly effluent sampling are performed to satisfy permit compliance requirements. The daily samples are composited to represent weekly values. The monitoring results of the total LLNL effluent are reported monthly to the LWRP. LLNL is seeking an EPA exemption from continued compliance with the Categorical Standards; therefore, the need for self-monitoring of categorical processes, as well as semiannual reports, has been suspended by the LWRP until further notice.

The self-monitoring program, including a discussion of analytical results for this wastewater discharge, is detailed in Chapters 5 and 13. LLNL received one Notice of Violation from the LWRP for a discharge of wastewater containing methylene chloride in January 1994 for exceeding the discharge limit for total toxic organics.

LLNL renewed two discharge permits by the LWRP for discharges of treated ground water to the sanitary sewer during 1994: (1) ground water discharge Permit No. 1508G (94-95) for discharge of sewerable waste from TFF and



(2) ground water discharge Permit No. 1510G (94-95) for an ERD sitewide treatability study. Discharges from TFF to the sanitary sewer are monitored quarterly and reported semiannually to the LWRP. Discharges to the sanitary sewer are monitored for the sitewide treatability study and reported annually. The self-monitoring programs and the associated analytical results documenting compliance with the self-monitoring provisions of these permits are detailed in Chapter 13.

Inspections

LWRP personnel spent two days on site during 1994 (in August and November) inspecting and sampling pretreatment discharges. There were no Notices of Violation issued by the LWRP as a result of these inspections.

Streambed Alteration Agreements

Three streambed alteration agreements were issued by the California Department of Fish and Game for construction and maintenance projects impacting the natural drainage at Site 300. A one-time agreement was issued for modifications to Doall Road. A five-year maintenance agreement was issued for removal from Corral Hollow Creek of vegetative growth resulting from the discharge of treated ground water from the eastern GSA treatment facility (Site 300). A one-time agreement was issued for the installation of a storm water sampling device in Corral Hollow Creek. A streambed alteration agreement application was submitted to the Department of Fish and Game on December 22, 1994, to extend a fire trail across Elk Ravine. This agreement was issued in February 1995.

Inspections

California Department of Fish and Game personnel inspected Site 300 in May 27, 1994, to determine the need for a streambed alteration agreement for proposed work associated with the Doall Road upgrade project.

California Department of Fish and Game personnel also inspected Site 300 in December 1994 to determine the need for a streambed alteration agreement for proposed installation of the storm water sampling device.

Clean Air Act/Air Quality Management Activities

Air permits are obtained from the Bay Area Air Quality Management District (BAAQMD) for the Livermore site and from the San Joaquin Valley Unified Air Pollution Control District for Site 300. In 1994, the former issued 71 permits to operate, 396 letters of exemption, and 164 permit renewals for the Livermore site.

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In 1994, the latter issued seven permits to operate, two letters of exemption, and 25 permit renewals for Site 300.

Inspections

The BAAQMD conducted five days of inspections at the Livermore site during 1994. No Notices of Violation were issued.

The San Joaquin Valley Unified Air Pollution Control District conducted three days of inspection at Site 300 during 1994. No Notices of Violations were issued.

National Emission Standards for Hazardous Air Pollutants

In August 1993, DOE and EPA signed a Federal Facility Compliance Agreement whereby LLNL would undertake measures to demonstrate compliance with National Emission Standards for Hazardous Air Pollutants (NESHAPs) for radionuclide emissions (Radionuclide NESHAPs, 40 CFR 61, Subpart H). The agreement contained a compliance schedule, required quarterly reporting, and documented the work that LLNL needed to perform to demonstrate compliance with these regulations. EPA notified DOE and LLNL in April 1994 that all requirements of the agreement had been met and that LLNL had demonstrated compliance with NESHAPs regulations.

The applicable NESHAPs regulations require that all potential sources of radionuclide air emissions be evaluated to determine the possible effective dose equivalent to the maximally exposed individual member of the public (MEI). These evaluations may include modeling based on radionuclide inventory data, measurements of the emissions, or both. Compliance with two dose limits must be evaluated. First, the sum of all effective dose equivalents to the MEI from all radionuclide emissions to air must not exceed 100 $\mu\text{Sv}/\text{y}$ (10 mrem/y). Second, all emission points with the potential for unmitigated emissions resulting in any effective dose equivalent greater than 1 $\mu\text{Sv}/\text{y}$ (0.1 mrem/y) must have continuous monitoring systems that meet the requirements stated in the regulations.

The 1994 NESHAPs annual report (Surano et al. 1995) reported to DOE and EPA the total calculated sitewide MEI effective dose equivalents for the Livermore site and Site 300 as 0.65 $\mu\text{Sv}/\text{y}$ (0.065 mrem/y) and 0.81 $\mu\text{Sv}/\text{y}$ (0.081 mrem/y), respectively. The reported doses include contributions from both point sources and diffuse sources. Modeling was based on monitoring data and on a comprehensive LLNL-wide radionuclide inventory. The totals are well below the 100 $\mu\text{Sv}/\text{y}$ (10 mrem/y) dose limits defined by the NESHAPs regulations. The details of these data are included in this report (see Chapter 12). The total calculated 1994 MEI effective dose equivalents for the Livermore site and Site 300 are comparable to those reported for 1993, when the effective dose equivalent values were 0.66 $\mu\text{Sv}/\text{y}$ (0.066 mrem/y) for the Livermore site and 0.37 $\mu\text{Sv}/\text{y}$ (0.037 mrem/y) for Site 300.



LLNL is committed to maintain continuous monitoring of Building 331, Building 332, and the hardened portion of Building 251. Continuous monitoring already exists in these buildings. They and five other buildings, where continuous monitoring systems are in place, will continue to be monitored. Inspections of these sampling systems indicated that representative sampling is being performed.

Toxic Substance Control Act

Toxic Substance Control Act (TSCA) regulations affecting the Livermore site are those that regulate the storage and disposal of PCBs and asbestos wastes. The PCB annual report, required under 40 CFR 761.180, is a record of PCB-containing equipment in service, taken out of service, or disposed of during the year. At LLNL, equipment containing PCBs is used in a totally enclosed manner until the equipment is taken out of service, at which time it is removed to HWM for disposal at an approved site. In addition, LLNL conducts research and development activities using PCBs. Statistics for PCBs compiled in 1994 are kept on file, available for EPA inspection. Asbestos wastes are reported in the Hazardous Waste Report, which is required by DTSC under 22 CCR 66264.75.

Current Issues and Actions

The Environmental Management Assessment, conducted last summer by DOE's Office of Environmental Audit, found LLNL's environmental communications exemplary. The report stated that all levels of Laboratory management and staff exhibited a high level of commitment to environmental excellence.

Several areas were singled out as "exceptional" by the DOE, including the Laboratory's emergency preparedness planning and response program, the Laboratory's internal communications program (for effectively conveying awareness of environmental issues), and the Laboratory's environmental planning program.

The report identified eight minor deficiencies having to do with DOE's organizational structure. Most of these had previously been identified by LLNL and DOE Oakland Operations Office, and corrective actions have been planned or completed.

Chemical Exchange Warehouse

A new program at LLNL is aimed at reducing the disposal of chemicals as hazardous waste. This program is known as the Chemical Exchange Warehouse (CHEW) program. In the past, a good fraction of the hazardous waste disposal resulted from unused chemicals. Today, the CHEW program provides a method of collecting, identifying, storing, and finding a new use for the materials. The CHEW program is finding a new home for at least 25% of the available chemicals

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and returning 25% of that volume to be recycled for additional use. The savings are estimated to offset the transportation and storage costs after program startup.

Building Drain Repair Project

In fiscal year 1994, LLNL received approval from DOE to redirect \$2.1 million of sanitary sewer rehabilitation funds to the Building Drain Repair Project. This project was charged with performing sitewide repair activities identified by the Building Drain Investigation Project and preparing regulatory permits to comply with the NPDES Storm Water requirements imposed by the RWQCBs. Drains discharging to improper destinations are removed or redirected in accordance with current mandated regulatory requirements. Over 200 repairs were identified at the Livermore site, and about 80 were identified at Site 300.

A major portion of this project involved assessing each of the drain discharges to ground to determine if it should be permitted or repaired. Once the assessments for over 25,000 drain sources were completed, along with the necessary field verification and database entry, the permitting and repair process began. All permit and repair work must be completed by the September 30, 1995, regulatory deadline. This work is being driven by the Porter-Cologne Water Quality Control Act, NPDES Stormwater Requirements for Industrial Facilities enacted in 1991. Once this project has been completed, building drain management will become the responsibility of Plant Engineering. All future drain additions and modifications will be tracked with a drain permit system as an infrastructure management function. Environmental drain discharge guidance support will continue to be the responsibility of the Environmental Protection Department (EPD).

Environmental Occurrences

Notification of environmental occurrences is required under a number of environmental laws and regulations, including the 5000 series of DOE Orders: DOE Order 5000.3B, Occurrence Reporting and Processing of Operations Information; and DOE Order 5484.1, Environmental Protection, Safety, and Health Protection Information Reporting Requirements. DOE Order 5000.3B, effective February 22, 1993, provides guidelines to contractor facilities regarding categorization and reporting of environmental occurrences to DOE. The order divides occurrences into three categories: emergencies, unusual occurrences, and off-normal occurrences. DOE Order 232.1, which will replace DOE Order 5000.3B, is being drafted.

EPD responds to all reports of spills or other environmental occurrences through a well-established reporting process. EPD has established a seven-day-a-week, 24-hour-a-day, on-call, rotational position called the Environmental Duty Officer (EDO), who can be reached by pager or by cellular phone at any time. Environmental analysts and the EDO cooperate in providing advice on immediate cleanup and monitoring necessary to protect the environment; in evaluating reporting

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requirements; and deciding with LLNL management on the process for notifying local, state, and federal regulatory agencies. The EPD's response to environmental occurrences is part of the larger LLNL On-Site Emergency Response Organization that also includes representatives from Hazards Control, Health Services, Plant Engineering, Public Affairs, Safeguards and Security, and Site 300.

EPD responded to 24 incidents that required agency notification during the 1994 calendar year. Three of the incidents were categorized as unusual occurrences according to the DOE Order 5000.3B implementing procedures; the others were reported as off-normal occurrences. (Any incident that requires notification of an environmental regulatory agency is considered an off-normal occurrence.) None of the incidents, summarized in **Table 2-4**, caused any adverse impact to human health or the environment. Agencies notified of the incidents described above included DOE, Alameda County Department of Health Services, San Joaquin County Public Health Services, San Francisco RWQCB, the Central Valley RWQCB, LWRP, National Response Center, and the Office of Emergency Services.

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Table 2-4. Tabulation of environmental occurrences, 1994.

Date ^(a)	Occurrence Category	Description
Jan 3	Off-normal	Approximately 7,200 liters of low-conductivity water was discharged to the storm water drainage system as a result of a leak in the low-conductivity water system in Building 191. The Fire Department responded, installed a sump pump in the basement of Building 191, and began pumping the water into the storm water drainage system that led to the Arroyo Las Positas. Because of unknown potential contaminants in the water and a possibility that the water left the Livermore site, the San Francisco Bay RWQCB was notified.
Jan 6	Off-normal	Analytical soil sample results from the 241-D1U1 tank removal indicated the presence of diesel fuel in the native soil. As required per Title 23, California Underground Storage Tank Regulation, the local agency was notified.
Jan 7	Off-normal	Holes were discovered on the top of an underground diesel tank, 241-D1U1, which had been tested and certified to be leak tight. Investigation revealed the state-certified test procedure had been modified by the tank tester, which caused erroneous readings. This incorrect procedure was also used on other tanks, including tanks at Site 300; therefore, Alameda County Health Agency and San Joaquin County Public Health Agency were notified.
Jan 12–13	Off-normal	LLNL personnel performed a helium injection/detection test on 231-D1U1. Results of the helium testing indicated that there was a leak in the gasketed area on the manway cover, a possible leak in the gasketed area of the lower gasket of the manway, and that the supply and return lines did not leak. The tank was pumped out and emptied the following day. It has since been replaced with an aboveground storage tank.
Jan 18	Unusual	The Permits and Regulatory Affairs Group received a Report of Violation from DTSC following an inspection at Site 300 on November 15–16, 1992. The inspection noted violations of inadequate/lack eyewash and safety shower at Building 805. There was also inadequate identification of wastes on a hazardous waste label at Building 879. An Report of Violation constitutes an unusual occurrence.
Feb 2	Off-normal	The monthly compliance sampling indicated that LLNL had exceeded discharge limits for total toxic organics. The allowable limit was 1.0 ppm, and the reportable result concentration was 1.5 ppm. The reporting requirements specify 24-hour notification to the LWRP.
Feb 7	Off-normal	A release of wastewater containing zinc above the limit imposed by LLNL's Wastewater Discharge Permit was registered by an alarm at Building 196 on January 29, 1994, and was reported by the Water Guidance and Monitoring Group to the LWRP. Zinc was present at 3.3 mg/L, as compared to the discharge limit of 3.0 mg/L.
Feb 10	Off-normal	A contaminant, 1,2-dichloroethane (1,2-DCA) was detected in routine monthly water sampling on November 22, 1993, from Well 20. Split-sample analytical results received on January 4, 1994, based on two different EPA methods, indicated 0.6 µg/L and 1.0 µg/L of 1,2-DCA. The Department of Health Services regulations set the maximum contaminant levels for 1,2-DCA at 0.5 µg/L.
Mar 11	Off-normal	During removal of an underground diesel tank at Building 827, diesel fuel was observed spilling out of the bottom of the tank and into the excavation pit. Approximately 40 liters of fuel was released into the pit. A San Joaquin County Public Health Services inspector was present at the time of the release; therefore, no additional verbal notification was necessary.
Mar 17	Off-normal	An excavation to prepare for the removal of the two 38,000-liter gasoline tanks, 879-G1U1 and 879-G2U1, at Building 879 resulted in the rupture of the city water supply to Building 879. Approximately 11,000 liters of water were pumped from the excavation.

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Table 2-4. Tabulation of environmental occurrences, 1994 (continued).

Date ^(a)	Occurrence Category	Description
Mar 18	Off-normal	Analytical results from rain water collected on February 23, 1993, and stored until December 1993 were received and indicated elevated tritium levels in a rain water sample from the Building 343 area. The incident was reportable because the sample analysis indicated a release exceeding historical data.
Mar 18	Off-normal	Soil analytical results from the 836-D1U1 tank removal were received and indicated an exceeded level of TPH-D in the backfill. Under Title 23, California Underground Storage Tank Regulation, any amount detected is considered an unauthorized release; therefore, the local agency was notified.
Mar 23	Off-normal	A 1,250-liter "Tuff" tank filled with 50% solution hydrogen peroxide was found leaking while still sitting in the delivery truck at Building 411. Because LLNL had not yet accepted the shipment, the California Highway Patrol (CHP) was contacted. The CHP issued multiple citations. The inspection revealed a few ounces were released onto the top of the container, which was caused by a loose lid. The shipper secured the lid, cleaned the top of the container before the shipment was accepted.
May 18	Off-normal	Soil sample results from a transformer spill that had occurred on April 18, 1994, indicated TPH-D levels of 26,000 mg/kg. It was estimated that 120 liters of oil from transformer on the south side of Trailer 1601 (<1 ppm PCBs) was released to the ground while being moved by a crane. Because the cleanup was not completed immediately, the incident became reportable to the San Francisco Bay RWQCB.
Jun 22	Unusual	The subcontractor for the Building 132 South Road project broke a 20-centimeters water line while excavating the area south of Building 131. Plant Engineering estimated the volume of water released at 170,000 liters. In February 1994, LLNL entered into agreement with the San Francisco Bay RWQCB regarding these types of releases. The agreement stated that releases of any material that leave LLNL discharge points or any discharge that might impact ground water must be reported immediately.
Jul 1	Off-normal	The Water Guidance and Monitoring Group reported to the Central Valley RWQCB statistical evidence for a release for two constituents of concern. Arsenic in concentration of 0.02 mg/L was found in wells downgrade of Site 300's landfill Pit 1; vanadium in concentration of 0.05 mg/L was found in one well downgrade of Site 300's landfill Pit 7.
Jul 1	Off-normal	Soil analytical results from the 805-D1U1 and 827-D2U1 tank removals were received and indicated an exceeded level of TPH-D in the backfill. Analyses indicated 7.4 mg/kg TPH-D from the 805-D1U1 and 11.0 mg/kg TPH-D from the 827-D2U1 samples. Under Title 23, California Underground Storage Tank Regulation, any amount detected is considered an unauthorized release; therefore, the local agency was notified.
Jul 27	Off-normal	While removing the underground fuel tank, 834-D1U1, adjacent to Building 871 an odor of diesel fuel was evident. The odor of diesel indicated a release to the environment. In addition, the odor of diesel fuel was discovered in a ground water monitoring well, approximately 5 meters away from the tank. The local agency was on site at the discovery of this release.
Aug 12	Off-normal upgraded to Unusual on Aug 24	The cooling tower sludge analysis from Site 300 had levels of zinc at 26,000 ppm. Building 865 has had its sludge removed annually since 1980. The prior maintenance practice was to dispose of the removed sludge on the ground. The total threshold limit concentration for zinc in Title 22 CCR is 5,000 ppm. The Central Valley RWQCB was notified of this finding.
Oct 20	Off-normal	Diesel contamination was discovered during a underground fuel tank removal at Building 865. The local agency was on site at the discovery of this release.

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Table 2-4. Tabulation of environmental occurrences, 1994 (concluded).

Date ^(a)	Occurrence Category	Description
Nov 28	Off-normal	A pump failure, apparently caused by a gasket failure, discharged approximately 190 liters of water, which entered the storm drainage system. The pump was used to circulate hot water that contains a corrosion inhibitor at concentrations of 500–1,000 ppm. The inhibitor contains nitrous acid, sodium salt molybdix acid, and disodium salt. Since the release was not potable and could not be cleaned up, the release was reportable to San Francisco Bay RWQCB.
Dec 6	Off-normal	Shipment papers for a radioactive material being shipped from DOE Ann Arbor to Reynolds Electrical & Engineering Co., Mercury, Nevada had not been filled out properly. The manifest was prepared by LLNL Hazardous Waste Management and did not include the letters "RQ" as required for each hazardous substance.
Dec 12	Off-normal	A spill of 594 kilograms of nondispersable solid uranium-238 metal ingots was released from a tractor trailer onto the concrete sidewalk. All of the uranium metal including the container packaging was recovered. The spill location was on Avenue B, southwest of Building 241.
Dec 29	Off-normal	The Tank Assessments and Guidance Group received analytical data indicating that soil removed during the removal of the underground diesel tank 152-D1U1 was contaminated with 4,500 mg/kg TPH-D.

^a The date indicated is the date the occurrence is categorized, not the date of its discovery.