

A P P E N D I X E

HAZARDOUS MATERIALS



APPENDIX E

HAZARDOUS MATERIALS

This appendix contains supplementary information regarding UC Berkeley safety programs, and federal, State and local laws and regulations governing hazardous materials.

E.1 UC BERKELEY SAFETY PROGRAMS

This section describes the UC Berkeley programs that have been established to protect the health and safety of the campus community and the public. The Office of Environment, Health & Safety (EH&S) at UC Berkeley has primary responsibility for creating and maintaining these programs to provide safe conditions for the campus community in compliance with related standards and regulations. EH&S technical staff has expertise in industrial hygiene, toxicology, chemical safety, radiation safety, physical safety, biohazard safety, hazardous waste management, animal care, and environmental protection.

UC Berkeley has exhibited a long-standing commitment to excellence in the areas of the environment, health, and safety, which is demonstrated by its proactive approach to these issues. The staff has put numerous programs in place, voluntary and mandatory, that not only meet but at some levels exceed compliance standards. Voluntary programs have included, for example, a structural Integrated Pest Management program established in the 1970s that resulted in a substantial reduction in pesticide use at UC Berkeley. In addition to employing biological and source controls, the program instituted policies such as reviewing building and landscape designs for their resistance to insect and animal pests. In another voluntary program, the Physical Plant–Campus Services (PP-CS) adopted less toxic cleaning agents to reduce occupational exposure and minimize waste. Mandatory compliance measures and programs are discussed below.

UC BERKELEY SAFETY PROGRAMS FOR NON-RADIOACTIVE HAZARDOUS CHEMICALS

TRANSPORTATION AND STORAGE OF HAZARDOUS MATERIALS

Hazardous and costly spills and injuries may occur if safe transportation procedures are not used. Safe transportation procedures are outlined in the EH&S Fact Sheet entitled *Transporting Chemicals Safely on Campus*.¹ Specific procedures for safe chemical transportation include the use of secondary containment and other acceptable practices. A separate EH&S publication, *The Move Manual: A Guide to Relocating Hazardous Materials*², sets forth procedures for moving an entire laboratory.

U.S. Department of Transportation regulations apply when hazardous materials or wastes are transported off-campus. These regulations include restrictions on packaging, labeling, and authorized drivers. EH&S staff members are trained in the Department of Transportation (DOT) regulations. They oversee all off-campus shipment of hazardous waste and assist in preparing hazardous materials for off-campus shipment. EH&S Radiation Safety is responsible for proper receipt, shipping and transportation of radioactive materials in accordance with DOT, State law, and the campus radioactive materials license.

Safe and proper storage of hazardous materials in laboratories is the responsibility of the principal investigator or laboratory manager. Requirements governing storage of hazardous materials include inventory and labeling, material compatibility, seismic safety, secondary containment, and spill protection. In addition, State building codes and fire codes contain specific requirements that must be observed for hazardous materials storage. In 1999, a state-of-the-art hazardous materials facility was completed to consolidate, package and ship hazardous waste for up to 90 days.

The EH&S booklets *Safe Storage of Hazardous Chemicals*, *Guidelines for Explosives and Potentially Explosive Chemicals – Safe Storage and Handling*, and *Fact Sheet Storage of Flammable Liquids in Laboratories*, and other publications available on the EH&S website provide details on safe hazardous materials storage practices.³ EH&S performs periodic site inspections to ensure that current chemical storage procedures are practiced.

The *Radiation Safety Manual*, *Radiation Safety Logbook*, and related documents and training provide guidance in the safe storage and labeling of radioactive materials. EH&S performs routine inspections to verify proper storage and labeling.

HAZARDOUS MATERIALS USE

Safe use of hazardous materials at UC Berkeley begins with EH&S but ultimately rests with the people who use the materials. EH&S issues guidance and fact sheets, evaluates departmental activities, and disseminates general information regarding the handling, storage, and disposal of hazardous materials and wastes. Every department is responsible for developing and maintaining a department safety program, with EH&S available if needed for assistance. EH&S is responsible for providing instruction and assistance to departments in the form of training, hazard communication, groundwater protection measures, and underground and aboveground storage tank programs.

TRAINING PROGRAM. UC Berkeley policy requires that all employees involved with hazardous materials handling undergo training. EH&S is responsible for providing information to the campus community, through established communication channels, on programs, regulatory impact and compliance requirements, and for developing and overseeing programs to be implemented by the campus to meet legal requirements and EH&S policies. The departments are responsible for ensuring that workers are trained to identify, avoid, and mitigate potential environmental health and safety hazards. EH&S provides training programs, guidelines, booklets, fact sheets, videos, and a thrice-yearly newsletter to update workers on safety matters.

In addition, EH&S has a matrix available on its web site detailing the programs and training mandated by law as well as the criteria for workplace conditions that would require training. EH&S provides training and expertise in many environmental health and safety topic areas. Training areas covered by EH&S include:

- Asbestos awareness
- Biological safety cabinet use

- Chemical inventory software
- Eye safety
- Fire and life safety
- Food sanitation
- Forklift and lift truck safety
- Fume hood use
- Hazard communication
- Hazardous waste disposal and minimization
- Injury and illness prevention
- Laboratory safety
- Respiratory protection
- Radiation Safety
- Laser Safety

Training programs and annual refresher courses are compulsory for individuals whose workplaces can potentially expose them to hazardous materials.

HAZARD COMMUNICATION PROGRAM. UC Berkeley has established a Hazard Communication Program for hazardous materials used outside of a laboratory (for hazardous materials used in laboratories, see below), in accordance with State “employee right-to-know” regulations. The program is designed to help maintain a healthy work environment by increasing employee awareness of workplace chemicals and their potential health effects, safe work practices, and emergency procedures. The Hazard Communication Written Program is available on the EH&S web site.

Under the program, each hazardous substance used by the departments must be listed on the department’s “Hazardous Chemicals Inventory,” and a copy of the list must be submitted to EH&S at least annually. To facilitate the process, the information can be submitted to EH&S electronically to update the EH&S Chemical Inventory database. EH&S provides oversight to assure that inventories are updated whenever a new hazardous material is brought into the workplace.

Material safety data sheets (MSDSs) contain hazard and precautionary information required by the Hazard Communication Standard. The University requires that the MSDSs are kept for each hazardous substance listed on the department’s Hazardous Chemicals Inventory. The most current MSDSs supplied by the chemical manufacturer or distributor are kept on file and made accessible to all employees, their representatives, and contractors for viewing or copying during each work shift. Departments are required to maintain paper copies of MSDSs either in individual workspaces or centrally within the department. In addition, EH&S maintains a collection of duplicate MSDSs electronically. EH&S subscribes to an online service which provides electronic versions of MSDSs for most chemicals purchased by the University.

CHEMICAL HYGIENE PLAN. Cal/OSHA (Title 8 CCR Section 5191) requires all laboratories to have a Chemical Hygiene Plan (CHP) containing Standard Operating Procedures (SOPs) relevant to safety and health considerations. UC Berkeley has established SOPs for common activities and requires laboratory-specific SOPs for hazards not covered by the campus-wide procedures. EH&S periodically reviews lab-specific SOPs and verifies that proper training has been documented in the CHP.

CHEMICAL INVENTORY DATABASE. UC Berkeley has developed a database that helps the University track its inventory and use of hazardous materials. The UC Berkeley Chemical Inventory (CI) database is used to track regulated substances to comply with chemical inventory, CalARP and other requirements. The CI database inventory includes quantities and locations that are updated continuously regularly as well as a chemical index that includes regulated substances listed by local, state, and federal agencies.

UC Berkeley uses the CI database to evaluate compliance with CalARP through a four-step process. Each step looks increasingly critically at the quantities of regulated substances handled. The first step examines only if a quantity of a particular listed regulated substance exists within the reporting area. If not, the substance will not appear on the report. The second step examines the distribution of a single chemical by building. The third step examines the distribution of a single chemical by room within a building. The last step involves an interview with the inventory taker to more accurately assess the situation, including the inventory amount and the concentration of the material in question. This process provides a detailed chemical and location approach to identifying and controlling potential releases before they occur and thus preventing possible accidents.

RADIOACTIVE MATERIAL DATABASE. UC Berkeley has developed and maintains an inventory of radioactive materials on the campus. This inventory is used to verify compliance with the campus radioactive materials license requirements.

TOXIC USE REDUCTION PROGRAMS FOR CAMPUS FACILITIES. UC Berkeley has taken proactive voluntary steps to reduce the use of toxic substances in maintenance and operations of facilities. An Integrated Pest Management Program was started in the early 1970s that emphasizes the use of parasites, trapping, habitat modification and education over the use of pesticides to control pests such as cockroaches, fleas, rodents, and silver fish. This program has resulted in the reduction in use of chemical pesticides by 100 percent in university housing and research facilities, and by 95 percent in kitchens. In addition, EH&S specialists review all new building designs for their ability to structurally resist pests as well as landscaping plans to make sure that the proposed landscaping would not create conditions that could harbor pests.⁴ Custodial operations have also switched to environmentally friendly cleaning products, reducing both the use of toxic cleaning products and their waste stream.

ABOVEGROUND STORAGE TANK SPILL PREVENTION CONTROL PROGRAM. In California, owners and operators of aboveground storage tanks (ASTs) must comply with State and federal regulations pertaining to oil spill prevention and aboveground petroleum storage. Facilities are subject to these regulations if they operate any tanks with a capacity of 660 gallons or greater, or if the total facility capacity exceeds 1,320 gallons. The daily management of fuel tanks supplying emergency generators is the responsibility of PP-CS. The Spill Prevention Control and Countermeasure (SPCC) plan is aimed at identifying possible spill scenarios and developing safeguards against such occurrences. Tanks are frequently visually inspected by campus PP-CS personnel as part of their normal duties. Any sign of deterioration or leakage that might cause a spill or accumulation of fuel oil on the concrete pad or inside an impounding basin is immediately reported to PP-CS supervisors. PP-CS personnel record monthly tank inspections on a checklist. This checklist requires the operators to inspect and record the conditions of the ASTs and pipings. Additionally, personnel are taught spill prevention and response and other safety measures through classroom and field training.

UNDERGROUND STORAGE TANK MONITORING AND RESPONSE PROGRAM. Although PP-CS is responsible for the day-to-day operations of the underground storage tanks (USTs) and for ensuring that the UST program meets and continues to meet operational requirements, it is not the sole party responsible for maintaining the UST program. University departments that own tanks for research or vehicle fueling also are responsible for those tanks and for routine monitoring, emergency response, and corrective action. Monitoring activities include weekly visual monitoring of the tank and piping with a written record of each inspection. Visual monitoring directly examines all exposed sections of the underground tank system including aboveground piping. Non-visual monitoring is mostly quantitative and can consist of manual tank gauging, automatic tank gauging, etc. UC Berkeley additionally carries out general integrity tests, such as tank integrity tests, piping integrity tests, and systems certification activities on all of their USTs.⁵

UC BERKELEY SAFETY PROGRAMS FOR HAZARDOUS WASTE

MANAGEMENT AND HANDLING PROGRAM

Strict environmental laws govern the disposal of all hazardous wastes. Unwanted hazardous materials may not be discharged into the environment, poured down the drain, or disposed of in the municipal trash. EH&S picks up hazardous materials for proper disposal after users properly package and label unwanted items. Guidelines for proper packaging and labeling of unwanted hazardous materials are described in the EH&S publication *Unwanted Hazardous Chemicals*.⁶

CHEMICAL EXCHANGE PROGRAM

UC Berkeley has established a program to minimize the disposal of hazardous materials that are potentially still usable. The Chemical Exchange Program (CHEX) is an online database that uses the Internet to facilitate the redistribution of unwanted chemicals to UC Berkeley faculty and staff members who can use them. EH&S collects unwanted chemicals when it receives Material Packing Lists from laboratories and facilities. After assessing the unwanted chemicals, staff members put the potentially useful chemicals on the CHEX list of available chemicals. CHEX allows UC Berkeley researchers to search for chemicals they

need, which are then redistributed by EH&S free of charge. The original owners receive a credit on their Hazardous Waste Recharge Account, equal to the amount of disposal cost. This program is being increasingly utilized by UC Berkeley researchers. In 2003, more than 160 chemicals were redistributed to users and kept out of the waste stream.⁷

WASTE MINIMIZATION PROGRAM

In compliance with the State Hazardous Waste Source Reduction and Management Review Act of 1989, UC Berkeley established a comprehensive waste minimization program in 1991. Unwanted hazardous materials and hazardous wastes produced at UC Berkeley are brought to the Hazardous Materials Facility and sorted by EH&S technical staff. Usable materials are identified for re-use and redistribution. Hazardous waste is packaged for transportation to a permitted hazardous waste treatment, storage, or disposal facility according to the Department of Transportation, Resource Conservation and Recovery Act (RCRA), and California Department of Toxic Substances Control requirements.

Table 4.6-1 in Chapter 4.6 shows the reduction in routinely generated hazardous waste since 1990 due to implementation of UC Berkeley's waste minimization program. The total weight of routinely generated hazardous waste in 2002 for the Main Campus totaled approximately 137,707 pounds, a reduction of over 53 percent from 1990 levels.

UC Berkeley updated its hazardous waste source reduction plan in 2002 to continue implementation of the ten source reduction measures. These measures are both operational and administrative in approach. Measures include the following:

- training professors, students, and staff on hazardous waste source reduction
- developing source reduction policy
- upper management commitment to source reduction
- information exchange
- inventory of chemicals
- surplus chemical exchange
- comprehensive waste tracking system
- disposal cost recharge program
- reduced volume used in experiments; and
- mercury reduction program

Because of their technical and institutional feasibility, these measures have proven successful in decreasing the amount of hazardous waste generated and protecting employee health and safety.

RADIOACTIVE WASTE MINIMIZATION PROGRAM

UC Berkeley has established a three-part program intended to minimize the production of radioactive waste. The parts are: 1) reduction in use, 2) strict segregation of radioactive wastes from other wastes, and 3) storage for decay and disposal program.

UC BERKELEY PROGRAMS FOR BIOHAZARDOUS MATERIALS

CHANCELLOR'S ADVISORY COMMITTEE ON LABORATORY AND ENVIRONMENTAL BIOSAFETY

The Chancellor's Advisory Committee on Laboratory and Environmental Biosafety (CLEB) is charged with the responsibility of formulating University policies to ensure the safe conduct of research involving biohazardous agents and materials. These policies, developed in accordance with guidelines set forth by the National Institutes of Health and the Centers for Disease Control, relate to facility design; containment equipment; safe laboratory practice; and training of students, staff and faculty working in the facility.

All faculty whose research involves working with biohazardous agents in animals and/or the laboratory must hold a valid Biohazard Use Authorization (BUA). BUA requirements apply generally to laboratory research involving organisms with the potential to cause human disease, and to experiments with recombinant DNA, covered by the NIH Guidelines for Research Involving Recombinant DNA Molecules. Before this authorization is issued, the animal and/or laboratory facilities and laboratory practices are reviewed by EH&S and CLEB. All BUAs involving biohazards that require Biosafety Level 3 containment and procedures are reviewed and approved by CLEB. As of 2003, there were 50 active BUAs at UC Berkeley, including two BUAs for Biosafety Level 3 work. The BUAs authorize research with Risk Group 2 and Risk Group 3 viruses, bacteria, fungi, recombinant DNA, and known HIV-positive blood samples.

OFFICE OF ENVIRONMENT, HEALTH AND SAFETY (EH&S)

The EH&S's Biosafety Program consists of three specific programs that are designed to ensure that all work involving biohazardous materials is conducted in compliance with federal and State regulations.

BIOHAZARD USE AUTHORIZATION PROGRAM. EH&S provides application forms and copies of the regulations to persons who plan to conduct laboratory work with biological materials (including recombinant DNA). EH&S also assists researchers in obtaining BUAs and meeting applicable Occupational Safety and Health Administration (OSHA) requirements.

OSHA BLOODBORNE PATHOGENS STANDARD. EH&S provides compliance assistance, technical information, training, and materials to implement the Cal/OSHA bloodborne pathogen standard at UC Berkeley. This standard requires that all laboratories and departments that work with human blood, body fluids, or tissue, develop and implement a written exposure control plan to reduce or eliminate risk of exposure to human bloodborne pathogens during research and teaching. EH&S has prepared and posted on its web site a template that researchers can use to develop a bloodborne pathogen exposure control plan. EH&S also maintains a database to track all research involving bloodborne pathogens, and ensures through annual reviews that the exposure control plans are being implemented in the laboratory.

BIOLOGICAL SAFETY CABINET PROGRAM. EH&S assists users at UC Berkeley in complying with National Sanitation Foundation (NSF) Standard 49 and Cal/OSHA ventilation requirements for biological safety cabinets and also assists users in the proper use of biological safety cabinets and laminar-flow clean benches. EH&S currently oversees the program to ensure that all biological safety cabinets used for biohazard levels 2 or above are tested annually.

OTHER RESOURCES. EH&S has also prepared and posted materials on its web site to assist researchers with biosafety, including fact sheets on using autoclaves in a safe manner, guidelines for management and disposal of medical waste, guidelines on how to relocate hazardous materials safely, sharps safety, and safety guidelines for field research.

MEDICAL WASTE MANAGEMENT PROGRAM

UC Berkeley generates medical waste (including biohazardous waste, biohazardous sharps waste, pathology waste, and chemotherapy wastes) primarily from research, animal facilities, and health services. As a large quantity generator of medical wastes, UC Berkeley is obligated to comply with the California Medical Waste Management Act, which requires that departments, units, and laboratories that generate medical waste properly manage that waste. Procedures documenting proper medical waste management are outlined in the EH&S publication *Guidelines for Managing and Disposing of Medical Waste*.⁸ The publication details correct medical waste management practices such as segregation of medical wastes and proper containment, decontamination, and disposal of medical waste. Medical waste is brought to an accumulation area and placed in a proper secondary container, where it is stored until pickup by the medical waste contractor. UC Berkeley's guidelines are more stringent than the regulatory requirements, so some wastes that are not classified as medical waste are treated as such.

UC BERKELEY RADIATION PROTECTION PROGRAMS

EH&S has a dedicated professional staff that ensures that work with radioactive materials and radiation-producing machines is conducted in accordance with policies and standards set forth by the NRC and the State. A Radiation Safety Committee composed of faculty representatives with significant experience in the safe use of radiation and radioactive materials reviews the work of the EH&S radiation safety staff and sets policy.

The UC Berkeley Campus Radiation Safety Program and the EH&S radiation safety staff have implemented processes, methods, and programs intended to assure that work with radioactive materials and radiation-producing machines is conducted in such a manner as to protect health, minimize danger to life and property, meet regulatory requirements, and to keep radiation exposure to all personnel as low as is reasonably achievable.

These methods and programs include the following:

RADIOACTIVE USE AUTHORIZATIONS. Before obtaining radioactive materials, each principal investigator must apply for a Radiation Use Authorization (RUA). The RUA specifies the materials (isotopes), chemical forms, and amounts being used. The RUA also contains a general description of the authorized uses of these materials and/or machines. Each authorized user also maintains an inventory of materials received, materials on hand, and materials disposed of to the sanitary sewer. Periodically, the EH&S radiation safety staff reviews these inventories and resolves any discrepancies that arise. This review is normally performed once each calendar quarter.

RADIATION SAFETY TEAM. The radiation safety team activities include the following:

- Overseeing university compliance with standards and policies for radiation protection and UC Berkeley radiation safety performance, including the review and approval of all initial RUAs and renewals, and verification that RUAs are approved prior to radioactive materials being delivered or work commences.
- Responsibility for operation of the UC Berkeley Campus Radiation Safety Program, for assuring that use of radiation is in conformity with UC Berkeley standards and applicable governmental regulations, and for assuring that radiation exposures to both on-campus and off-campus personnel and members of the general population from radiation and radioactive material used at UC Berkeley is as low as reasonably achievable.
- Responsibility for the development, publication, and revision of the Campus Radiation Safety Manual, which contains license requirements and sets forth UC Berkeley radiation safety policy.
- Reporting radiation safety problems and issues to the Radiation Safety Committee and university management.
- Coordinating radiation safety issues in emergency response, including halting any radioactive operations that pose an immediate health and safety danger to the public and workers.

CAMPUS RADIOACTIVE MATERIALS LICENSE. The campus Radiation Safety Officer is responsible for developing, publishing, and revising as necessary the Campus Radiation Safety Manual (the Manual), which promulgates license requirements and sets forth campus radiation safety policy. The Manual includes statements on:

- The scope of the radiation control program and the activities covered.
- Procedures to be followed in obtaining authorization to acquire and use radioisotopes and radiation producing machines.
- Regulations and procedures for the storage, transportation, and disposal of radioactive materials.
- Responsibilities of Authorized Users for control of radiation hazards.
- Maximum permissible radiation exposure to personnel.
- Minimum requirements for posting of radiation hazard warning signs.
- Procedures to be followed in emergencies involving radiation.
- Authorization for radiation uses.

The Radiation Safety Officer is also responsible for assuring that the Manual is current or making necessary updates. Proposed changes to the Manual are approved by the Radiation Safety Committee.

RADIATION PRODUCING MACHINES. X-ray machines are the main radiation-producing machines used at UC Berkeley. Although they do not contain radioactive material, they produce ionizing radiation. In general, the use of radiation-producing machines requires the same controls as radioactive material use. Precautions are taken to limit human exposure to radiation when X-ray machines are used. All work done with X-ray machines is authorized by an RUA. Radiation-producing machines may only be operated by authorized personnel. X-ray machines (for use with animals and humans or in research) at UC Berkeley are inspected annually by the EH&S. Safety features are checked and verified to be operational and repairs are made as needed.

Radiation-producing machines are not subject to licensing by State or federal agencies; however, State regulations require registration of each machine with the state. EH&S notifies the DHS within 30 days of receipt, transfer, or disposal of ionizing radiation-producing machine. Specific methods and programs to assure the safe use of these machines are described in the UC Berkeley Radiation Safety Manual. That manual is also part of the Campus Radioactive Materials License (incorporated by reference).

RADIOACTIVE WASTE PROGRAM. EH&S is responsible for UC Berkeley's radioactive waste program. This waste program is required to conform with state and federal regulations as set forth in the Campus Radioactive Materials License, and the terms and conditions of the two radiation use authorizations which are monitored for compliance, through quarterly inspections, by the radiation safety staff.

RADIOACTIVE WASTE MINIMIZATION. EH&S with the Radiation Safety Committee has implemented a campus-wide radioactive waste minimization program that provides users of radioactive materials with methods to reduce their generation of radioactive wastes. Some elements of this program include better laboratory technologies, replacement of radioactive materials with nonradioactive materials, trial runs using nonradioactive materials, surveying materials to assess whether they are contaminated with radioactive materials, proper separation of radioactive and nonradioactive materials, and microchemistry procedures. Overall reductions in radioactive materials use have diminished radioactive wastes by over 50 percent since the early 1990s.⁹

UC BERKELEY SAFETY PROGRAMS FOR RESEARCH INVOLVING TRANSGENIC MATERIALS

RECOMBINANT DNA RESEARCH INVOLVING INFECTIOUS AGENTS

Recombinant DNA research involving infectious agents is subject to the same requirements and control programs that apply to research involving biohazardous materials (see Section 4.6). The investigator is required to obtain a BUA before undertaking such research. Infectious waste produced during research must be disposed of in a manner similar to other medical waste.

RESEARCH INVOLVING TRANSGENIC ANIMALS

For research involving transgenic animals, the investigator must register with EH&S. Research involving transgenic animals is subject to compliance with the NIH Guidelines for Research involving Recombinant DNA Molecules and the same control programs that are discussed in Section 4.6 with respect to laboratory animal use and care. The Committee on Animal Research Space Assignment (CARSA) (or OLAC; Jennifer, Karl suggests that we check with Libby) provides oversight for all aspects of transgenic animal care.

RESEARCH INVOLVING TRANSGENIC PLANTS

The Oxford Facilities Committee provides oversight to all research involving transgenic plants. This research also requires registration with EH&S and compliance with NIH Guidelines. Because of the relatively low risk involved in types of transgenic plant research conducted at UC Berkeley, controls consist of the use of segregated and screened greenhouses. Records are also maintained on the plants used in the research. A permit from the USDA is required for open field-based research involving transgenic plants.

UC BERKELEY SAFETY PROGRAMS FOR NON-IONIZING RADIATION (NIR)

It is the policy of UC Berkeley to provide a workplace safe from the known hazards of NIR by assuring compliance with federal and State safety regulations. This policy applies to all persons (staff, researchers, students, and visitors) exposed to NIR hazards on UC Berkeley property. Campus NIR policy is set by the Non-Ionizing Radiation Safety Committee. EH&S is responsible for implementing the NIR safety policies established by the Non-Ionizing Radiation Safety Committee (NIRSC). Committee members are appointed on the basis of knowledge of the hazard control principles and practices of resulting from or associated with the use of lasers and other NIR sources. The NIR Safety Program is divided into two sections: laser safety and other NIR sources.

LASER SAFETY PROGRAM

EH&S oversees and implements the laser safety program through the Laser Use Registration (LUR) Program. No Class 3a, 3b, or 4 laser may be used at UC Berkeley without a LUR. The LUR is used to assure the NIRSC that the laser use has been assessed and found to be safe. The LUR is also used to track the location, use and ownership of each laser.

NIR SAFETY PROGRAM

EH&S oversees and implements the NIR Safety Program assuring that NIR sources are used in conformity with policies set by the NIRSC. Some non-laser NIR sources include (but are not limited to) visible and invisible light sources (e. g. ultraviolet lamps, welding), microwave ovens, antennas, and static magnetic sources (e.g., MRI and NMR units).

Through inspections or request, EH&S reviews the use of these NIR sources and makes appropriate safety recommendations. Problems discovered during these reviews or inspections that cannot be resolved or are of concern are referred to the NIRSC.

EMERGENCY RESPONSE PROGRAMS

EH&S maintains an Emergency Response Team (ERT) that consists of health and safety professionals, hazardous materials technicians, and appropriately licensed hazardous materials drivers. The team is able to respond to most incidents at UC Berkeley and arranges for appropriate outside assistance when necessary. This assistance can include the City of Berkeley Fire Department, the Lawrence Berkeley National Laboratory Fire Department, and outside emergency response contractors. All ERT members have the appropriate OSHA Hazardous Waste Operations and Emergency Response (HAZWOPER) training and renew this with annual 8-hour refresher training. Currently an ERT member will be in contact with the incident caller within 15 minutes (usually much less). Site response time depends on the type of equipment needed and the location of the incident. EH&S staff also respond to radiological spills, contamination, and emergencies.

UC Berkeley periodically assesses its response time and service and makes staffing adjustments as necessary to maintain a high service level. UC Berkeley also meets periodically with the City of Berkeley Fire Department to discuss future campus planning and the city's emergency response equipment needs.

New buildings are automatically included in the campus-wide emergency response plan. This is accomplished by working with the newly appointed building coordinator to develop a new building emergency plan upon occupancy of the new structure. This plan is then provided to a contact from each department in the building. The department contacts in turn provide emergency procedures training to their staff.

E.2 REGULATORY FRAMEWORK

FEDERAL LAWS AND GUIDELINES

RESOURCE CONSERVATION AND RECOVERY ACT OF 1976, AS AMENDED BY THE HAZARDOUS AND SOLID WASTE AMENDMENTS OF 1984

Federal hazardous waste laws are generally promulgated under the Resource Conservation and Recovery Act (RCRA). These laws provide for the "cradle to grave" regulation of hazardous wastes. Any business, institution, or other entity that generates hazardous waste is required to identify and track its hazardous waste from the point of generation until it is recycled, reused, or disposed.

The EPA has primary responsibility for implementing the RCRA, but individual states are encouraged to seek authorization to implement some or all RCRA provisions. California received authority to implement the RCRA program in August 1992. The California DTSC is responsible for implementing the RCRA program as well as California's own hazardous waste laws, which are collectively known as the Hazardous Waste Control Law. The DTSC has in turn delegated enforcement authority in Berkeley, including UC Berkeley, to the City of Berkeley under the Certified Unified Program Agency (CUPA) program.

COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION, AND LIABILITY ACT OF 1980, AS AMENDED BY THE SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT OF 1986

The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980, commonly called the Superfund program, created a national policy and procedures to identify and clean up sites contaminated by releases of hazardous substances. The law was amended in 1986 by the Superfund Amendments and Reauthorization Act (SARA). The EPA has primary responsibility for implementing Superfund regulations, but State agencies may be authorized to take the lead at some cleanup sites. In California, the DTSC is the State's lead agency for the federal Superfund and also enforces the State's own Superfund Law. Where groundwater contamination is the primary concern, one of the State's Regional Water Quality Control Boards may be the lead agency or a cooperating agency for the cleanup. There are no Superfund sites at UC Berkeley.

EMERGENCY PLANNING AND COMMUNITY RIGHT-TO-KNOW ACT

The Emergency Planning and Community Right-to-Know Act (EPCRA) was adopted as Title III of the Superfund Amendments and Reauthorization Act of 1986. The law is intended to increase public access to information about the storage and use of hazardous chemicals. At the federal level, the EPA administers the EPCRA. However, some of its components overlap with State requirements (the Hazardous Materials Business/Management Plan and Accidental Release Prevention Law) that predated EPCRA, and these are implemented at the State and local level. Businesses, institutions, and other entities that use, store, or release hazardous substances in Berkeley submit most of the required information to the BTMP, the local certified CUPA.

HAZARDOUS MATERIALS TRANSPORTATION ACT

The U. S. Department of Transportation regulates hazardous materials transportation under Title 49 of the CFR. State agencies with primary responsibility for enforcing federal and State regulations and responding to hazardous materials transportation emergencies are the California Highway Patrol and the California Department of Transportation. These agencies also govern permitting for hazardous materials transportation.

TITLE 29 CFR, OCCUPATIONAL SAFETY AND HEALTH ACT

The Occupational Safety and Health Act is intended to ensure that employers provide their workers with a work environment free from recognized hazards to safety and health, such as exposure to toxic chemicals, excessive noise levels, mechanical dangers, or unsanitary conditions. To establish standards for workplace health and safety, the Act also created the National Institute for Occupational Safety and Health (NIOSH) as the research institution for the Occupational Safety and Health Administration (OSHA). OSHA oversees the administration of the Act and enforces standards in all states.

TITLE 40 CFR PART 112, OIL POLLUTION PREVENTION

The Spill Prevention Control and Countermeasure (SPCC) plan is required by Title 40, Code Federal Regulations (CFR) Part 112. In California, owners and operators of aboveground storage tanks (ASTs) must comply with federal regulations pertaining to oil spill prevention and aboveground petroleum storage. Facilities subject to these regulations must complete a SPCC plan if they contain tanks with a capacity of 660 gallons or more, or if the total facility capacity exceeds 1,320 gallons. The SPCC plan provides an analysis of the potential for release from ASTs and the measures that could be put into place to reduce the potential of release. UC Berkeley is required to complete a SPCC plan under this regulation.

TITLE 42 CFR SELECT AGENT REGULATION

In addition to Title 29 of the CFR, which regulates worker safety in laboratories, federal laws relative to biological safety are contained in Title 42 of the CFR. Title 42 CFR Part 73, published in December 2002, implements provisions of the Public Health Security and Bioterrorism Preparedness Response Act, which requires the Secretary of Health and Human Services to regulate the possession of certain biological agents (“select agents”) harmful to humans. The regulation controls the access, use, and transfer of select agents to ensure that these are shipped only to institutions or individuals equipped to handle them appropriately and only to those who have legitimate reasons to use them. The CDC is responsible for implementing this regulation; a facility must register with the CDC if it possesses a select agent or agents. The new rule updated the previous select agent rule which required facilities to register with the CDC only if they intended to transfer a select agent. Some of the select agents and toxins subject to regulation by the CDC are also regulated by USDA under 9 CFR part 121. Laboratories at UC Berkeley which possess, use or transfer select agents are required to comply with this regulation.

ATOMIC ENERGY ACT

In the United States, the use of radioactive materials is in general regulated by the Nuclear Regulatory Commission (NRC) under the Atomic Energy Act. The three major NRC rules that apply to UC Berkeley from Title 10 of the CFR (Chapter I, Nuclear Regulatory Commission) are Part 19, Notices, Instructions and Reports to Workers, Inspections, Part 20, Standards for Protection Against Radiation, and Part 30 (see page E-14).

The following sections of the CFR apply to the UC Berkeley Campus Radiation Safety Program:

- Title 10: Chapter I, Nuclear Regulatory Commission
- Part 19, Notices, Instructions and Reports to Workers, Inspections
- Part 20, Standards for Protection Against Radiation
- Part 30, Rules of General Applicability to Domestic Licensing of Byproduct Material
- Part 40, Domestic Licensing of Source Material
- Part 55, Operator’s Licenses
- Part 70, Domestic Licensing of Special Nuclear Materials

- Title 49: Chapter I, Research and Special Programs Administration, Department of Transportation

ANIMAL WELFARE ACT OF 1966

The Animal Welfare Act of 1966 (and its subsequent amendments) is the primary federal law that governs the use of animals in research, testing, and teaching in the United States. This Act is implemented and enforced by the U. S. Department of Agriculture (USDA). It provides the basis for the regulatory authority given to the USDA to ensure the welfare of animal species that are covered by the Act and used in regulated activities. The Act includes all warm-blooded vertebrates but specifically exempts all farm animals used in food and fiber research or production. The Act also exempts rodents used in research. The law defines humane care to include such factors as sanitation, ventilation, and housing.

Compliance with the regulations is ensured by the Institutional Animal Care Use and Committees (IACUC). The primary functions of IACUC are reviewing and inspecting all aspects of an institution's animal care and use program, including all animal facilities and animal care records; reviewing animal use protocols; reviewing and investigating complaints about animal use; and making recommendations to the Institutional Official. This is to ensure compliance with all regulations and policies and allows for interaction between the IACUC and institutional staff members. At UC Berkeley, the Animal Care and Use Committee (ACUC) serves as the IACUC.

U.S. PUBLIC HEALTH SERVICE POLICY ON THE "HUMANE CARE AND USE OF LABORATORY ANIMALS"

The U.S. Public Health Service (PHS) Policy on the "Humane Care and Use of Laboratory Animals requires institutions to establish and maintain proper measures to ensure the appropriate care and use of all animals involved in research, research training, and biological testing conducted or supported by the PHS. The PHS Policy is intended to implement and supplement the U.S. Government Principles for the Utilization and Care of Vertebrate Animals Used in Testing, Research, and Training.

NATIONAL ANIMAL WELFARE GUIDELINES AND ACCREDITATION

AAALAC International is a private nonprofit organization that promotes the humane treatment of animals in science through a voluntary accreditation program. This voluntary accreditation program is conducted in addition to complying with local, State, and federal laws that regulate animal research. By undergoing the voluntary accreditation process, the research programs demonstrate that they not only meet the minimum regulatory requirements but actually exceed them to achieve excellence in animal care and use. AAALAC International relies on the Guide for the Care and Use of Laboratory Animals (published by the National Research Council) as its primary standard for evaluation of laboratory animal care and use programs. As a condition of accreditation, AAALAC International requires correction of any deficiencies in either programs or physical facilities that they observe during site visits.

The goal of the National Research Council's Guide for the Care and Use of Laboratory Animals is to promote the humane care of animals used in biomedical and behavioral research, teaching, and testing. In this guide, "laboratory animals" refer to any vertebrate animals, including traditional laboratory animals, farm animals, wildlife, and aquatic animals. The guide serves to provide information that will enhance the well-being of animals, the quality of biomedical research, and the advancement of biological knowledge relevant to humans or animals. UC Berkeley is accredited by the AAALAC and is required to follow the guide.

HEALTH RESEARCH EXTENSION ACT

The Health Research Extension Act of 1985 provides for the establishment of guidelines for the proper care and treatment of animals used in biomedical and behavioral research, by the Director of the NIH. The guidelines require animal care committees at each entity which conducts biomedical and behavioral research with funding from the NIH to ensure compliance with the guidelines. At UC Berkeley, the Animal Care and Use Committee (ACUC) meets this requirement for research.

FEDERAL PLANT PEST ACT

The federal agencies primarily responsible for regulating transgenic materials in the United States are the USDA, the EPA, and the Food and Drug Administration (FDA). Under the authority of the Federal Plant Pest Act, the USDA Animal and Plant Health Inspection Service regulates importation, interstate movement, and environmental release of transgenic plants and organisms. The Service licenses, through permits, the field testing of food crops before commercial release. UC Berkeley researchers who plan to grow transgenic plants in field trials are required to obtain a permit from the USDA.

FEDERAL INSECTICIDE, FUNGICIDE, AND RODENTICIDE ACT

The EPA utilizes its authority under the Federal Insecticide, Fungicide, and Rodenticide Act to regulate the distribution, sale, use, and testing of plants and microbes producing pesticidal substances.

9 CFR PART 121 AND 7 CFR 331

The Agricultural Bioterrorism Protection Act of 2002, a subpart of the Public Health Security and Bioterrorism Preparedness Response Act of 2002, requires that entities that possess, use, or transfer agents or toxins deemed a severe threat to animal or plant health or products must notify and register with the Secretary of the USDA. USDA's Animal and Plant Health Inspection Service (APHIS) has been designated by the Secretary as the Agency for implementing the provisions of the law for USDA.

CDC AND NIH GUIDELINES

The CDC and NIH have issued federal guidelines that address biological safety; because research at university campuses often involves federal funding, compliance with these guidelines becomes mandatory for most research. The CDC and the NIH have developed containment and handling guidelines for use in microbiological and biomedical laboratories. UC Berkeley has adopted these guidelines as standard practice and instituted Biosafety Levels in its laboratories.

BIOSAFETY LEVELS. UC Berkeley has adopted the most current guidelines set forth in the U.S. Department of Health and Human Services' publications *Biosafety in Microbiological and Biomedical Laboratories*¹⁰ and *Guidelines for Research Involving Recombinant DNA Molecules*¹¹ to classify biohazardous agents and to determine the level of safety precautions that must be used. Four biosafety levels apply to biohazardous materials operations, depending on the risk group of the agent used:

- **Risk Group 1** agents pose minimal or no known potential hazard to laboratory personnel and the environment.
- **Risk Group 2** agents are considered to be of ordinary (not special) potential hazard and may produce varying degrees of disease through accidental inoculation, but Risk Group 2 agents may be effectively contained by ordinary laboratory techniques and facilities.
- **Risk Group 3** agents pose serious risks; therefore, work with these agents must be conducted in contained facilities using special ventilation systems and controlled access separate from public areas.
- **Risk Group 4** agents pose a high risk of life-threatening disease for which there may be no available vaccine or therapy; therefore work with these agents must be conducted under the most stringent containment conditions.

Therefore, Biosafety Level 1 is for the least hazardous biological agents and Biosafety Level 4 is for the most hazardous biological agents. No Biosafety Level 4 agents or laboratories exist or are allowed at UC Berkeley. The Department of Health and Human Services guidelines describe Biosafety Levels 1, 2, and 3 as follows:

- **Biosafety Level 1** practices, safety equipment, and facilities are appropriate for [work involving] defined and characterized strains of viable microorganisms not known to consistently cause disease in healthy humans. ... Many agents not ordinarily associated with disease processes in humans are, however, opportunistic pathogens and may cause infection in the young, the aged, and immunodeficient or immunosuppressed individuals.
- **Biosafety Level 2** practices, equipment, and facilities are applicable to [work involving] moderate-risk agents present in the community and associated with human disease of varying severity. With good microbiological techniques, these agents can be used safely in activities conducted on the open bench, provided the potential for producing splashes or aerosols is low. . . . Primary hazards to personnel working with these agents relate to accidental percutaneous or mucous membrane exposure, or ingestion of infectious materials. ... [P]rocedures with aerosol or high splash potential that may increase the risk of such personnel exposure must be conducted in primary containment equipment [or devices]. ...
- **Biosafety Level 3** practices, safety equipment, and facilities are applicable to [work involving] indigenous or exotic agents with a potential for respiratory transmission, and which may cause serious and potentially lethal infection. ... Primary hazards to personnel working with these agents relate to autoinoculation, ingestion, and exposure to infectious aerosols.

BIOLOGICAL SAFETY CABINETS. Aerosol control of infectious agents or other biologically derived molecules is usually achieved by carrying out the procedure using a biological safety cabinet. There are currently three primary classes of biological safety cabinets, which are distinguished by their respective design, containment, and cleanliness capabilities.

- **Class I** cabinets are similar to conventional laboratory hoods with an open-face and negative-pressure design, but Class I cabinets exhaust through a high-efficiency particulate air (HEPA) filter.
- **Class II** cabinets, also referred to as laminar-flow biological safety cabinets, are effective in protecting operators from research materials as well as protecting research materials from external contamination. These cabinets are designed with an inward air flow to protect personnel, HEPA-filtered downward vertical laminar flow for product protection, and HEPA-filtered exhaust air for environmental protection.
- **Class III** cabinets are totally enclosed, ventilated cabinets of gas-tight construction. Operations in the cabinet are conducted through attached protective gloves.

RESEARCH INVOLVING RECOMBINANT DNA. The NIH Guidelines for Research Involving Recombinant DNA Molecules specifies practices for constructing and handling recombinant DNA molecules and organisms and viruses containing recombinant DNA molecules. These guidelines are applicable to all recombinant DNA research conducted in the United States for institutions receiving NIH funding.

In addition to Biosafety Levels for biohazardous materials, the Guidelines identify containment at four Biosafety Levels for recombinant DNA research involving plants (BL1-P through BL4-P) and small laboratory animals (BL1-N through BL4-N), and containment practices for plants, microorganisms, and animals. Recombinant DNA experiments at Biosafety Level 1 pose no significant hazard, Biosafety Level 2 experiments pose minimal hazard, and Biosafety Levels 3 and 4 involve more hazardous agents. There are no Biosafety Level 4 laboratories at UC Berkeley.

STATE AND LOCAL LAWS AND REGULATIONS

HAZARDOUS MATERIALS BUSINESS OR MANAGEMENT PLAN

Chapter 6.95 of the California Health and Safety Code requires that facilities that use, produce, store, or generate hazardous substances or have a change in business inventory are have a Hazardous Materials Management Plan (HMMP or Business Plan). The plan must disclose of the type, quantity, and storage location of materials. The law also requires a site-specific emergency response plan, employee training, and designation of emergency contact personnel.

As a State agency and large-quantity user of hazardous materials, UC Berkeley is required to submit an HMMP to the local administering agency, the BTMP. The HMMP describes hazardous materials storage and handling practices and contains procedures for monitoring storage, performing regular inspections, detecting releases, and testing of the detection systems on a regular basis. Compliance with the hazardous materials programs at UC Berkeley is verified through annual inspections.

TITLE 23 CCR, UNDERGROUND STORAGE OF HAZARDOUS SUBSTANCES

The underground storage tank (UST) monitoring and response program is required under Chapter 6.7 of the California Health and Safety Code and Title 23 of the CCR. The program was developed to ensure that the facilities meet regulatory requirements for monitoring, maintenance, and emergency response in operating USTs. UC Berkeley operates several USTs that must meet these requirements.

ABOVEGROUND PETROLEUM STORAGE ACT

The Aboveground Petroleum Storage Act requires registration and spill prevention programs for ASTs that store petroleum. In some cases, ASTs for petroleum may be subject to groundwater monitoring programs that are implemented by the Regional Water Quality Control Boards and the State Water Resources Control Board. UC Berkeley operates a number of ASTs that are subject to these requirements.

SB 1889, ACCIDENTAL RELEASE PREVENTION LAW/CALARP

SB 1889 required California to implement a new federally mandated program governing the accidental airborne release of chemicals promulgated under Section 112 of the Clean Air Act. Effective January 1, 1997, CalARP replaced the previous California Risk Management and Prevention Program (RMPP) and incorporated the mandatory federal requirements. CalARP addresses facilities that contain specified hazardous materials, known as “regulated substances,” that, if involved in an accidental release, could result in adverse off-site consequences. CalARP defines regulated substances as chemicals that pose a threat to public health and safety or the environment because they are highly toxic, flammable, or explosive. Detailed chemical inventories maintained by UC Berkeley to comply with the Business Plan law show that it does not use regulated substances in large enough quantities to trigger CalARP requirements. UC Berkeley is therefore currently not required to submit a risk management plan.

TITLE 22, CALIFORNIA HAZARDOUS WASTE CONTROL LAW

The DTSC regulates the generation, transportation, treatment, storage, and disposal of hazardous waste under the RCRA and the California Hazardous Waste Control Law. Both laws impose “cradle to grave” regulatory systems for handling hazardous waste in a manner that protects human health and the environment. The DTSC has delegated some of its authority under the Hazardous Waste Control Law to county health departments and other CUPAs, including the City of Berkeley.

SB 14, HAZARDOUS WASTE SOURCE REDUCTION AND MANAGEMENT REVIEW ACT OF 1989

Federal amendments to hazardous and solid waste laws made waste minimization a national policy in 1984. Under this congressional action, a Generator's Certification is required on each Uniform Hazardous Waste Manifest to help ensure that each generator of hazardous waste has a program in place to reduce the volume and toxicity of waste generated. Additional regulatory oversight was provided in State legislation, the Hazardous Waste Source Reduction and Management Review Act of 1989 (SB 14). The goal of this Act is to achieve optimal minimization of the generation of hazardous waste. Most recently, Hazardous Waste Source Reduction and Management Act Modifications (SB 1726) reduced the reporting threshold, which increased the universe of generators governed by the Act. To comply with this Act, UC Berkeley established a comprehensive waste minimization program in 1991.

TITLE 8 CCR, CALIFORNIA OCCUPATIONAL SAFETY AND HEALTH ACT

WORKER SAFETY. In California, Cal/OSHA assumes primary responsibility for developing and enforcing standards for safe workplaces and work practices. Cal/OSHA standards must be at least as stringent as federal standards, and they are generally more stringent. Cal/OSHA hazardous materials regulations include requirements for safety training, availability of safety equipment, hazardous substance exposure warnings, and emergency action and fire prevention plan preparation. Cal/OSHA enforces hazard communication program regulations, which include identifying and labeling hazardous substances, providing employees with Material Safety Data Sheets (MSDSs), and describing employee-training programs. These regulations also require UC Berkeley to prepare emergency action plans, including escape and evacuation procedures. Title 8 also establishes general industry safety orders for bloodborne pathogens, sharps injury prevention, and disposal of infectious wastes. All laboratories that involve the handling of biohazardous materials must comply with OSHA standards.

ASBESTOS AND LEAD PROGRAMS. The removal and handling of asbestos-containing materials is governed primarily by EPA regulations under Title 40 of the CFR but implemented by the Bay Area Air Quality Management District (BAAQMD). This program is described further in Section 4. 2. Fed/ OSHA also has a survey requirement under Title 29 of the CFR, which is implemented by Cal/OSHA under Title 8 of the CCR. These regulations require facilities to take all necessary precautions to protect employees and the public from exposure to asbestos.

The Cal/OSHA lead standard for construction activities is implemented under Title 8 of the CCR. The standard applies to any construction activity that may release lead dust or fumes, including, but not limited to, manual scraping, manual sanding, heat gun applications, power tool cleaning, rivet busting, abrasive blasting, welding, cutting, or torch burning of lead-based coatings. Unless otherwise determined by approved testing methods, all paints and other surface coatings are assumed to contain lead at prescribed concentrations, depending on the application date of the paint or coating. UC Berkeley requires contractors to implement the Hazardous Waste Control Law as well as all necessary precautions to protect employees, students, subcontractors, and visitors from exposure to lead-containing dust.

PORTER-COLOGNE WATER QUALITY CONTROL ACT

Disposal of chemicals into the sanitary sewer is regulated by the Porter-Cologne Water Quality Control Act, codified in the California Water Code. This set of laws essentially implements the requirements of the Federal Clean Water Act and other requirements including East Bay Municipal Utility District (EBMUD) Ordinance 311 and the EBMUD Wastewater Discharge Permit issued to UC Berkeley. These laws prohibit any drain disposal of hazardous wastes and limit the allowable wastewater concentration of a number of specific hazardous substances. Federal and California hazardous waste laws permit laboratories to drain-dispose of some chemicals in small quantities that do not pose a hazard to human health or the environment. Discharge of hazardous wastes into the university sanitary sewer system is prohibited by EBMUD's drain ordinance.

EMERGENCY RESPONSE TO HAZARDOUS MATERIALS INCIDENT

California has developed an Emergency Response Plan to coordinate emergency services provided by federal, State, and local government and private agencies. The plan is administered by the OES and includes response to hazardous materials incidents. OES coordinates the response of other agencies including the Cal/EPA, the California Highway Patrol, the California Department of Fish and Game, the Regional Water Quality Control Board, the BAAQMD, and the City of Berkeley Fire Department.

MEDICAL WASTE MANAGEMENT ACT

In 1990 the California legislature adopted the Medical Waste Management Act, which provides for the regulation of medical waste generators, transporters, and treatment facilities. The California Department of Health Services (DHS) has adopted statewide regulations covering medical waste treatment permits and shares regulatory authority with local programs that choose to enforce the requirements. As a large generator of medical wastes, UC Berkeley must comply with these regulations.

CALIFORNIA RADIATION LAW

California is an "agreement state" with respect to federal radiation law. The agreement is that the State will administer the NRC federal regulations found in Title 10 of the CFR. The DHS is the agency responsible for administering the agreement. Under the agreement, the rules for California must be adequate to protect public health and safety and compatible with those of the NRC. The California rules are codified under Title 17 of the CCR. Under the California Radiation Control Law, the Radiological Health Branch of the DHS administers these rules.

The State's rules govern the receipt, storage, use, transportation, and disposal of sources of ionizing radiation and provide for the protection of users of these materials and the general public from radiation hazards. The DHS controls the use of radioactive materials in California by issuing Radioactive Material Licenses to California users of radioactive materials and radiation-producing machines. Several types of licenses exist, and UC Berkeley has a Broadscope Radioactive Materials License (the license) granted by the DHS.

E.3 REFERENCES

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