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Compliance Summary

Introduction

During 1999, Lawrence Livermore National Laboratory (LLNL) participated in numerous activities to comply with federal, state, and local environmental regulations as well as internal requirements and Department of Energy (DOE) orders. This chapter, which is organized according to the various laws and regulations that drive LLNL's compliance activities, describes the activities the Laboratory carried out related to air, water, waste, waste reduction, community "right to know," protection of sensitive resources, and other environmental issues at the Livermore site and Site 300. A wide range of compliance activities is summarized in this chapter. Compliance activities specific to DOE Orders 5400.1 and 5400.5 are discussed in the chapters that follow. Many documents concerned with these activities and other environmental topics are available for public viewing at the LLNL Visitors Center and the Livermore and Tracy public libraries.

Comprehensive Environmental Response, Compensation and Liability Act

The Livermore Site Ground Water Project (GWP) and the Site 300 CERCLA Project are under the jurisdiction of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA)/Superfund Amendment and Reauthorization Act, Title 1. As part of work on these projects, DOE and LLNL also continued with environmental restoration and community relations activities. These projects and activities are described in the following sections.

Livermore Site Ground Water Project

The GWP at the Livermore site complies with provisions specified in a federal facility agreement (FFA) entered into by the U.S. 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 (SFBRWQCB). As required by the FFA, the project addresses compliance issues by investigating potential contamination source areas (such as suspected old release sites, solvent-handling areas, and leaking

underground tank systems), continuous monitoring, and remediation of ground water. The ground water contaminants (constituents of concern) are volatile organic compounds (VOCs), primarily trichloroethene (TCE) and tetrachloroethene (PCE). For the most part, these contaminants are present within the site boundary and to some extent at the site boundary and beyond, mainly to the west and south of the site (see **Figures 8-3** to **8-7**, Chapter 8). In 1999, GWP activities included preparing the required CERCLA documents, meeting milestones, operating ground water treatment facilities, and maintaining liaison with community groups.

Documentation

As required by the Livermore site FFA, DOE and LLNL issued the *1999 Ground Water Project Annual Report* (Aarons et al. 2000) on March 23, 1999. DOE and LLNL also finalized and issued Remedial Project Manager (RPM) meeting summaries. Quarterly self-monitoring data were reported in letter reports (Bainer and Joma 2000a, 2000b). LLNL also issued an updated *Quality Assurance Project Plan* (Dibley 1999).

A draft explanation of significant differences, submitted on December 14, 1999, for regulatory review, described proposed changes to the planned ground water treatment system at Trailer 5475 to allow ground water containing both VOCs and tritium above their maximum contaminant levels (MCLs) to go through an aboveground treatment unit (Berg 1999).

DOE and LLNL began preparing a draft action memorandum (Berg and Bainer 2000) for a time-critical removal action for soil containing residual polychlorinated biphenyls (PCBs) in the East Traffic Circle. The document will be finalized in 2000.

Milestones and Activities

LLNL has completed all the *1999 Remedial Action Implementation Plan (RAIP)* milestones (Table 5 in Dresen et al. 1993) for the Livermore site ahead of schedule. For a detailed list of these milestones and corresponding dates, please see **Table 8-1** in Chapter 8. Details of 1999 environmental restoration activities are discussed in the *LLNL Ground Water Project 1999 Annual Report* (Aarons et al. 2000).

Treatment Facilities

In 1999, LLNL operated ground water treatment facilities in the TFA, TFB, TFC, TFD, TFE, TFG, TF406, TF518, and TF5475 areas (see **Figure 8-1** in Chapter 8). Sixty-nine ground water extraction wells operated at 20 separate locations, treating about 3,161,000 liters of ground water per day. The vapor treatment facilities VTF518 and

VTF5475 treated about 3000 m^3 of vapor per day. Together, these treatment facilities removed approximately 269 kg of VOCs in 1999. Since remediation efforts began in 1989, more than 4.5 billion liters of ground water and approximately 477,480 m^3 of vapor have been treated, and about 752 kg of VOCs have been removed. Remediation activities at the Livermore site are discussed in greater detail in Chapter 8.

Community Relations

The Community Work Group met once in 1999 to discuss the DOE budget, progress on the Livermore site cleanup, and the Livermore Site Priority List/Consensus Statement. LLNL continued to correspond and communicate with Community Work Group members throughout the year. DOE and LLNL met four times with members of Tri-Valley Communities Against a Radioactive Environment (CAREs) and its scientific advisor as part of the activities funded by an EPA technical assistance grant.

Other Livermore site community relations activities in 1999 included communications and meetings with neighbors; local, regional, and national interest groups; and other community organizations. LLNL also conducted public presentations, including those to local realtors and to national and northern California peace leaders; produced and distributed the Environmental Community Letter; maintained the information repositories and the administrative record; conducted tours of the site environmental activities; and responded to public and news media inquiries. In addition, LLNL now conducts some community relations activities electronically, answering questions and sending responses via electronic mail. LLNL also posts documents, letters, and public notices on the Internet at the following address: http://www-envirinfo.llnl.gov/

Site 300 CERCLA Project

Investigations and remedial activities are ongoing at Site 300, which became a CERCLA/Superfund site in 1991, when it was placed on the National Priorities List. Investigations and remedial activities are conducted under the joint oversight of the EPA, the Central Valley Regional Water Quality Control Board (CVRWQCB), California EPA's DTSC, and the authority of an FFA for the site. (There are separate FFAs for Site 300 and the Livermore site.)

During 1999, LLNL submitted all required regulatory documents (see Chapter 8) on or ahead of schedule, performed all actions stipulated in the FFA, and maintained liaison with community groups. Results and status for Site 300 environmental restoration study areas are discussed in Chapter 8. Background information for LLNL environmental

characterization and restoration activities at Site 300 can be found in the *Final Site-Wide Remedial Investigation Report, Lawrence Livermore National Laboratory Site 300* (Webster-Scholten 1994).

Documentation

LLNL submitted the required documentation to oversight agencies on time in 1999. The *Draft Final* and *Final Site-Wide Feasibility Study* (Ferry et al. 1999a,b), *Draft Final Proposed Plan for Environmental Cleanup* (Dresen et al. 1999), quarterly reports, and work plans were among the documents submitted.

Milestones and Activities

LLNL has completed all the 1999 FFA milestones for Site 300 on or ahead of schedule. For a detailed list of these milestones and corresponding dates, please see **Table 8-2** in Chapter 8.

Treatment Facilities

VOCs (primarily TCE) are the main contaminants at Site 300. High explosives, tritium, depleted uranium, organosilicate oil, nitrates, and perchlorates are also found in ground water. Three treatment facilities that remove and treat VOCs operated throughout 1999. Additionally, three new treatment facilities were constructed and began operation at Site 300 during 1999. These facilities are discussed in more detail in Chapter 8. Eighteen wells that extract ground water only, and 17 wells that extract both ground water and soil vapor operated during 1999, treating about 84.5 million liters of ground water. The 17 wells that extract both vapor and ground water and three wells that extract vapor only, together removed 431,000 m^3 of vapor. In 1999, the Site 300 treatment facilities removed approximately 39 kg of VOCs. Since remediation efforts began in 1990, more than 565 million liters of ground water and approximately 1.58 million m^3 of vapor have been treated, to yield about 141 kg of removed VOCs. Chapter 8 also includes maps of the study areas and details of the distribution of contaminants in ground water at Site 300.

Community Relations

The Site 300 CERCLA project maintains proactive communication with the surrounding communities of Tracy and Livermore. Community relations activities in 1999 included maintenance of the information repositories and administrative records; Site 300 tours for scientists and students from universities and local public schools; off-site, private well-sampling activities; and preparation of a fourth Site 300 Environmental Restoration

fact sheet (Heffner 1999). Quarterly meetings were held with Tri-Valley CAREs, which receives an annual technical assistance grant from EPA to independently evaluate CERCLA activities at Site 300. A tour of Site 300 CERCLA activities was also conducted for Tri-Valley CAREs.

In March 1999, the remedial project managers held a public workshop to present the initial selection of remedial alternatives in the *Draft Site-Wide Feasibility Study* (Ferry et al. 1999a) to the community. In December 1999, a second public workshop was held to present the *Draft Final Proposed Plan for Environmental Cleanup* (Dresen et al. 2000).

Site Evaluations Prior to Construction

Before any construction begins, the CERCLA Record of Decision requires that the project site be evaluated to determine if soil or rubble (concrete and asphalt) is contaminated. Soil is sampled and analyzed for potential radioactive and/or hazardous contamination. Depending on the analytical results, soil may be reused on site or disposed of according to established procedures. Depending on the potential for radioactive contamination, rubble may be either surveyed or analyzed for radioactivity. During 1999, soil and rubble were evaluated at 75 construction sites.

Agency for Toxic Substances and Disease Registry Assessment

The Agency for Toxic Substances and Disease Registry (ATSDR) is a federal public health agency whose mission is to prevent exposure and adverse human health effects and diminished quality of life associated with exposure to hazardous substances from waste sites, unplanned releases, and other sources of pollution in the environment. As part of its mission, ATSDR is mandated by Congress to conduct Public Health Assessments (PHAs) at sites, such as LLNL, that appear on the National Priorities List.

In 1999, ATSDR worked with the California Department of Health Services (CDHS) to complete a health consultation related to Livermore site operations, which will most likely be part of the final PHA for LLNL. This health consultation report assessed concerns related to the discovery of plutonium at levels above background in Big Trees Park in the City of Livermore.

Big Trees Park has been the object of public scrutiny since 1993, when a single soil sample was found to contain plutonium at a concentration higher than would have been

expected from global fallout alone. In 1998, LLNL resampled soil in the park to determine the vertical and lateral extent of plutonium contamination and the likelihood of possible pathways. LLNL and ATSDR, in August 1999 and January 2000, respectively, published reports concluding that there was no systematic distribution of plutonium at depth, that the horizontal distribution is consistent with the application of plutonium-contaminated sewage sludge as a soil amendment, and that the most credible pathway to the park was the application of plutonium-contaminated sewage sludge as a soil amendment. The plutonium at the park was found to be below levels of health concern and below the recommended levels requiring additional activities. (See Chapter 10 for more information on the sampling and analysis.)

The ATSDR report, LLNL sampling documents, and regulatory statements can be viewed at the following address: http://www-envirinfo.llnl.gov

Superfund Amendment and Reauthorization Act, Title III

Title III of the Superfund Amendment and Reauthorization Act (SARA) is known as the Emergency Planning and Community Right-to-Know Act (EPCRA). It requires owners or operators of facilities that handle certain hazardous chemicals on site to provide information on the release, storage, and use of those chemicals to organizations responsible for emergency response planning. Executive Order 12856 directs all federal agencies to comply with the requirements of EPCRA, including SARA 313, Toxic Release Inventory Program.

EPCRA requirements and LLNL compliance are summarized in **Table 2-1**. **Tables 2-2** and **2-3** identify those chemicals and their hazards reported during 1999 by LLNL for the Livermore site and Site 300, respectively, under Title III, Section 311.

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 (SJVUAPCD) for Site 300. In 1999, BAAQMD issued or renewed air permits for 128 air emission sources for the Livermore site. In 1999, SJVUAPCD issued or renewed air permits for 47 air emission sources for Site 300 (see **Table 2-4**). During 1999, BAAQMD inspectors found no deficiencies at the

Livermore site (see **Table 2-5a** for a summary of inspections in 1999). At Site 300 SJVUAPCD conducted an inspection of emission sources and observed the start-up of an internal combustion engine; no deficiencies were found (see **Table 2-5b**). On October 19, 1999, SJVUAPCD issued permits to operate the explosive waste treatment units.

Table 2-1. Summary of LLNL compliance with EPCRA in 1999.

EPCRA requirement	Brief description	Compliance
302 Planning Notification	Operator must notify SERC[a] of presence of extremely hazardous substances. In California, operator must notify CEPRC[b] of presence of extremely hazardous substances above threshold planning quantities.	Originally submitted May 1987.
303 Planning Notification	Operator must designate a facility representative to serve as emergency response coordinator.	Updates submitted February 10, 1999, and May 20, 1999.
304 Release Notification	Releases of certain hazardous substances must be reported to SERC and LEPC.[c]	No EPCRA-listed extremely hazardous substances were released above reportable quantities.
311 MSDS[d]/Chemical Inventory	Operator must submit MSDSs or chemical list to SERC, LEPC, and Fire Department.	**Tables 2-2** and **2-3**. Updated May 20, 1999.
312 MSDS/Chemical Inventory	Operator must submit hazardous chemical inventory to appropriate county.	Business plans and chemical inventory submitted to San Joaquin County (December 11, 1998) and Alameda County (January 20, 1999).
313 Toxic Release Inventory	Operator must submit Form R to U.S. EPA and California EPA for toxic chemicals released.	Form R for Freon 113 submitted June 24, 1999, to DOE; DOE forwarded it to U.S. EPA and California EPA on June 30, 1999.

a SERC = State Emergency Response Commission.

b CEPRC = Chemical Emergency Planning and Response Commission.

c LEPC = Local Emergency Planning Committee.

d MSDS = material safety data sheet.

Table 2-2. Livermore site, SARA, Title III, Section 311, Chemical List, 1999.[a]

Livermore site chemicals	Physical hazard			Health hazard	
	Fire	Pressure	Reactivity	Acute	Chronic
Acetylene	●	●		●	
Air		●			
Ammonia, anhydrous		●		●	
Ammonium hydroxide				●	
Argon		●		●	
Brayco 889, coolant	●				
Carbon, activated	●				
Carbon dioxide		●		●	
Chlorine		●	●	●	
Chromium(III) chloride				●	
Cobalt	●			●	●
Diesel fuel	●				
Ethyl alcohol	●			●	●
Freon 113				●	
Gasoline	●			●	●
Helium		●		●	
Hydrochloric acid				●	●
Hydrofluoric acid		●[b]	●	●	●
Hydrogen	●	●		●	
Hydrogen peroxide (<52%)			●		
Insulating oil, inhibiting	●				
Lead (bricks and ingots)				●	●
Methane	●	●		●	
Neon		●		●	
Nitric acid	●		●	●	●
Nitric oxide		●	●	●	
Nitrogen		●		●	
Oxygen		●	●		
Paint	●				
Potassium cyanide				●	

Table 2-2. Livermore site, SARA, Title III, Section 311, Chemical List, 1999 (concluded).[a]

Livermore site chemicals	Physical hazard			Health hazard	
	Fire	Pressure	Reactivity	Acute	Chronic
Propane	●	●		●	
Sodium hydroxide			●	●	●
Sulfur hexafluoride			●	●	
Sulfuric acid			●	●	●

[a] Physical and health hazard information obtained primarily from material safety data sheets.

[b] Some containers have a pressure hazard.

Table 2-3. Site 300, SARA, Title III, Section 311, Chemical List, 1999.[a]

Site 300 chemicals	Physical hazard			Health hazard	
	Fire	Pressure	Reactivity	Acute	Chronic
Argon		●		●	
Carbon, activated	●				
Chlorine		●		●	
Bis(2,2-dinitro-2-fluoroethyl) formal in methylene chloride	—[b]		—[b]	●	●
Diesel fuel	●				
Gasoline	●			●	●
Helium		●		●	
High explosives			●		
Lead (bricks)				●	●
Nitrogen		●			
Oil, hydraulic	●				
Oil, inhibited insulating	●				
Oil, transformer	●				
Sulfuric acid			●	●	●

[a] Physical and health hazard information obtained primarily from material safety data sheets.

[b] Dangerous fire or explosion risk in neat form (solvent evaporates).

Table 2-4. Summary of permits active in 1999.[a,b]

Type of permit	Livermore site	Site 300
Air	BAAQMD issued 128 permits for operation of various types of equipment, including boilers, emergency generators, cold cleaners, ultrasonic cleaners, degreasers, printing press operations, manual wipe-cleaning operations, metal machining and finishing operations, silk-screening operations, silk-screen washers, paint spray booths, adhesives operations, image tube fabrication, optic coating operations, storage tanks containing VOCs in excess of 1.0%, plating tanks, drum crusher, semiconductor operations, diesel air-compressor engines, ground water air strippers/dryers, ovens, material-handling equipment, sewer diversion system, wave soldering machine, oil and water separator, fire test cells, gasoline-dispensing operation, resin-mixing operation, paper-pulverizer system, and firing tanks.	SJVUAPCD issued 47 permits for operation of various types of equipment, including boilers, emergency generators, paint spray booth, ground water air strippers, soil vapor extraction units, woodworking cyclone, gasoline-dispensing operation, explosive waste treatment units, and drying ovens.
Water	WDR Order No. 88-075 for discharges of treated ground water from Treatment Facility A to percolation pits and recharge basin. WDR Order No. 95-174, NPDES Permit No. CA0030023 for discharges of storm water associated with industrial activities and low-threat nonstorm water discharges to surface waters. WDR Order No. 99-08-DWQ, NPDES California General Construction Activity Permit No. CAS000002, DWTF Site ID No. 201S305140, Soil Reuse Project ID No. 2015305529 and National Ignition Facility, Site ID No. 201S306762, for discharges of storm water associated with construction activities affecting two hectares or more. WDR Order No. 99-086 for the Arroyo Las Positas Maintenance Project. Two ongoing projects permitted under streambed alteration agreements. FFA for ground water investigation/remediation.	WDR Order No. 99-08-DWQ, NPDES California General Construction Activity Permit No. CAS000002, Contained Firing Facility/Chemistry Magazine Loop, Site ID No. 5B39S307131 for discharges of storm water associated with construction activities impacting two hectares or more. WDR Order No. 93-100 for post-closure monitoring requirements for two Class I landfills. WDR Order No. 94-131, NPDES Permit No. CA0081396 for discharges of storm water associated with industrial activities and from cooling towers. WDR Order No. 96-248 for operation of two Class II surface impoundments, a domestic sewage lagoon, and percolation pits. WDR Order No. 97-242, NPDES Permit No. CA0082651 for discharges of treated ground water from the eastern General Services Area treatment unit. One ongoing project permitted under a streambed alteration agreement. FFA for ground water investigation/remediation. 52 registered Class V injection wells.

Table 2-4. Summary of permits active in 1999 (concluded).[a,b]

Type of permit	Livermore site	Site 300
Hazardous waste	EPA ID No. CA2890012584. Authorization to mix resin in Units CE231-1 and CE443-1 under conditional exemption tiered permitting. Closure under interim status of the Building 419 size reduction unit and Building 419 solidification unit. Authorizations to construct the permitted units of Building 280, Building 695, and additions to Building 693. Authorization under hazardous waste permit to operate 18 waste storage units and 14 waste treatment units. Continued authorization to operate seven waste storage units and eight waste treatment units under interim status.	EPA ID No. CA2890090002. Part B Permit—Container Storage Area (Building 883) and Explosives Waste Storage Facility (issued May 23, 1996). Part B Permit—Explosives Waste Treatment Facility (issued October 9, 1997). Docket HWCA 92/93-031. Closure and Post-Closure Plans for Landfill Pit 6 and the Building 829 Open Burn Facility.
Sanitary sewer	Discharge Permit No. 1250 (99/00) for discharges of wastewater to the sanitary sewer. Permit 1510G (99) for discharges of sewerable ground water from CERCLA restoration activities.	
Storage tanks	Nine operating permits covering 13 underground petroleum product and hazardous waste storage tanks: 111-D1U2 Permit No. 6480; 113-D1U2 Permit No. 6482; 152-D1U2 Permit No. 6496; 271-D2U1 Permit No. 6501; 321-D1U2 Permit No. 6491; 322-R2U2 Permit No. 6504; 365-D1U2 Permit No. 6492; 490-R3U1 and 490-R3U2 Permit No. 6509; and 611-D1U1, 611-G1U1, 611-G2U1, and 611-O1U1 Permit No. 6505.	One operating permit covering five underground petroleum product tanks assigned individual permit numbers: 882-D1U1 Permit No. 006530; 875-D1U2 Permit No. 006549; 879-D1U1 Permit No. 006785; 879-G3U1 Permit No. 007967; and 871-D1U2 Permit No. 008013

[a] Permit numbers are based on actual permitted units or activities maintained and renewed by LLNL during 1999.

[b] See Glossary for list of acronyms.

Table 2-5a. Inspections and tours of the Livermore site by external agencies in 1999.

Medium	Description	Agency[a]	Date	Finding
Air	Emission sources	BAAQMD	1/14 1/28 2/18 3/11 11/4 11/17 12/2	No violations
Water	Sandia Recharge Basin	SFBRWQCB	1/11	No violations
	Tour of North and Southwest Buffer Zones, Drainage Retention Basin, Treatment Facility A recharge ponds		11/2	
Sanitary sewer	Annual compliance sampling	LWRP	10/12–13	No violations
	Categorical sampling		3/12 10/12 12/2 12/8	
Waste	Hazardous waste facilities	DTSC	6/28–6/29, 7/12, 7/13, 7/15, 7/16, and 8/12	16 alleged violations[b]
	Medical waste	ACDEH	9/14	No violations
Storage tanks	Compliance with underground storage tank upgrade requirements and operating permits.	ACHCS	3/11 9/20	No violations

a See Glossary for list of acronyms.

b LLNL disputes some of these alleged violations in the final Summary of Violation (SOV) dated on 12/22/99, and responded to DTSC on 2/15/00.

Table 2-5b. Inspections and tours of Site 300 by external agencies in 1999.[a]

Medium	Description	Agency[b]	Date	Finding
Air	Emission sources	SJVUAPCD	4/14	No violations
	Review for internal combustion engine start-up		12/16	
Water	Permitted operations	CVRWQCB	4/13	No violations
Waste	Various facilities	DTSC	6/17, 7/9, and 7/13	One violation[c]

a There were no inspections of the sanitary sewer or storage tanks at Site 300 in 1999.

b See Glossary for complete list of acronyms.

c DTSC determined that Site 300 returned to compliance on 9/16/99.

National Emission Standards for Hazardous Air Pollutants

To demonstrate compliance with the National Emissions Standards for Hazardous Air Pollutants (NESHAPs) for radiological emissions (40 Code of Federal Regulations [CFR] 61, Subpart H), LLNL is required to monitor certain air release points and evaluate all potential sources of radionuclide air emissions to determine the possible effective dose equivalent to the maximally exposed individual of the public. These evaluations include air surveillance monitoring and modeling (using EPA-sanctioned computer codes) based on radionuclide inventory data, effluent (source emission) monitoring, or both.

The *LLNL NESHAPs 1999 Annual Report* (Gallegos et al. 2000), submitted to DOE and EPA, reported that the estimated total site-wide maximally exposed individual radiological doses for the Livermore site and Site 300 were 1.0 µSv/y (0.1 mrem/y) and 0.35 µSv/y (0.035 mrem/y), respectively, for 1999. Using the EPA-mandated assumption that gaseous tritium be treated as though it were tritiated water yielded a slightly higher dose of 1.2 µSv (0.12 mrem) for Livermore site operations.

The reported doses include contributions from both point and diffuse sources. The totals were well below the 100 µSv/y (10 mrem/y) dose limits defined by the NESHAPs regulations. The details of these data are included in this report (see Chapter 13).

In 1999, LLNL continuously monitored radionuclide emissions from Building 331 (the Tritium Facility), Building 332 (the Plutonium Building), the seismically strengthened portion of Building 251, and five other buildings (see Chapter 4). During 1999, some sampling systems were deactivated (see Chapter 4). There were no unplanned atmospheric releases at the Livermore site or at Site 300 in 1999.

Clean Water Act and Related State Programs

Preserving clean water is one objective 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 waters of the U.S. In addition, the State of California, under the Porter Cologne Water Quality Control Act, requires permits, known as Waste Discharge Requirements (WDRs), for any waste discharges affecting the beneficial uses of waters of the state. The regional water quality control boards are responsible for issuing and enforcing both permits.

Several agencies issue other water-related permits. The Livermore Water Reclamation Plant (LWRP) requires permits for discharges of sewerable water to the city sanitary sewer system. The Army Corps of Engineers (ACOE) issues permits for work in navigable waterways below the ordinary high-water mark and for controlling fill operations in waters of the United States. The State Water Resources Control Board (SWRCB) can issue water quality certifications or WDRs. The California Department of Fish and Game (CDFG) under the Fish and Game Code Section 1601 et seq. requires streambed alteration agreements for any work that may disturb or impact rivers, streams, or lakes. The Safe Drinking Water Act requires registration with the EPA and management of injection wells to protect underground sources of drinking water. The Clean Water Act also requires facilities meeting specific storage requirements to have and implement Spill Prevention Control and Countermeasure (SPCC) plans for oil-containing equipment and tanks. Finally, Alameda County Health Services (ACHS) and San Joaquin County Environmental Health Services issue permits for operating underground storage tanks containing hazardous materials or hazardous waste as required under the California Health and Safety Code. Water-related permits are summarized in **Table 2-4** and discussed in detail in Chapters 6, 7, and 9.

In December 1998, LLNL performed the triennial review and evaluation of the SPCC plans for Site 300 and the Livermore site. Based on this review, the Site 300 SPCC plan was amended in December 1999, and the Livermore site SPCC plan will be amended in 2000. No significant changes were made to the technology or practices documented in the *Spill Prevention Control and Countermeasures Plan* (Campbell 1995). The changes noted in the review reflect a reduction in the number of oil-containing tanks and equipment managed at the Livermore site and Site 300.

Ground Water and Surface Water

Discharges of treated ground water to surface water drainage courses and percolation ponds at LLNL are governed by NPDES permits, WDRs, and CERCLA Records of Decision (see **Table 2-4**). The CVRWQCB is currently in the process of reissuing WDR 94-131. The SFBRWQCB is in the process of reissuing WDR 95-174. Details about surface water discharges are found in Chapter 7 of this report. Details about ground water monitoring are found in Chapters 8 and 9 of this report, the *LLNL Ground Water Project 1999 Annual Report* (Aarons et al. 2000), and the LLNL Remedial Program Manager's quarterly reports (Littlejohn and Lamarre 1999, and Bainer and Littlejohn 1999a,b).

LLNL discharges storm water associated with industrial activities, low-threat nonstorm water, various process waters, and domestic wastewater to surface waters, percolation pits, surface impoundments, and a sewage lagoon under four NPDES permits and four WDRs (see Chapters 7 and 9). LLNL received no Notices of Violation (NOVs) in 1999 from the regional water quality control boards that issued the NPDES and WDR permits; however, LLNL identified nonconformance with two of the four NPDES permits (see **Table 2-6**). In addition, LLNL was unable to comply with prohibitions in WDR 96-248 on three occasions in 1999, where wastewater was released to the ground from containment or disposal systems. These discharges were reported by phone and in writing to the CVRWQCB and are discussed further in Chapter 9.

Table 2-6. Summary of NPDES permit nonconformance.

Permit No.	Outfall	Nonconformance	Date(s) of nonconformance	Description–solution
CAS000002	Arroyo Las Positas (Livermore site)	National Ignition Facility—Failure to repair BMPs[a] within the SWPPP[b]-specified 48-hour period.	6/98–5/99[c]	Delayed repair did not result in BMP failures or releases to the storm drainage system. Contractors and construction staff were reminded of maintenance requirements.
		National Ignition Facility—Failure to perform and document inspections for laydown areas.	6/98–5/99	Revised SWPPP compliance strategy for laydown areas to place them under industrial SWPPP program.
		Soil Reuse Project—Failure to update SWPPP to incorporate the more protective BMPs being implemented.	9/98	Updated the SWPPP.
	Elk Ravine (Site 300)	Contained Firing Facility/Chemistry Magazine Loop Project—Failure to update SWPPP to incorporate a new project area.	6/98–5/99	Wrote SWPPP amendment.
		Contained Firing Facility/Chemistry Magazine Loop Project—Failure to update SWPPP at the start of a new construction project.	4/99	Updated the SWPPP.
CA0081396	Corral Hollow Creek (Site 300)	Failure to collect required quarterly cooling tower monitoring samples.	10–12/99	Issued an internal nonconformance report and established a system to remind technologists to collect required samples.

a BMP = Best management practice.

b SWPPP = Storm Water Pollution Prevention Plan.

c These dates reflect the construction reporting period of June 1998 through May 1999. The actual nonconformance may not have occurred over the entire time; however, specific nonconformance dates cannot be determined.

LLNL continued construction operations on four projects during 1999. These activities are covered by the California General Construction Activity permit (see **Table 2-4**). Continuing operations included construction of the Decontamination and Waste Treatment Facility (DWTF), the Soil Reuse Project, and the National Ignition Facility (NIF) at the Livermore site and the Contained Firing Facility/Chemistry Magazine Loop Project at Site 300.

The SFBRWQCB visited the Livermore site to observe the Sandia Recharge Basin associated with the pending reissuance of WDR 88-075, and visited the North and Southwest Buffer Zones and the Drainage Retention Basin after a staff change at the regional water quality control board. The CVRWQCB inspected the Site 300 permitted facilities in April 1999. No violations were found at either site (see **Tables 2-5a** and **2-5b**).

Sewerable Water

The Livermore site's sanitary sewer discharges are sampled continuously, daily, weekly, and monthly to satisfy various permit requirements. The monitoring results for the LLNL effluent were reported monthly to the LWRP. In 1999, LLNL had no discharges in violation of the LWRP permit covering wastewater discharges to the sanitary sewer. Self-monitoring of categorical processes continued during 1999, as required in the permit; results were reported semiannually. In 1999, there were no compliance issues related to categorical processes.

Discharges from ground water treatment facilities to sanitary sewer under Permit 1510G (1999) are monitored as they occur and reported annually to the LWRP. In 1999, LLNL complied with all the terms and conditions of Permit 1510G. Chapter 6 discusses these self-monitoring programs for the site effluent, categorical processes, and discharges from ground water treatment facilities. The analytical results that document permit compliance with the self-monitoring provisions of the permits are discussed in Chapter 6.

LWRP collected split samples of site effluent as part of the annual compliance sampling. LLNL and LWRP also inspected and sampled identified federally regulated processes. No deficiencies or violations were noted during any of the inspections (**Table 2-5a**).

Streambed Alteration Agreements and Nationwide Permits

CDFG, SFBRWQCB, and ACOE all issue permits for work in streambeds. CDFG issued one five-year streambed alteration agreement for maintenance within Arroyo Seco (see **Table 2-7**). LLNL continued operations allowed under a five-year streambed alteration agreement issued for the Arroyo Las Positas Maintenance Project, and the SFBRWQCB issued a WDR for this project in October 1999. At Site 300, LLNL continued to operate under a five-year CDFG streambed alteration agreement issued in 1995 for maintenance of drainage channels. No projects at Site 300 or the Livermore site required permits from ACOE during 1999.

Table 2-7. Summary of streambed alteration agreements, 404 nationwide permits, and 401 waivers or WDRs[a].

Project	Location	Agency/ type of permit	Year submitted
Storm-generated debris removal and vegetation management (five-year agreement)	Arroyo Seco	CDFG/SAA[b]	1999
Arroyo Las Positas Maintenance Project (five-year agreement)	Arroyo Las Positas	CDFG/SAA SFBRWQCB/ WDR	1998 1998
Maintenance (five-year agreement)	Site 300 drainage culverts	CDFG, SAA	1995

a WDR = Waste discharge requirements.

b SAA = Streambed Alteration Agreement.

Tank Management

LLNL manages its underground and aboveground storage tanks through the use of underground tank permits, monitoring programs, operational plans, closure plans and reports, leak reports and follow-up documentation, and inspections. At LLNL, underground storage tanks contain diesel fuel, gasoline, waste oil, and process wastewater; aboveground storage tanks contain diesel fuel, insulating oil, and process wastewater. Some wastewater systems are a combination of underground storage tanks and aboveground storage tanks. **Table 2-8** shows the status of tanks at the Livermore site and Site 300 as of December 31, 1999. All regulated underground storage tanks at the Livermore site were inspected in 1999, and no violations were found (see **Table 2-5a**).

Resource Conservation and Recovery Act and Related State Laws

The Resource Conservation and Recovery Act (RCRA) and its corresponding regulations provide 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) and the *California Code of Regulations* (CCR) Title 22, set requirements for managing hazardous wastes in California. RCRA and HWCA also regulate hazardous waste treatment, storage, and disposal facilities, including permit requirements. Because RCRA program authorization was delegated to the State of California in 1992, LLNL works with DTSC on compliance issues and in obtaining hazardous waste permits.

Table 2-8. Summary of in-service tanks, December 31, 1999.

Tank type	Livermore site			Site 300		
	Permitted	Permits not required	Total	Permitted	Permits not required	Total
Underground storage tanks						
Diesel fuel	7	0	**7**	4	0	**4**
Gasoline	2	0	**2**	1	0	**1**
Waste oil	1	0	**1**	0	0	**0**
Process wastewater	3	31	**34**	0	7	**7**
Subtotal	**13**	**31**	**44**	**5**	**7**	**12**
Aboveground storage tanks						
Diesel fuel	0	25	**25**	0	6	**6**
Insulating oil	0	1	**1**	0	3	**3**
Process wastewater	10[(a)]	56	**66**	0	12	**12**
Subtotal	**10**	**82**	**92**	**0**	**21**	**21**
TOTAL	**23**	**113**	**136**	**5**	**28**	**33**

[a] These 10 tanks are located at the LLNL Treatment and Storage Facility.

Hazardous Waste Permits

Livermore Site

The hazardous waste management facilities at the Livermore site consist of permitted units (located in Area 612, Building 280, and Buildings 695 and 693 of the DWTF) and units that operate under interim status (Area 514 Facility and the Building 233 Container Storage Facility). Two units formerly under interim status reverted to generator status under a delayed closure provision in the hazardous waste permit. These units are the Area 612-4 Container Storage Unit and Building 612 Laboratory Packing/Packaging Container Storage Unit. Permitted and interim status waste management units include container storage, tank storage, and various treatment processes (e.g., wastewater filtration, blending, and size reduction).

In accordance with the document, *Transition Plan, Transfer of Existing Waste Treatment Units to the Decontamination and Waste Treatment Facility* (Van Warmerdam and Finley 1997), operations in the Area 514 Facility will eventually be replaced by those in the new DWTF, and the Building 233 Container Storage Facility operations will be replaced by the Building 280 Facility.

On May 27, 1999, DTSC signed the hazardous waste permit and issued a Notice of Final Permit Decision for DWTF. On July 2, 1999, Tri-Valley CAREs et al. filed a petition for review to appeal the permit decision. On July 29, 1999, DTSC issued a notice of the permit decision appeal, staying the effective date of the hazardous waste permit, which was scheduled to become effective on July 9, 1999. On November 19, 1999, DTSC issued an order denying the permit appeal, and the permit immediately became effective. On December 23, 1999, a California Environmental Quality Act (CEQA) lawsuit was filed by Tri-Valley CAREs et al. This lawsuit challenges many of the environmental impact evaluations made in the DTSC initial study, which formed the basis of the CEQA Negative Declaration determination. The lawsuit is currently in litigation.

As reported in previous SAERs, the Building 513 shredder incident on July 2, 1997, resulted in DOE and DTSC investigations. The DOE/Oakland Operations Office (OAK) Type B Accident Investigation Committee issued its report on October 31, 1997, which included several Judgments of Need (JONs). LLNL, in turn, submitted an action plan in response to the JONs, and on March 11, 1999, DOE validated the completion of corrective actions derived from the JONs. DTSC representatives visited LLNL on November 12, 1997, and February 5, 1998. Their investigation of the shredder incident resulted in a Summary of Violations (SOV) dated February 9, 1998. LLNL, DOE, and DTSC are still developing an agreement regarding these issues, but continued delays caused by higher priority actions effectively closes our reporting of the Building 513

incident in this report. The shredder unit involved in the incident has undergone RCRA closure, the shredder equipment has been removed from service, and the building has been released for normal use.

On May 26 and 27, 1998, DTSC conducted a compliance evaluation inspection of the hazardous waste storage and treatment facilities at the Livermore site. LLNL did not receive the final inspection report in 1999.

On June 28 and 29; July 12, 13, 15, and 16; and August 12, 1999, DTSC conducted a compliance evaluation inspection of the hazardous waste storage and treatment facilities at the Livermore site (see **Table 2-5a**). On August 12, 1999, LLNL received a SOV listing four alleged violations. LLNL responded to DTSC's SOV on August 19, 1999. On December 22, 1999, LLNL received the final inspection report and SOV. The final SOV listed 16 alleged violations, incorporating some of the previous alleged violations listed in the August SOV, dismissing others that were previously listed, and adding new alleged violations. The final inspection report also requested 41 items of additional information. On February 15, 2000, LLNL responded to DTSC regarding the alleged violations and information request. LLNL has not yet received a response from DTSC.

Site 300

The Explosives Waste Treatment Facility (EWTF), which replaced the closed Building 829 Open Burn Facility, became operational in March 1999. Upon receiving DTSC approval, closure operations for the Building 829 Open Burn Facility began in October 1997. The facility was closed in accordance with the *Final Closure Plan for the High-Explosives Open Burn Facility at Lawrence Livermore National Laboratory Experimental Test Site 300* (Mathews and Taffet 1997). The closure report, *Construction Quality Assurance for the RCRA Closure of Building 829 High Explosives Open Burn Treatment Facility* (Golder Construction Services 1998), was submitted to DTSC in February 1999.

On June 17, July 9, and July 13, 1999, DTSC conducted a compliance evaluation inspection of Site 300 hazardous waste generator areas, the Building 883 Container Storage Area, Explosives Waste Storage Facility (EWSF), and EWTF. As a result of the inspection, on July 13, 1999, DTSC issued a SOV under the category of "Minor Violations/ Notice to Comply" for failing to provide annual refresher self-contained breathing apparatus training for one Building 883 Container Storage Area Hazardous Waste Management technician (see **Table 2-5b**). LLNL provided the required training on July 27, 1999, and submitted a certification of course completion to DTSC on August 2, 1999. After reviewing the submittal, DTSC issued a letter, dated September 16, 1999, stating that Site 300 is again in compliance.

Hazardous Waste Reports

LLNL completed two annual hazardous waste reports, one for the Livermore site and the other for Site 300, which address the 1999 transportation, storage, disposal, and recycling of hazardous wastes. The annual reports, required under 22 CCR 66262.41, were completed and submitted to meet DTSC's April 1, 2000, deadline. These same reports, *1999 Hazardous Waste Report—Mainsite* and *1999 Hazardous Waste Report—Site 300* (Galles and Gilbert 2000a, b), were submitted to the EPA under Sections 3002 and 3004 of RCRA, which requires a biennial reporting of hazardous wastes. DTSC is authorized to receive the reports for EPA.

Hazardous Waste Transport Registration

Transportation of hazardous waste over public roads (e.g., from one LLNL site to another) requires DTSC registration (22 CCR 66263.10). Conditions for registration may include annual inspections of transport vehicles and trailers by the California Highway Patrol (CHP), biennial terminal inspections, and special training and annual physical examinations for drivers. DTSC renewed LLNL's registration in November 1999. The CHP opted not to conduct inspections of LLNL vehicles in 1999.

Waste Accumulation Areas

In January 1999, there were 20 Waste Accumulation Areas (WAAs) at the Livermore site. Consolidation efforts resulted in the closure of one WAA; additionally, five temporary WAAs were put into service, and four temporary WAAs were taken out of service. Program representatives conducted formal inspections at least weekly at all WAAs to ensure that they were operated in compliance with regulatory requirements. Approximately 1107 formal WAA inspections were conducted at the Livermore site.

In January 1999, there were two WAAs at Site 300. One WAA was closed in 1999, leaving one WAA at Site 300. Program representatives conducted 92 formal inspections of the WAAs at Site 300.

California Medical Waste Management Act

All LLNL medical waste management operations comply with the California Medical Waste Management Act, Health and Safety Code Sections 117600–118360, Chapters 1–11. The Medical Waste Management Act establishes a comprehensive program for regulating the management, transport, and treatment of medical wastes that contain substances that may potentially infect humans. The program is administered by the State Department of Health Services (DHS) and is enforced by the Alameda County Department of Environmental Health (ACDEH).

LLNL is registered with the ACDEH as a generator of medical waste and has a treatment permit. The ACDEH inspection of buildings at Health Services, the Biology and Biotechnology Research Program, and the Medical Photonics Laboratory did not result in any compliance issues or violations (see **Table 2-5a**).

Federal Facility Compliance Act

LLNL is continuing to work with DOE to maintain compliance with the Site Treatment Plan (STP) that was signed in February 1997. All milestones for 1999 were completed on time. Reports and certification letters were submitted to DOE as required. The use of commercial facilities has allowed and will continue to allow earlier disposal of some waste streams than the dates listed in the STP.

Toxic Substances Control Act

The Federal Toxic Substances Control Act (TSCA) and implementing regulations found in Title 49, *Code of Federal Regulations,* Parts 700–789, govern the uses of newly developed chemical substances and TSCA-governed waste by establishing requirements for recordkeeping, reporting, disposal standards, employee protection, compliance and enforcement, and cleanup standards.

In 1999, LLNL generated TSCA PCB waste from CERCLA cleanup projects, PCB oil drained from electrical equipment, electrical equipment contaminated with PCBs, liquid PCBs used to calibrate analytical equipment, and TSCA-regulated asbestos from building demolition or renovation projects.

All TSCA-regulated waste was disposed of in accordance with TSCA, state, and local disposal requirements except for radioactively contaminated PCB waste. Radioactive PCB waste, typically known as transuranic (TRU) mixed waste or mixed waste, is currently stored at one of LLNL's hazardous waste storage facilities until the Waste Isolation Pilot Project, or other approved facility, accepts this waste for final disposal.

National Environmental Policy Act

The National Environmental Policy Act (NEPA; 42 U.S. Code [USC] 4321 et seq.) established federal policy for protecting environmental quality. The major method for achieving established NEPA goals is the requirement for preparing 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 (FONSI) is issued when an 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 a more in-depth NEPA review (i.e., preparation of either an EA or EIS). DOE NEPA implementing procedures (61 FR 36222 and 57 FR 15122) identify those categorical exclusions and the eligibility criteria for their application. If a proposed project does not clearly fit one of the exclusion categories, DOE determines which type of assessment document may be needed.

In 1999, one FONSI for the EA of the Terascale Simulation Facility Project was issued by DOE. Preparation of another EA for the decommissioning and demolition of Buildings 222 and 412 began in 1999. Eighteen categorical exclusion applications were approved by DOE, and there were no proposed actions at LLNL that required separate DOE floodplain or wetlands assessments under DOE regulations in 10 CFR 1022. In March 1999, DOE issued a *Supplement Analysis* (U.S. Department of Energy 1999b) that concluded that the 1992 *Final Environmental Impact Statement and Environmental Impact Report for Continued Operation of Lawrence Livermore National Laboratory and Sandia National Laboratories, Livermore (1992 EIS/EIR)* (U.S. Department of Energy and University of California 1992a and b) did not need to be supplemented and remained adequate.

California Environmental Quality Act

In November 1992, the University of California (UC) and LLNL made a commitment to implement 67 mitigation measures identified by the *1992 EIS/EIR* and to provide annual reports on their implementation. The measures are being implemented in accordance with the approved 1992 Mitigation Monitoring and Reporting Program associated with that joint DOE/UC EIS/EIR. The fiscal year 1997 annual report was published in 1999; the next annual report will cover fiscal year 1998 activities. One CEQA mitigated Negative Declaration was issued in 1999 for the Arroyo Las Positas Maintenance Project.

National Historic Preservation Act

The National Historic Preservation Act of 1966 (NHPA), as amended through 1992, requires federally operated and funded installations such as LLNL to balance agency missions with cultural values by integrating historic preservation into federal agency programs. Federal agencies must 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 (the Council) to comment. LLNL has three significant types of cultural resources: (1) prehistoric, (2) historic (turn-of-the-century homesteading, ranching, and industrial), and (3) historic (World War II and Cold War science and technology).

A draft Programmatic Agreement (PA) was developed by LLNL in 1997 in consultation with the DOE/OAK, the Council, and the California Office of Historic Preservation to help LLNL implement applicable federal and state cultural resource laws and regulations. Activities included cultural overviews, development of theme and context for significance evaluation, research designs, archaeological site identification and evaluation methods, and records and collection management. The activities will also generate needed data and methods in order to develop a Cultural Resource Management Plan (CRMP), the final objective of the PA.

As a result of consultation with the Council and SHPO during a joint meeting with DOE in December 1998, the 1997 Draft PA is being modified and finalized. During 1999, LLNL continued consulting with DOE/OAK, the Council, and SHPO to formulate the content of the revised PA. The Fire Trail Relocation Project at Site 300 cut a new section of fire trail outside the boundaries of a known historic archaeological site. This action served to protect and preserve the site from future impacts so that LLNL can evaluate it and assess its significance and eligibility for listing on the National Register of Historic Places.

Endangered Species Acts and Sensitive Natural Resources

LLNL must meet the requirements of the U.S. Endangered Species Act, the California Endangered Species Act, and the California Native Plant Protection Act as they pertain to endangered or threatened species and habitats and other species of special concern that may exist or are known to exist at the LLNL sites. For example, in implementing the 1992 Mitigation Monitoring and Reporting Program in 1999, biological assessment surveys were performed for special-status species at 76 LLNL project construction (ground-disturbing) areas. Presence data for the San Joaquin kit fox (*Vulpes macrotis mutica*), American badger (*Taxidea taxus*), and Western burrowing owl (*Speotyto cunicularia*) were collected at each Site 300 project location, and other applicable mitigation measures were implemented where appropriate.

During 1999, no active San Joaquin kit fox dens were discovered, but five potential dens were found. Ten occupied American badger dens were discovered, and 40 unoccupied dens were identified. Eighteen active burrowing owl dens were discovered and monitored throughout the breeding and wintering season. The owls were marked with aluminum leg bands to initiate long-term studies, monitoring, and conservation of the species in the rugged topography of Site 300. Livermore site populations of the federally threatened California red-legged frog *(Rana aurora draytonii)* were monitored and protected in accordance with the 1997 and 1998 amended U.S. Fish and Wildlife Service Biological Opinions. In addition, a Species of Special Concern and federal candidate, the California tiger salamander *(Ambystoma tigrinum),* was monitored at wetland locations at Site 300. At the Livermore site, three pairs of white-tailed kites *(Elanus lecurus),* a state-protected bird of prey, successfully fledged 18 young. The kites were marked with aluminum leg bands to initiate long-term studies of the species in a semiurban edge habitat.

Two of the three known natural populations of the large-flowered fiddleneck (*Amsinckia grandiflora*), a federally listed endangered plant species, occur at Site 300. A portion of Site 300 has been designated as federal critical habitat for the plant. In addition, LLNL has established an experimental population within the designated critical habitat. LLNL is working with the U.S. Fish and Wildlife Service on continued monitoring of native and experimental *Amsinckia* populations, and to further develop habitat restoration and maintenance techniques. A progress report was prepared and submitted to the U.S. Fish and Wildlife Service in October 1999 (Carlsen et al. 1999).

The smaller of the two on-site native populations of fiddleneck was extirpated in 1997 when the bank containing the population washed away. No plants have been observed at this site since 1998. The number of fiddleneck plants in the larger native population

continued to decline (six plants remaining in 1999, down from 218 plants observed in 1998). The number of fiddleneck plants observed in the experimental population also declined (42 plants remaining in 1999, down from 64 plants observed in 1998).

These declines were observed even though both populations were treated in 1998 to reduce competing grass cover. The three-year decline has also been observed in other existing natural and experimental populations of fiddleneck. A dramatic increase in nutlet predation by small rodents has been observed in the Site 300 experimental population. It is likely that several years of heavy grass cover resulted in increased numbers of seed predators. A study to determine the effect of rodent removal on nutlet predation is planned. The experimental population will also be expanded with additional native grass and *Amsinckia* transplantation to investigate more fully the use of fire as a management tool.

Monitoring of the big tarplant (*Blepharazonia plumosa*, listed on the California Native Plant Society Rare Plant 1B List), and the diamond-petaled poppy (*Eschscholzia rhombipetala*, a plant thought to be extinct until rediscovered) continued in 1999. The big tarplant remained widespread throughout Site 300, although the individual populations were much reduced in size. A total of nine diamond-petaled poppy plants were located (down from the 26 observed in 1998). Of these, six plants produced seed-bearing pods.

Antiquities Act (of 1906): Paleontological Resources

During soil excavation for the National Ignition Facility at the Livermore site in 1997, a molar from a 14,000-year-old mammoth was found at a depth of about 10 m below the surface. After this discovery, LLNL obtained an excavation permit from the Department of Interior under the provisions of the Antiquities Act of 1906 and removed bones from the construction area in late 1997 and early 1998. The bones (including 11 ribs, three vertebrae, one humerus, one complete and one partial tusk, and a partial skull with palate, jawbone, and molars) were accessioned into the UC Berkeley Museum of Paleontology collection in 1999 and have been partially prepared for possible later presentation at LLNL.

Environmental Occurrences

Notification of environmental occurrences is required under a number of environmental laws and regulations as well as DOE Order 232.1, *Occurrence Reporting and Processing of*

Operations Information, and DOE Order 5484.1, *Environmental Protection, Safety, and Health Protection Information Reporting Requirements*. DOE Order 232.1 provides guidelines to contractor facilities regarding categorization and reporting of environmental occurrences to DOE and divides occurrences into three categories: emergency occurrences, unusual occurrences, and off-normal occurrences.

The Environmental Protection Department's response to environmental occurrences is part of the larger LLNL on-site emergency response organization that also includes representatives from Hazards Control (including the LLNL Fire Department), Health Services, Plant Engineering, Public Affairs, Safeguards and Security, and Site 300. In 1999, four environmental incidents were reportable under DOE Order 232.1 and were categorized as off-normal occurrences according to DOE Order 232.1.

None of the environmental occurrences, summarized in **Table 2-9**, caused any adverse impact to the public or the environment. Agencies notified of these incidents included DOE and DTSC.

Table 2-9. Tabulation of environmental occurrences reported under the Occurrence Reporting (OR) System, 1999.

Date[a]	Occurrence category	Description
Feb 2	Off-Normal	LLNL shipped two 50-lb containers of dry explosives from the Nevada Test Site to the Pantex facility in Texas by commercial carrier. A small amount of the dry explosives (approximately one teaspoon) was released from one of the containers to the bed of the truck carrying the containers. The material was properly cleaned up, and the vehicle was released. The loose explosive material was not capable of detonation but could have contributed to a fire. A release of a hazardous material meets the requirements of an Off-Normal Occurrence. OR 1999-0004.
July 13	Off-Normal	Following a regulatory inspection of Site 300 by the DTSC, LLNL was issued a SOV for a training violation. During a review of personnel training records, it was discovered that a HWM[b] field technician was two months overdue for SCBA refresher training. Receiving an SOV meets the requirements of an Off-Normal Occurrence. OR 1999–0026.
Aug 12	Off-Normal	As a result of a regulatory inspection by the DTSC, LLNL was issued a SOV on Aug. 12, 1999. The initial SOV identified four alleged violations. On Dec. 22, 1999, LLNL received a DTSC Inspection Report and NOV, adding 12 alleged violations to the previous four. The alleged violations involved administrative practices, operating record issues, and training deficiencies. No findings involved compromise of public protection. Receiving an SOV/NOV meets the requirements of an Off-Normal Occurrence. OR 1999–0037.

Table 2-9. Tabulation of environmental occurrences reported under the Occurrence Reporting (OR) System, 1999 (concluded).

Date[a]	Occurrence category	Description
Sept 22	Off-Normal	On September 21, 1999, a Hazardous Waste Management contractor employee was preparing hazardous waste for off-site shipment. The contractor was packaging a bottle containing Raney nickel, a solid that is normally suspended in water. After observing that there was no water in the container, the contractor added water to the container, allowed time for gas generation, and then replaced the screw cap. The contents of the container over-pressurized, blowing off the plastic screw cap. Less than 2.5 ounces of the material was discharged to the ceiling of the room and to the contractor's hair and shirt collar. The contractor and the room were decontaminated. There was no release to the environment because all the contents of the bottle were contained in the room. No injuries occurred, and assistance from the Fire Department was not needed. It was determined that this near-miss occurrence resulted from a failure to communicate or follow instructions. A courtesy phone call was made to DTSC informing it that a DOE occurrence report was initiated. Having only one barrier to prevent the release of a hazardous material to the environment meets the requirements of a Near Miss Off-Normal Occurrence. OR 1999–0045.

[a] The date indicated is the date when the occurrence was categorized, not the date of its discovery.

[b] See Glossary for list of acronyms.

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