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# MASTER EMERGENCY PLAN

LAWRENCE BERKELEY LABORATORY

SEPTEMBER 1993

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LAWRENCE BERKELEY LABORATORY

**MASTER EMERGENCY PLAN**

SEPTEMBER 1993

LAWRENCE BERKELEY LABORATORY  
UNIVERSITY OF CALIFORNIA  
BERKELEY, CA 94720

# MASTER EMERGENCY PLAN

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## 1. INTRODUCTION

### 1.1 Purpose of Master Emergency Plan

The purpose of this Master Emergency Plan is to ensure the maximization of and readiness of Lawrence Berkeley Laboratory's (LBL's) resources before, during, and after an emergency. Emergency response organizations should use this plan as a basis for developing their individual plans. This plan also describes LBL's philosophy and approach to self-help or individual emergency preparedness. The objectives of emergency planning are 1) to save lives, 2) to protect the environment and property, and 3) to return to normal operations as soon as possible.

This plan is based on the philosophy that proper response can only be attained if each individual reacts appropriately and knowledgeably. It is the intent of the plan therefore, to use the talent and specialized knowledge that exists at all levels at the Laboratory. While normal lines of administrative and departmental authority and responsibility will form the basis for emergency action, immediate knowledgeable response at the local level is considered to be the first line of defense. Prompt and proper action by those on the scene will limit the extent of danger to personnel and property, and may avert a disaster. Laboratory management, emergency response groups and other support groups will become involved as outlined herein. Since this plan describes concepts and procedures applicable before, during, and after emergencies, it is in effect immediately upon publication.

This plan meets the requirements of DOE Orders 5500.1B, 5500.2B, 5500.3A, 5500.10 and 5500.7B. LBL is committed to improving its emergency preparedness and response capability as expressed by the Secretary of Energy in SEN 11-89. Locally, this plan is consistent with the LBL Health and Safety Manual (Pub-3000).

Emergency Program Implementation Procedures (EPIPs) that provide the details of actions to be accomplished are provided separately.

#### 1.1.1 Updating the Emergency Plan

This plan will be reviewed annually and updated not later than 30 September, if required. Other updates resulting from organizational changes, results of drills and exercises, or changes based on improved practices will be made as necessary. Changes will be distributed to all Emergency Plan holders in the form of change pages to be inserted in their binders. The Emergency Preparedness Coordinator (EPC) of the Environment, Health and Safety Division is solely responsible for updating the plan. All recommended changes should be directed to the Office of Emergency Preparedness.

#### 1.1.2 Document Control

All copies of the Master Emergency Plan will be sequentially numbered and issued to organizations or individuals by this control number. Issuance will be documented by entering the recipients in a data base maintained by the EPC.

### 1.2 Scope

This plan addresses emergencies classified as "operational" in accordance with DOE 5500.2B. (LBL has no potential for an "energy" or "continuity of government" emergency.) Operational emergencies are classified in three levels: *alert*, *site area emergency* and *general emergency*. Event

classification and Emergency Action Levels are discussed in more detail in Chapter 4, Operational Emergency Event Classes.

This plan applies to all operational emergencies at locations listed in Section 1.4. of this chapter. These include LBL buildings and facilities on the Laboratory main site, on the University of California Berkeley Campus, and at its locations in the cities of Berkeley and Emeryville. Offsite emergency planning incorporates local government and mutual aid responses.

Emergencies that would not be classified as operational emergencies are covered by individual Building Emergency Plans. A widespread disaster could trigger activation of several building emergency plans and thus become an operational emergency. However single events do not normally constitute such an operational emergency.

### **1.3 Concept of Operation**

Site-wide emergency planning is based on a worst case scenario presupposing widespread damage and injury. The most credible hazard that could trigger such an event would be a large earthquake on the Hayward fault, which lies near the western boundary of the main Laboratory site. Such an event could trigger secondary hazards such as fire, landslide, hazardous material spills or releases, and structural damage to buildings. These events would have serious impacts on personnel. Planning for such a scenario will facilitate dealing with emergencies of a lesser nature. Section 1.5, Hazard Assessment and Planning Scenario in this chapter addresses the basis for LBL's Emergency Plan concept.

During a site-wide emergency, LBL will draw upon all existing resources to respond to and mitigate the effects of the emergency. This commitment of resources will include, (but not be limited to) assignment of personnel, provision of supplies, equipment, facilities, and funding, and requesting mutual aid when necessary.

### **1.4 Site Description**

#### **1.4.1 Overview Site Description**

LBL is a multi-program national laboratory operated by the University of California for the Department of Energy. The mission of LBL is to perform multidisciplinary research in general and energy and life sciences. The oversight of LBL operations is assigned to the DOE San Francisco Field Office (DOE/SF). The DOE program office with major programmatic responsibilities for LBL is the Office of Energy Research (ER).

#### **1.4.2 Detailed Facility Description and Physical Attributes of the Site**

LBL is located three miles east of San Francisco Bay (Figure 1-1) and 15 miles northeast of San Francisco in Alameda County, California. The Laboratory occupies a 130-acre site (Figure 1-2) on the west-facing slope of the Berkeley Hills above the University of California Berkeley campus. The boundary between two cities divides the site, with the western three-quarters being in Berkeley and the eastern quarter in Oakland. Much of the surrounding area is urbanized. The LBL site is in the northwest corner of property owned by the Regents of the University of California, and is bounded on the north by single private family homes, and on the west by private multi-dwelling units and a University student hall. The south eastern portion of the UC Regents' property includes recreational facilities and a botanical garden, while the eastern portion of this property is maintained in its natural state. LBL is drained by Blackberry Canyon, which receives drainage

from the central part of the site, and Strawberry Canyon, which generally forms its southern boundary. As a result of the site's hilly terrain, grading and filling have often been necessary to provide suitable building sites. Areas have been built up with soil up to tens of meters thick in some of the original ravines and depressions.

LBL buildings are owned by the DOE and constructed on land leased to the DOE under long-term agreements. Additional University space used for DOE programs is supplied under the terms of the DOE-University of California M&O contract. DOE/SF is responsible for oversight of LBL operations.

LBL's activities are located both onsite and at a number of locations offsite. Approximately 85 percent of the gross office/laboratory space use by LBL is onsite. On-site space consists of approximately 1.6 million gross square feet in 81 buildings (Figure 1-3). The offsite space consists of 21 buildings on the UCB campus and 4 leased buildings elsewhere. Two of the off-site leased buildings are used as warehouse space and one as a printing facility. LBL has environmental, health and safety responsibility for two buildings (the Donner and Calvin Laboratories) on the UCB campus .

The Laboratory was originated on the UCB campus in 1931. In 1940, it was relocated to its present site. It is one of three multiprogram national laboratories operated by the University of California for the DOE. Its present staff of full time and part time employees and students exceeds 3000.

The Hayward Fault, which is a seismically active part of the San Andreas Fault System, trends in a northwest-southeast direction along the base of the hills below LBL and has the potential to produce an earthquake of approximately Richter magnitude 7.5. The San Andreas fault zone, which has potential for a magnitude 8.3 earthquake, lies about 20 miles (32 km) west of the site, offshore beyond the Golden Gate. The San Andreas Fault and the Calaveras fault zone, which lies about 15 miles east of the site, would produce less intense ground shaking at the LBL site than would the Hayward Fault (see Figure 1-4).

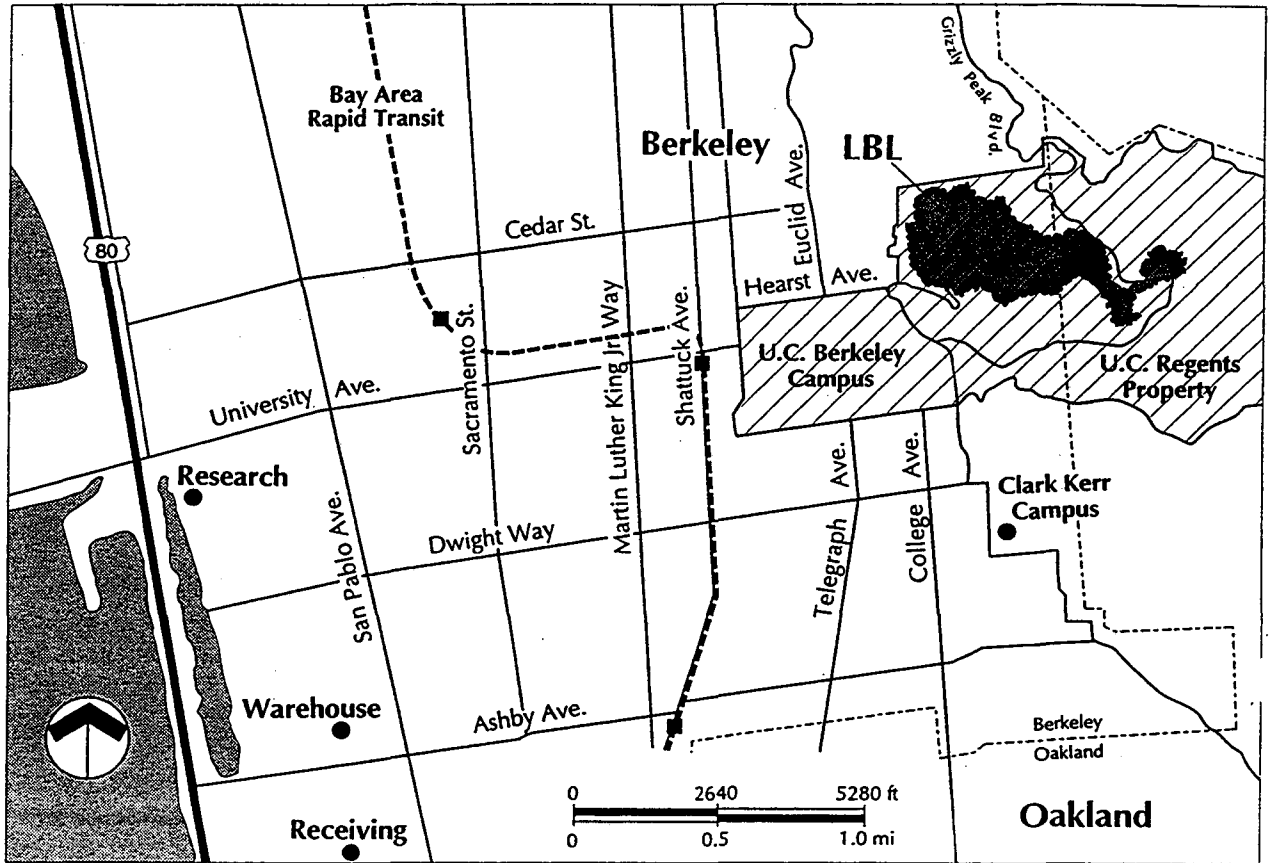


Fig. 1-1. LBL location in City of Berkeley.










-  Residential
-  Commercial
-  Central business district
-  Institution or government
-  Park, recreation, or watershed
-  Thoroughfare
-  BART Station

Fig. 1-2. Land use surrounding LBL and UC campus.

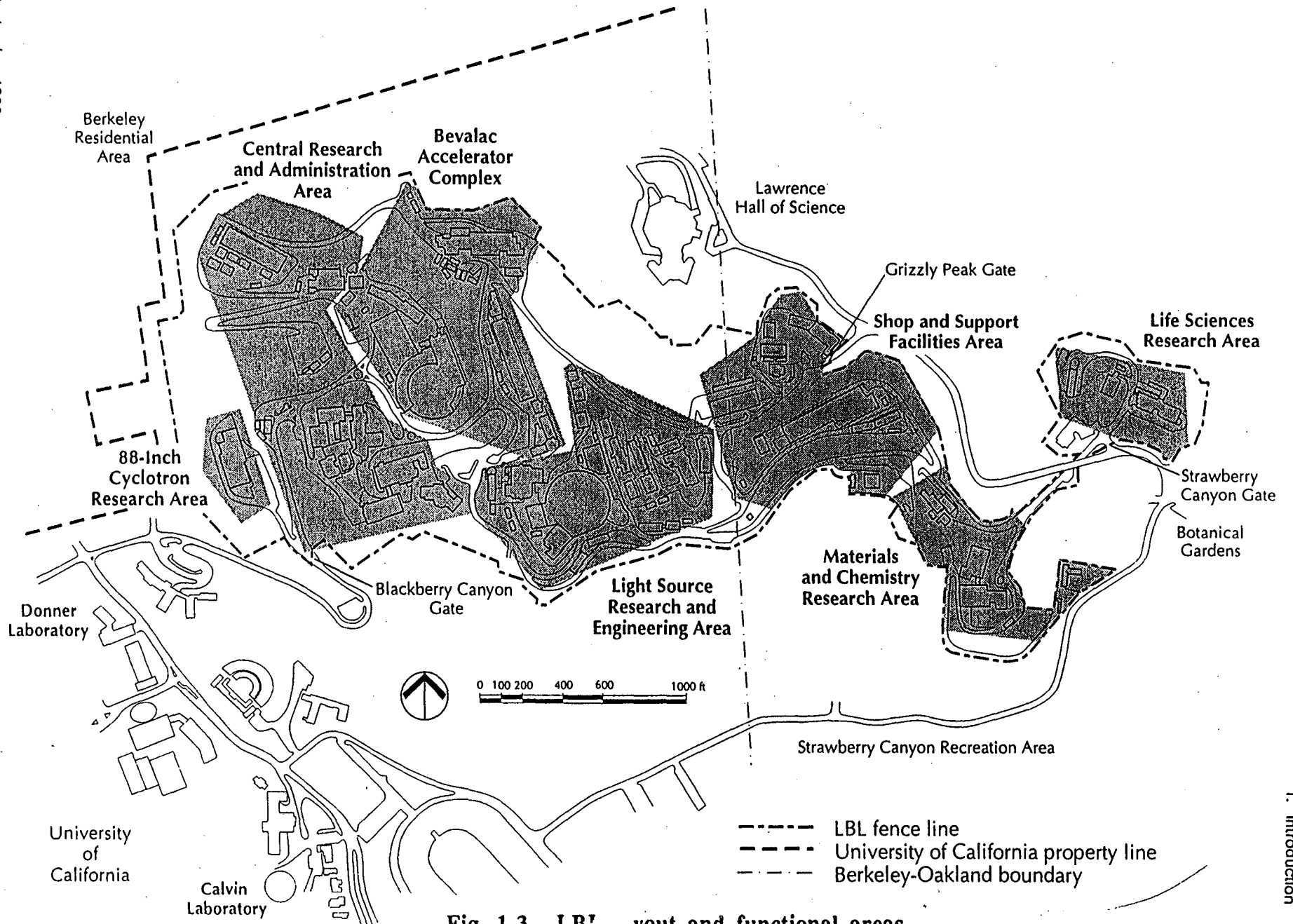


Fig. 1-3. LBL layout and functional areas.

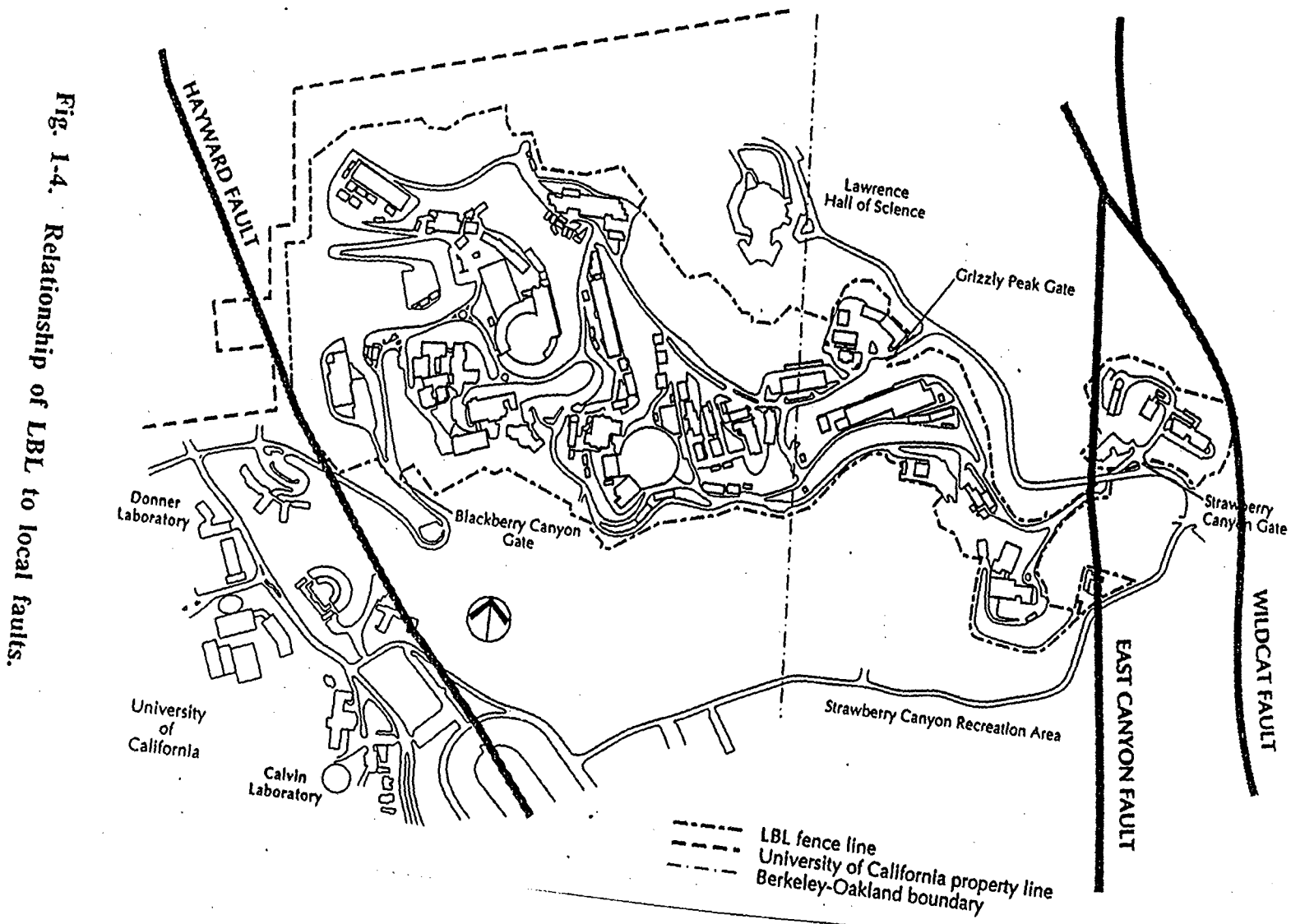


Fig. 1-4. Relationship of LBL to local faults.

September 1993



## ***Meteorology***

LBL, being located east of San Francisco Bay and the Pacific Ocean, benefits from the associated moderate climate. Temperature changes are not dramatic and rarely range below 30°F (-1 C) in the winter or exceed 80°F (27 C) in the summer. Weather patterns are normally influenced by the Pacific jet stream. Winters are usually mild with a rainy season extending from late October through March. Rainfall averages 20 inches (57 cm) but periods of drought and heavy rain are not uncommon. April through September is a period of minimal precipitation because of the northern flow of the jet stream.

Winds generally flow from the west off the Pacific Ocean. An exception occurs when a high pressure system exists over the region, generally centered in Nevada. This situation produces warmer and less humid winds from the east (Diablo winds), which during periods of high fire danger increases the risk of wildland fires.

## ***Population Distribution***

The densely populated cities of Albany, Berkeley, Emeryville, and Oakland are located on the northwest to southwest perimeter of the Laboratory. The most recent censuses for these cities are listed below:

Albany:	16,327
Berkeley:	102,724
Emeryville:	5,740
Oakland:	372,242

To the east of LBL are sparsely populated regions of the Berkeley Hills, with the nearest city being Orinda.

## ***Transportation Systems***

LBL transportation assets include shuttle bus service both on and off site. Figures 1-5 and 1-6 are schematics and schedules of these bus services. There are three LBL gates that allow access and egress. The gate information is found on the same schematics. Site evacuation plans are published separately.

Public transportation offsite includes local bus service and the Bay Area Rapid Transit (BART) System. The closest BART station is located at the intersection of Shattuck Avenue and Center Street in Berkeley. LBL provides bus service to BART.

Major highways near LBL are Interstate 80 which can be reached by traveling west approximately 3 miles (5 km) from the LBL Blackberry Canyon Gate along University Ave. From the Strawberry Canyon Gate Highway 24 is reached by traveling south on Gayley Avenue or College Avenue. The Grizzly Peak Gate on the northeast of the site allows access to a network of small two-lane roads in the Oakland Berkeley Hills. Orinda can be reached through this road network on the eastern slope. Site evacuation by automobile during an emergency will be a challenge and is addressed in the LBL Site Evacuation Plan.

Three major airports serve the Bay Area: San Francisco, San Jose, and Oakland. The San Francisco Airport is west of LBL and can be reached by traveling west on I-80 across the Bay Bridge and traveling south on Highway 101 for 20 miles (32 km). The Oakland Airport is south

of LBL and may be reached by following I-80 south to I-880. The San Jose Airport is south of LBL and can be reached by traveling south on I-880 to San Jose.

Ferry service across San Francisco Bay runs daily from Jack London Square in Oakland to the Ferry Building in San Francisco.

### **Utility Systems**

Public utility systems providing service to LBL are included in Section 1.5, Hazards Assessment and Planning Scenario.

## **1.5 Hazards Assessment and Emergency Planning Scenario**

A hazard assessment in accordance with DOE Order 5500.3A is being developed. The initial screening of threshold planning quantities has been accomplished and a formal assessment will follow. This assessment will provide the technical basis for the emergency management program. The extent of emergency planning and preparedness required for a particular building or area directly corresponds to the type and scope of hazards present and the potential consequences of accidents or events. A hazards assessment includes identification of any hazards unique to a building or area, analyses of potential accidents or events, and evaluation of consequences. Every conceivable situation will not be analyzed and not every response will be preplanned. However, an adequate hazards assessment, in combination with effective emergency planning and preparedness, provides the framework for response to emergencies. Lawrence Berkeley Laboratory is vulnerable to multiple natural and technological hazards. Natural hazards include earthquakes, wildfires, and landslides. Technological hazards include hazardous material spills and releases. Natural disasters trigger secondary events that result in multiple hazards. Breaches of security and terrorist threats are also considered to be possible hazards.

### **1.5.1 Earthquake**

The most credible and potentially devastating hazard facing LBL is a significant earthquake (7.0 or greater) along the Hayward Fault. This fault, west of the site, runs through the Memorial Stadium on the University campus and continues northeast of the Foothill Housing facility. While damage is difficult to predict, a large earthquake on the Hayward Fault with an epicenter in or near Berkeley will cause significant damage in the Berkeley area. LBL will feel the effects, and secondary events, such as fire and hazardous material incidents are entirely possible. The most exhaustive study of the effects of a 7.5 magnitude temblor on this fault was completed in 1987 by the California Department of Conservation, Division of Mines and Geology. This study was published in Special Publication 78 (See Figure 1-4).

The LBL planning scenario is based on the maximum credible earthquake that could occur on the Hayward Fault. The assumed characteristics of this earthquake are: a Richter magnitude of 7.5 (M7.5) that results from the rupture of the entire 100-kilometer length of the fault from San Pablo Bay to east of San Jose; surface faulting that produces horizontal offsets averaging 5 feet (1.5 m) [10 feet maximum (3 m)]; potentially damaging shaking that continues for 25-35 seconds within 20-25 miles (32-40 km) of the fault; and frequent aftershocks that continue for many weeks, including events of M6 or larger. The likelihood of such a M7.5 as in this scenario is much lower than that of a M7 event such as the earthquake of 1868.

While this LBL planning scenario is based upon a maximum credible event for the Hayward Fault, damage patterns would in many respects be similar for an event of smaller magnitude. An M7 event, for example, would result from rupture along only one half the length of the fault and would

produce about 3 feet (1 m) of surface offset. The resulting damage to lifelines, critical facilities, and local utility distribution systems, while not as severe, would affect most of the same facilities along the ruptured segment of the fault. Shaking near the rupture zone would be as severe, but presumably not as prolonged. Ground failures would occur in the same general areas.

The following analysis describes the effects of a 7.5 magnitude earthquake on an area in and around Berkeley, including LBL. This analysis will include possible deaths and injuries, effects on structures, transportation lifelines, utilities, and major lifeline corridors.

### ***Death and Injuries***

Deaths resulting from this scenario are estimated to range from 1,500 to 4,500 depending upon the time and day of occurrence. Hospitalized casualties are estimated to be 3 times the number of deaths, and significant nonhospitalized casualties are estimated at 30 times the number of deaths. Extrapolating from these numbers, it is estimated that LBL will have 3-4 fatalities, 12-15 serious injuries, and 120-150 minor injuries if a major earthquake as described occurred during normal working hours. LBL Health Services should use a worst-case scenario during plan development.

### ***Hospitals near the Fault***

Eight of the 26 general acute care hospitals (99 beds or more) in Alameda and Contra Costa Counties are located within one mile of the Hayward Fault. These eight hospitals represent a bed capacity of 2,300 out of a total of 6,200 available in these major facilities (about 35%). Almost all buildings at these eight sites were constructed before adoption of more stringent hospital building requirements in 1972. Direct damage, restricted access, prolonged loss of public utility services, and reduced public confidence in structures near the fault will require closure of some of these facilities. Thus, one or more hospitals could become an added post-earthquake burden.

### ***Transportation Lifelines***

#### **Trans-Bay Bridges**

The trans-bay bridges will be temporarily closed due to ground and structural failures at the bridge approaches. Roadway clearance, emergency repairs, detours, and bridge inspections will prevent or severely restrict use of these bridges during the initial post-earthquake hours. The Oakland-San Francisco Bay Bridge will be effectively closed by major damage at the eastern approach interchanges and northward along Interstate 80/880; The Richmond-San Rafael, San Mateo, and Dumbarton bridges should be available to limited emergency traffic in less than 36 hours. The Golden Gate Bridge will remain open, but traffic will be severely limited by damage at its southern approaches.

#### **Major Freeways**

**Roadway Structure.** All of the major freeway routes to the East Bay Region from the east and south either cross the Hayward Fault or are otherwise vulnerable to damage by strong shaking and ground failures. Major routes subject to surface fault offset include Interstate 80 at San Pablo, Interstate 580 in East Oakland, Interstate 680 at Fremont and south to Milpitas, Route 24 west of the Caldecott Tunnel and most of Route 13. Ground failures due to liquefaction and strong ground shaking may cause major damage along Interstate 880 from Oakland to San Jose.

**Freeway Bridges.** Virtually all older freeway bridges in the area have been retrofitted to increase their resistance to shaking. Nevertheless, damage to and collapse of some of these

bridges is to be expected. Access to and travel within the East Bay Region will be difficult and will thus be limited to emergency traffic. Most principal routes on the San Francisco and Marin Peninsulas and the western part of the San Jose area would be open to traffic, but subject to major delays and detours.

### **Airports**

The runways of the major Bay Area airports are generally constructed on fill placed over bay mud of varying depths. Their performance when subjected to prolonged shaking is questionable, and liquefaction and differential settlement may render all or portions of many of these runways unusable for larger aircraft. For planning purposes, San Jose Municipal Airport is assumed to be available for larger transport aircraft. San Francisco and Oakland International Airports, the Hayward Municipal Airport, and other secondary Bay Area airports should be available for limited use by small aircraft and helicopters. The Alameda Naval Air Station is expected to be closed.

### **BART System**

The Bay Area Rapid Transit (BART) System will shut down due to lack of electrical power and the need to assess and repair damage. Principal damage will be to the Berkeley Hills tunnels, which will be closed indefinitely as a result of fault rupture. Damage to a few elevated spans is postulated in the East Bay Region. The trans-bay tube and the subway systems should survive with no major damage.

### **Rail System**

Rail service to the Bay area from the east and south will be curtailed due to fault rupture, ground failures at various locations around the Bay perimeter, and structural damage to numerous bridges. Railroad service via the coast route from southern California to San Francisco will be restored rapidly but all other lines to and from the East Bay Region will be blocked for at least the initial 72 hours after the earthquake.

### **Bay Area Ports**

Port facilities in San Francisco are not expected to suffer great damage and therefore will remain open. Operations may be curtailed initially by loss of power and impaired access. In the East Bay Region, the major Port of Oakland and other smaller commercial port facilities at Richmond and in the Carquinez Straits will generally be nonfunctional as a result of prolonged power loss and damage to truck and rail access routes. Within the port areas filled land will settle, disrupting both rails and streets. Damage to oil pipeline and storage facilities at Richmond and Carquinez facilities poses a threat of contamination and fire in those areas.

### **Utility Lifelines**

#### **Communications**

**Local Coordination.** Telephone communications will be overloaded by post-earthquake calls from within and outside the area. This situation will be further complicated by physical damage to equipment due to ground shaking and loss of electrical power. Moreover, not all of the systems in the region are set up to automatically process emergency calls on a previously established priority basis, thus, the overloading of functioning equipment could be very significant.

**LBL Communication System.** LBL has developed a hierarchical system of communications to ensure that communications are maintained both within and outside the Laboratory during major

emergency events. This hierarchical system consists of a combination of the Laboratory's Integrated Communications System (ICS: a digital system for both voice and data), the use of business lines from Pacific Telesis as alternatives to the LBL ICS system, cellular telephones (part of a commercial network), radio systems (both internal, and on local police and fire department networks), and a receive-only satellite system. While the LBL ICS telephone system, microwave towers, etc., are hardened for seismic events, a major earthquake along the Hayward fault is likely to render one or more of these hierarchical communication systems inoperative or inaccessible.

### **Electrical Power**

During some portion of the first 72-hours following the earthquake, all portions of the Bay Area will experience some loss of power. It is reasonable to assume that about one-third of the service connections in the area will be without power for 24 hours. In the urban sections of Oakland and other East Bay cities, including LBL, the power outage should be considered at 100% for the first 24 hours and 75% for an additional 24 hours. LBL standby generators for key facilities are provided for use during total power outages.

### **Water**

Water supply systems in the East Bay Region will be severely crippled in this earthquake scenario. Displacement along the Hayward Fault will heavily damage all major tunnels, aqueducts, and the many distribution systems that cross the fault. The flow of water crossing the fault will be reduced to 10-30% for the first 24 hours. Restoration of water service to all areas east of the fault in the East Bay hills will be greatly delayed. Restoration of full service could take months. LBL has two separate public supplies, three incoming lines, emergency pumping stations, two 200,000-gallon (758,000-liter) storage tanks, and two looped systems (each served by separate on-site tanks).

### **Natural Gas**

Horizontal displacement averaging about 5 feet (1.5 m) across the fault zone will cause thousands of breaks in mains, valves, and service connections. High intensity shaking, causing secondary ground breaks in proximity of the fault zone, will cause many additional breaks in the system. Some fire could occur in streets due to broken gas mains; structural fires will occur as a result of broken service connections. Fault rupture will also cause damage to the larger diameter transmission pipelines where they cross the fault at San Pablo and Fremont. As a result natural gas will be unavailable to all of the East Bay Region from San Pablo to Milpitas. While gas supplies to most areas of the East Bay Region will be restored rapidly, some areas in the hills immediately east of the fault could be without gas for several weeks. Damage will be minimized at LBL due to the automatic shut off valves located throughout the system.

#### **1.5.2 Landslide**

LBL is situated on the western slope of the Berkeley Hills and under conditions of heavy rain and/or earthquake is vulnerable to landslide. While steps have been taken to mitigate this hazard, landslides could occur, which could result in road blockage that impairs access and egress. Landslides, depending on their severity, could trigger secondary events such as utility failures or hazardous material spills, which could result in personal injury. Since many effects of a landslide are similar to those of an earthquake, the same considerations must be included in emergency planning.

### **1.5.3 Wildland Fire**

Drought conditions coupled with warm east winds make LBL vulnerable to wildland fires, an extreme example of which was the Oakland-Berkeley Hills Fire of October 1991. Such wildland fires provide some warning but move very quickly under specific meteorological conditions. These fires could approach LBL from almost any direction and extend to destruction of structures. Depending on the degree of containment and meteorological conditions, the size of such a fire could remain small (an acre or less) or spread to encompass much larger areas. Fires on- or off-site could trigger secondary events such as power failure, closure of roads, reduction or loss of water pressure, and spills or releases of hazardous materials, and could involve multiple casualties.

### **1.5.4 Hazardous Materials**

The hazards assessment in accordance with DOE 5500.3A will address the threat of hazardous materials incidents.

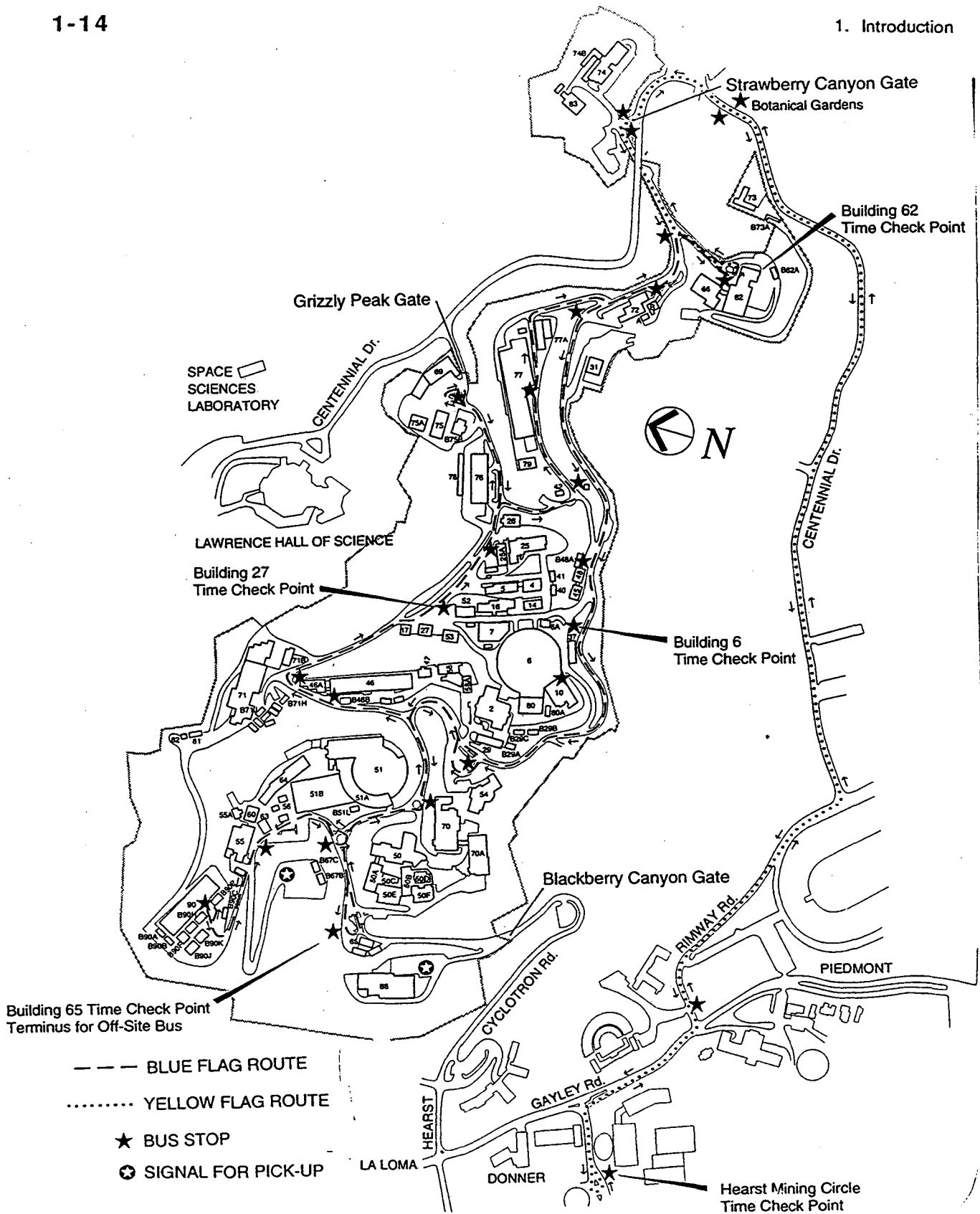


Fig. 1-5. LBL site map with building numbers and bus routes.

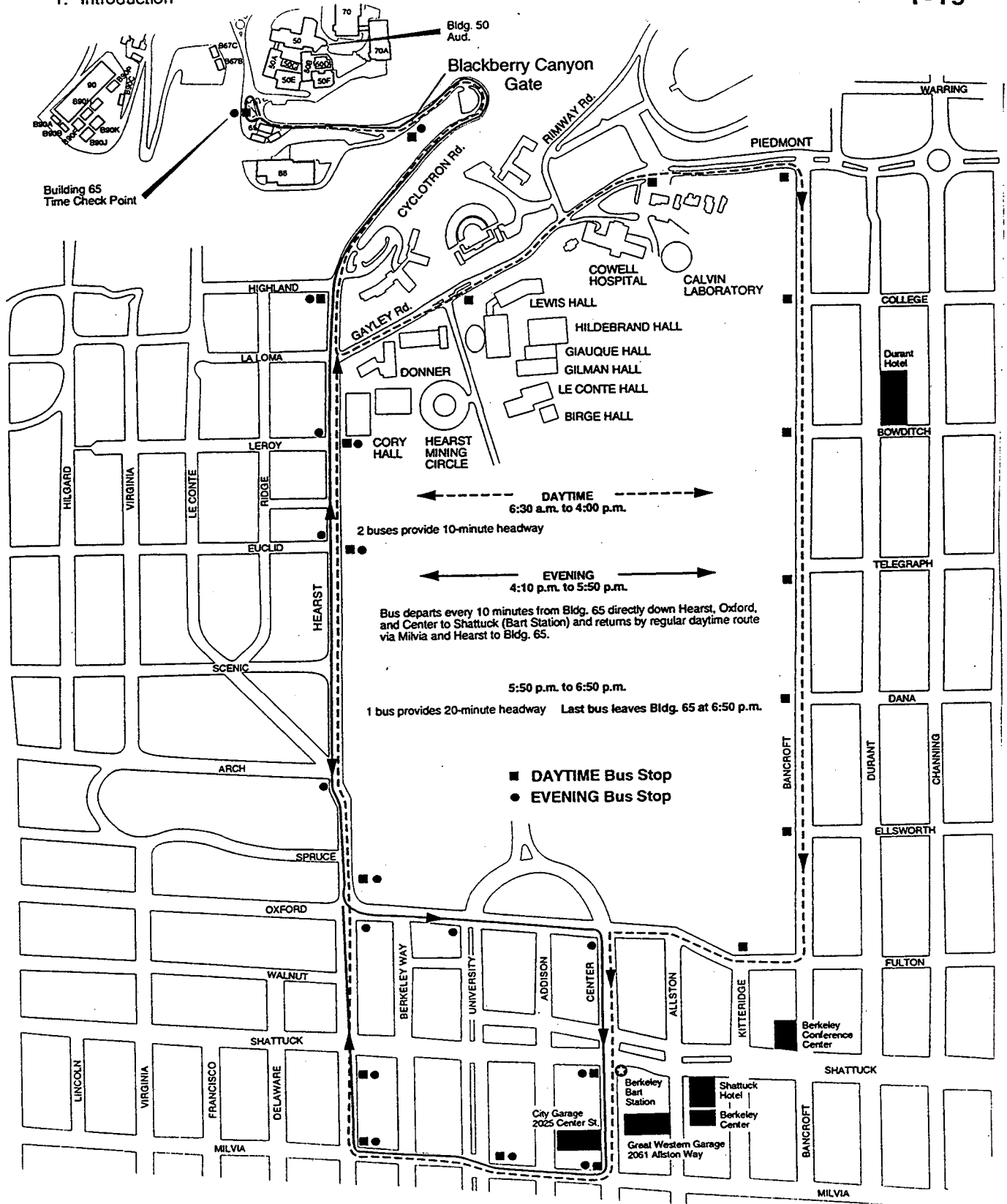


Fig. 1-6. LBL relation to downtown area with LBL bus route.



**2. ORGANIZATION**

## **2. EMERGENCY RESPONSE ORGANIZATION**

### **2.1 Emergency Response Organization Structure**

Emergency preparedness planning is the responsibility of the Emergency Preparedness Coordinator (EPC) in the Environment, Health and Safety Division. The EPC develops this Master Emergency Plan and coordinates it with all Laboratory Divisions. In accordance with the LBL Health and Safety Manual (Pub-3000), Chapter 3A, each LBL employee has an emergency preparedness responsibility to be familiar with building emergency plans. Supervisors are responsible for ensuring that employees are familiar with the emergency plan for their building. Supervisors must assist the Incident Commander during an emergency and be familiar with safety equipment and shutdown procedures. These provisions are LBL's first level of response to an emergency. Professional and volunteer organizations described in the chapter are, by definition, response organizations.

The purpose of emergency planning is to ensure maximum use of resources during emergency response and recovery. The structure of the emergency response organization and that of the normal laboratory may differ depending on the severity of the emergency. This will be discussed in greater detail in Section 2.2. A description of each of these organizations follows.

### **2.2 Environment, Health and Safety Division**

The Environment, Health and Safety (EH&S) Division is assigned the responsibility of providing technical guidance and support in the field of health and safety, including emergency response support as required by LBL Management. To carry out these responsibilities, the EH&S Division maintains a staff of qualified specialists in the disciplines of Environmental Protection, Industrial Hygiene, Health Services Health Physics, Fire Protection, Hazardous Waste Management, and Industrial Safety. Functional descriptions of the departments included in the EH&S Division are given below.

#### **2.2.1 Emergency Services Group**

- Maintains all LBL building emergency plans.
- Conducts emergency drills.
- Establishes and trains Building Emergency Response teams.
- Develops and updates Master Emergency Plan.

#### **2.2.2 Fire Department**

- Provides emergency fire protection services for LBL.
- Participates in statewide fire/rescue mutual aid programs with neighboring fire departments.
- Conducts fire prevention/fire safety education activities.
- Facility (Bldg. 48) serves as the LBL Command Center during operational emergencies.
- First responder for hazardous material releases/spills.
- Provides first responder (BLS) emergency medical care and transportation.
- Coordinates/performs search/rescue operations.

### 2.2.3 Health Services Group

- Provides basic health services including regular and special medical examinations for all LBL personnel.
- Provides health education and a Wellness Program.
- Issues safety and laser glasses.
- Sponsors the Employee Assistance Program (EAP).
- Supports the Human/Animal Use Committee;
- Conducts radiation bioassay services.

### 2.2.4 Industrial Hygiene Group

- Serves as a resource for information on hazardous agents, hazard mitigation methods, and ergonomics.
- Conducts occupational hazard analyses, which includes air monitoring, noise dosimeter, and medical surveillance referrals.
- Helps develop policies regarding chemical hygiene, lab safety, and biohazard control.
- Directs the annual LBL Chemical Inventory collection and issues the HMMP.
- Assesses adequacy of existing engineering hazard controls (e.g., lab hoods) and provides facility design support for selection of hazard control devices.
- Implements the Respiratory Protection Program, the Asbestos Program, and the Lead Program.

### 2.2.5 Radiation Assessment Group

- Is responsible for all radiation-related issues at LBL, including the field operations (i.e., source inventory) responding to requests for information or assistance from LBL employees, etc.
- Performs dosimetry (i.e., issues and measures radiation on radiation badges).
- Transports hazardous materials on the LBL Site, to LBL University campus sites, and to LBL off-site facilities in the City of Berkeley.
- Provides health physics support.

### 2.2.6 Waste Management Group

- Responsible for effectively and efficiently managing the storage and treatment of hazardous waste and radiation waste at the hazardous waste handling facility.
- Responsible for the transport and disposal of hazardous waste, radioactive waste, mixed (hazardous and radioactive) waste, and biohazardous/medical waste off-site in accordance with the provisions of applicable laws and regulations.

### 2.2.7 Environmental Protection Group

- Conducts environmental monitoring at LBL, including measuring air emissions, soil contamination, ground water releases, and surface water releases.
- Prepares applications for all required environmental permits.
- Conducts environmental characterization of the LBL site in accordance with the LBL Site Characterization Plan.

### 2.2.8 Occupational Safety Group

- Responsible for all LBL OSHA-related issues, including investigations and inspections, compiling OSHA statistics, equipment safety, and contractor safety.

### **2.2.9 EH&S Training Department**

- Responsible for developing training courses and establishing a system to implement health and safety training for all LBL employees.
- Responsible for maintaining documentation systems for all EH&S training.

## **2.3 Law Enforcement and Traffic Control**

Law enforcement is provided by the University of California Berkeley Campus Police Department (UCBPD). This group is responsible for the protection of property and personnel at LBL. The UCBPD provides (1) round-the-clock surveillance of Laboratory facilities and equipment and (2) emergency support (i.e., crowd and traffic control) for hazardous material spills/releases or civil disturbances. The department enforces both the laws of the State of California and the regulations of the University of California, and conducts preliminary investigations to determine violations of the laws of the State of California. The UCBPD patrols all areas of the Laboratory and responds to alarms in all areas of the Laboratory as well as to five off-site, non-campus LBL operational locations.

## **2.4 LBL Emergency Response Teams**

Emergency Response Teams are readily available to assist in a myriad of emergencies. All teams regularly participate in site-wide drills to ensure emergency preparedness. These teams are described below.

### **2.4.1 Amateur Radio Operators**

This team, administered by the Emergency Preparedness Coordinator, communicates outside LBL via amateur radio operators using both personal and Laboratory equipment. It responds automatically during a widespread emergency by providing backup communications services.

### **2.4.2 Ambulance Team**

This team is administered by the Fire Department. Should the need arise, it assists the Fire Department by manning three delivery vans that can serve as temporary ambulances. The team responds automatically during any widespread emergency, and consists of three persons who are certified in advanced first aid and CPR.

### **2.4.3 Building Emergency Teams**

These teams are administered by the Building Managers who report to the Emergency Preparedness Coordinator in matters concerning emergency preparedness. Each occupied building has an Emergency Team headed by an Emergency Team Leader. The team's primary responsibility is to assist the Building Manager until a Professional Emergency Response Group arrives. A list of Building Managers is provided in the LBL Phone Directory.

### **2.4.4 Facility Inspection Teams**

There are four teams consisting of Engineers, Safety Specialists, Maintenance personnel and EH&S Specialists. They report to and are dispatched from Building 76. These inspection teams inspect building(s) for structural and facility damage after seismic activity or explosions (e.g.,

following an earthquake). The Chief Structural Engineer of the Facilities Department coordinates the planning and training for the team. Leaders have been designated for each team.

#### **2.4.5 Command Center Team**

This team is administered by the Emergency Preparedness Coordinator. The team is made up of a broad cross-section of management personnel led by the Associate Laboratory Director for Operations. The members report automatically to the Command Center following any major emergency situation. The team's function is to gather emergency incident information and coordinate resources to deal with each incident.

#### **2.4.6 Auxiliary Fire Fighting Team**

This team is administered by the Fire Department. It assists the Fire Department during a situation when additional trained personnel are needed. Team members undergo training and orientation in all aspects of fire fighting, and respond automatically following a widespread event, such as a large earthquake.

#### **2.4.7 Auxiliary First Aid Team**

This team is administered by the Health Services Group and it assists by providing support during any multi-casualty situation. Following any widespread disaster situation, such as a severe earthquake, team members automatically meet at Building 26 or Building 55.

#### **2.4.8 Traffic Control Team (ATOMS)**

This team is administered by the Emergency Preparedness Coordinator and the team leader. This LBL team assists the UCBPD with traffic control whenever needed. Following a disaster, such as a large earthquake, team members report automatically to assigned posts. They will assist with traffic control and urge personnel not to use their automobiles so that roads may remain clear for emergency vehicle use.

### **2.5 Facilities Department**

#### **2.5.1 Architecture and Engineering**

Architecture and Engineering is responsible for the planning, design, management and inspection of the construction of physical plant facilities and utilities. Personnel include Architects, Civil, Structural, Mechanical and Electrical Engineers with design knowledge of all facilities who play a strong engineering advisory and consultative role to the Incident Commander or to those responsible for the operation and maintenance of the plant.

#### **2.5.2 Facility Maintenance and Operations**

Facility Maintenance and Operations is responsible for the operation and maintenance of the physical plant facilities, including utilities. Personnel include Maintenance Technicians who are resident operators of the physical plant 24 hours per day, 7 days per week, Electricians, Plumbers, Steamfitters, Carpenters, Painters, Laborers and Custodians. Equipment for emergency use includes standby generators, dump trucks, loaders, mobile crane, jacks, etc.

These personnel may also play an operational support or advisory role to the Incident Commander if necessary.

Facility Maintenance and Operations also serves as the dispatch center for the Facility Inspection Teams. The Facility Maintenance and Operations coordinator in the ECC will notify his/her dispatch center in Building 76 of the need to send teams to assess damage throughout the Laboratory.

## **2.6 Electronics Engineering Technology Department**

This department provides support for the Laboratory-wide radio system, electronic security and alarms, the LBL radio paging system, and the site-wide public address system. During an emergency this department will provide support and repair services to keep these emergency systems operational.

## **2.7 Materiel Management Department**

This department operates the Storerooms, Inventory Management and Transportation of Materials Sections. During and following an emergency, this department will provide materials and supplies from stores stock as necessary. The Transportation Section will provide drivers for the three delivery vans equipped as auxiliary ambulances, who will rendezvous with the volunteer Ambulance Team at a prearranged location following a major quake or as instructed via radio or PA in any other event. This department will also provide assistance with the transport of material as required.

## **2.8 Business Services Department (Bus Services and Cafeteria)**

This department operates the Bus Transportation System and Motorpool, and oversees the Cafeteria and Vending Machine Operations. During and following an emergency, it will provide bus transportation as necessary and keep the cafeteria open, if building conditions permit, to feed and shelter those persons required to stay at the Laboratory, as well as provide management and liaison for any necessary function in its jurisdiction.

## **2.9 Emergency Direction and Control**

During operational emergencies requiring activation of the Emergency Command Center, the LBL Director has overall responsibility for emergency response and policy. If the Director is not on site, the sequence of delegated authority to act for the Director is as follows:

1. Laboratory Deputy Director
2. Associate Laboratory Director, Operations
3. Associate Laboratory Director, Administration
4. Associate Laboratory Director, Planning and Development
5. Division Director, Environment, Health and Safety
6. Division Director, Accelerator and Fusion Research
7. Division Director, Engineering
8. Division Director, Nuclear Science.

To assist the Director during operational emergencies there are two groups: 1) the Emergency Response Organization (ERO), which consists of the Emergency Command Center team and the first-responder groups, and 2) the Policy Group, which includes the Deputy Director and

Associate Laboratory Directors. Typically, the Associate Laboratory Director, Operations is the Incident Commander in charge of the ERO and the Deputy Director chairs the Policy Group. This emergency management organization is consistent with the Incident Command System used by federal, state, and local jurisdictions to manage emergency response to disasters.

Both of the above groups report to the Emergency Command Center upon notification of a major emergency.

### **2.9.1 The Emergency Command Center (ECC)**

The ECC is located in the Firehouse, Building 48, and is activated under the following conditions:

1. Upon request of the On-Scene Commander (OSC) due to the incident requiring resources much greater than those normally employed during response.
2. The Associate Laboratory Director for Operations may activate the Command Center based on the emergency situation.
3. The Director may activate the Command Center.

The Emergency Command Center staff have many functions to perform. The members of the Command Center staff and their primary functions are listed below. Detailed procedures are found in Appendix A, Emergency Command Center Activation, and in the Emergency Program Implementation Procedures (EPIPs) provided separately.

### **2.9.2 The Incident Commander**

The Incident Commander (IC) coordinates and manages the Laboratory's response to a disaster. The Command Center Staff report to the IC during activation of the ECC.

### **2.9.3 The Fire Coordinator**

The Fire Coordinator manages the activities of personnel engaged in fire and rescue as well as other emergency operations, maintains communications with field units, evaluates status reports, makes decisions regarding the commitment of resources, determines the need for additional resources, and keeps the IC informed.

### **2.9.4 The Law Enforcement and Traffic Control Coordinator**

The Law Enforcement and Traffic Control Coordinator manages the activities of law enforcement and traffic control personnel on site and coordinates these activities for LBL facilities off site, manages the movement of people from hazardous or threatened areas to lower risk areas, maintains communications with field units; supervises the Auxiliary Traffic Control Team, evaluates status reports, makes decisions regarding commitment of resources, determines the need for additional resources and keeps the IC informed.

### **2.9.5 The Medical Coordinator**

The Medical Coordinator ensures that all personnel involved in medical support are apprised of the current status of the disaster to ensure medical resources are properly assigned; maintains

communications with the clinic and/or triage areas on scene; maintains communications with Alameda County Emergency Medical Services; coordinates with the presiding physician on commitment of resources and the need for additional supplies; manages and supports public health measures; supports efforts in communicable disease control; and keeps the IC informed.

### **2.9.6 The Facility Maintenance and Operations Coordinator**

The Facility Maintenance and Operations Coordinator manages the allocation of resources required for emergency debris removal, ventilation systems, alarm systems, road clearance and repair, utility repair and restoration; maintains communications with field units and local utility companies; makes recommendations on commitment of resources; determines requirements for additional resources and keeps the IC informed.

### **2.9.7 The Facility Coordinator**

The Facility Coordinator accumulates damage assessment information; maintains communications with damage assessment teams; makes decisions on re-occupying vacated buildings; manages and commits engineering resources; determines the need for additional resources and keeps the IC informed.

### **2.9.8 The Logistics Coordinator**

The Logistics Coordinator manages logistics operations in support of disaster response and recovery to include transportation, purchasing/procurement and distribution of available stored supplies and equipment; manages cafeteria operations; provides auxiliary ambulance support; keeps records of supplies and equipment used to respond to the emergency and keeps the IC informed.

### **2.9.9 The Public Information Officer**

The Public Information Officer (PIO) or alternate handles all inquiries from the media concerning any emergency incident. All media and public contact will be referred to that person or their designee. The PIO keeps the IC informed of all requests for information and inquiries.

### **2.9.10 The Environmental Health and Safety Coordinator**

The Environmental Health and Safety Coordinator coordinates activities of EH&S Groups in the performance of monitoring and evaluation of spills and releases. Ensures regulatory agencies are informed, if appropriate. Coordinates the commitment of EH&S resources with the exception of Fire and Health Services which are represented in the ECC. Keeps the IC informed.

### **2.9.11 The Status/Planning Coordinator**

The Status/Planning Coordinator gathers, analyzes and coordinates information on the nature, severity and extent of an emergency and response operations. Briefs the IC and other ECC staff on the overall status of operations.



**2.9.12 The Radio/PA Coordinator**

The Radio/PA Coordinator maintains readiness of all Radio/PA communication equipment and coordinates normal and emergency use. Operates the Building Manager radio network and keeps the IC informed.

**2.9.13 The Integrated Communication System Coordinator**

The Integrated Communication System Coordinator maintains readiness of all ICS Telephone and Network systems and communication equipment, and coordinates normal and emergency use.

**3. OFF-SITE RESPONSE**

### **3. OFF-SITE SUPPORT RESPONSE**

#### **3.1 General**

Some emergencies may warrant the interface, coordination, and utilization of offsite organizations and agencies at the federal, state, and local level. Agreements have been made with offsite agencies to provide support services, which include medical assistance, fire control, evacuation, ambulance services, and law enforcement. Since it is imperative that such support be provided on short notice, written agreements have been entered into with local support agencies. These written agreements outline the support services that will be provided when requested. These requests for assistance will be initiated by the Incident Commander. Requests to local jurisdictions will be in accordance with the written agreement. Request for federal assistance will be made through the Department of Energy San Francisco Field Office (DOE/SF).

#### **3.2 Communications**

Communications with participating offsite response agencies must be in clear text; code language will not be used. During ECC activation the LBL Fire Department Dispatcher will convey mutual aid requests for fire, medical, and police support. Other offsite support will be requested by the appropriate service coordinator in the ECC. All requests for mutual aid must be approved by the IC.

#### **3.3 Local Support Services**

LBL is located in Alameda County and its main site is located in the Cities of Berkeley and Oakland. Alameda County maintains an emergency operations center and has a full time emergency management staff. Alameda County has been designated as an operational area by the State Office of Emergency Services (OES) and as such, maintains direct satellite communications with state agencies and serves as the focal point for emergency responses in Alameda County. The Cities of Berkeley and Oakland have designated emergency managers and can activate an EOC during emergencies.

##### **3.3.1 Fire Support**

LBL participates in the California Master Mutual Aid Agreement whereby fire support may be requested through the local mutual aid coordinator or directly through the Berkeley Fire Department.

##### **3.3.2 Medical Support**

LBL has an agreement with the Berkeley Fire Department for paramedic ambulance support to the Laboratory. This support may be requested from the Berkeley Fire Department by the LBL fire dispatcher. LBL also has a memorandum of understanding with Alta Bates Hospital for the treatment of patients contaminated with radiation.

##### **3.3.3 Hazardous Material Controls**

Although LBL has the capability to respond to and control spills and releases of hazardous materials, additional support is available from the Berkeley Fire Department HAZMAT Unit. This

support is available under the mutual aid agreement and is requested through the LBL Fire Department dispatcher.

### **3.3.4 Law Enforcement Support**

LBL's law enforcement support is provided by the Police Department of the University of California at Berkeley through a memorandum of agreement. In addition to the daily police services, the UCBPD will provide a Police Lieutenant to the LBL ECC during ECC activation to serve as the Law Enforcement Coordinator. The ECC Law Enforcement Coordinator is requested through the UCBPD Dispatch Center.

### **3.4 State of California Support Services**

The State Office of Emergency Services in Sacramento maintains regional offices to facilitate support and emergency assistance. LBL is located in the OES Coastal Region with its headquarters in Pleasant Hill. During a widespread local disaster, regional offices provide assistance to local jurisdictions. LBL will notify the Coastal Region Office upon activation of the ECC. Communications and coordination with the Coastal Region Office will remain in effect until the emergency conditions are mitigated.

### **3.5 Federal Assistance**

Federal assistance may be requested through the DOE/SF representative to the LBL Command Center. Depending on the nature of the emergency, support from the following federal agencies may be requested:

- a. Federal Emergency Management Agency (FEMA)
- b. U.S. Coast Guard
- c. Environmental Protection Agency
- d. Federal Bureau of Investigation

### **3.6 Memoranda of Agreement/Understanding**

All Memoranda of Agreement and Understanding (MOAs and MOUs) are on file in LBL Building 48, Room 108 (Office of the Emergency Preparedness Coordinator). Following are general descriptions of these MOAs and MOUs:

#### **3.6.1 Emergency Medical Support with the City of Berkeley**

This mutual aid agreement (signed November 23, 1982) sets forth the procedures for emergency medical mutual aid between the City of Berkeley and LBL.

#### **3.6.2 Bay Area Inter-County Fire Mutual Aid Plan**

This document, issued March 12, 1987 by the County Fire Mutual Aid Coordinator, describes procedures for requesting fire mutual aid from other counties and cities in the Bay Area.

**3.6.3 Fire Mutual Aid with the City of Oakland**

This agreement, signed October 26, 1982, describes the fire support mutual aid agreement with the City of Oakland.

**3.6.4 Emergency Radiological Assistance Agreement with  
Alta Bates Hospital**

This agreement, signed May 30, 1984, sets forth the terms under which Alta Bates Hospital will treat radiation contaminated patients.

**3.6.5 Law Enforcement Agreement with the University of California,  
Berkeley**

This agreement, signed May 28, 1992, outlines the law enforcement services to be provided to LBL by the University Police Department.



## 4. EVENT CLASSIFICATION

### 4.1 General

Incidents, accidents, and other events that might be considered unusual are classified in accordance with DOE Orders 5000.3A or 5500.2B. Event classification in accordance with DOE 5000.3A is prescribed in the LBL Health and Safety Manual (Pub 3000), Chapter 4. DOE Order 5500.2B describes the broad categories of emergencies, which are *operational*, *energy*, *continuity of government* and *other*. LBL is vulnerable only to operational emergencies. The other broad categories do not apply.

Operational emergencies are significant accidents, incidents, events, or natural phenomena which have, or can potentially, seriously degrade safety or security of DOE facilities. Operational emergencies apply to DOE reactors, and other DOE facilities (nuclear and non-nuclear) involved with hazardous materials; DOE safeguards and security events; and transportation accidents involving hazardous material under DOE control. LBL is not a nuclear reactor facility but falls into the non-nuclear category for handling hazardous materials.

The three classes and definitions of operational emergencies listed in order of increasing severity are:

**Alert.** Events in progress or having occurred that involve an actual or potential substantial reduction of the level of facility safety and protection. Any environmental release of hazardous materials is expected to be limited to a small fraction of the appropriate Protective Action Guideline (PAG) or Emergency Response Planning Guideline (ERPG) onsite.

**Site Area Emergency.** Events in progress or that have occurred involving actual or likely major failure(s) of facility safety or safeguards systems needed for the protection of onsite personnel, the public health and safety, the environment, or national security. Any environmental releases of hazardous materials are not expected to exceed the appropriate PAG or ERPG exposure levels offsite.

**General Emergency.** Events in progress or having occurred that involve actual or imminent catastrophic failure of facility safety systems with potential for loss of confinement integrity, catastrophic degradation of facility protection systems, or catastrophic failure in safety or protection systems threatening the integrity of a weapon or test device that could lead to substantial offsite impacts. Any environmental release of hazardous materials can reasonably be expected to exceed the appropriate PAG or ERPG exposure levels offsite.

### 4.2 Emergency Action Levels

Emergency Actions Levels (EALs), the specific criteria used to recognize and categorize events, will be developed for the spectrum of potential operational emergencies identified by the hazards assessment. EALs form the basis for notification of and participation by offsite organizations, and for determining what and when protective measures will be implemented. EAL initiating conditions will be specifically identified in each applicable building or complex. Specific EALs are generally of two types—symptomatic or event. The distinction between the two is based on the available methods of detecting and recognizing the event initiating conditions.

*Symptomatic-based EALs* are based upon one or more observable conditions or parameter values (i.e., symptoms) that are measurable over some continuous spectrum. They are often the same indicators used by operational personnel to monitor building operation. Operating staff are trained

to recognize off-normal readings, identify the probable causes, recognize the potential consequences, and take corrective actions. The level of severity indicated by these symptoms is directly related to the facility's hazardous materials confinement barriers, other symptoms that occur simultaneously, and the ability of personnel to gain control and bring the indicator(s) back to safe levels. The resulting EALs consist of specific quantified values that require no additional interpretation by the user. The correct emergency class can be determined by comparing the observed value to the EALs in the event classification procedure.

*Event-based EALs* address the occurrence of discrete events with potential safety significance. The level of severity is determined by the degree to which hazardous material confinement barriers are either failed or challenged as a result of the event and the ability of personnel to gain control of the situation. Methods available to detect and quantify event initiating conditions are often limited. The resulting EALs are usually stated in terms of the overall event descriptor and may require a separate definition of what constitutes the event, for example, the recognition that an event has occurred may in itself become the EAL. Event classification requires the interpretation of one or more qualitative conditions or discreet observable indicators to determine if the existing situation matches the description contained in the event classification procedure.

The development of the *event* based EALs is the approach used by the Laboratory, recognizing that there are initiating conditions that require a symptomatic based approach. Quite often event-based EALs can be restated in more quantitative (i.e., symptomatic) terms. The quantitative nature of the symptomatic-based EALs make them the preferable method at sites whose primary function is research into and/or manufacturing of nuclear substances. LBL's program scope is primarily non-nuclear, consequently the event based approach is the preferable and more appropriate method.

Table 4-1 describes LBL's emergency action levels developed using the event based criteria. This table should be used to classify events occurring at LBL.

### 4.3 Emergency Actions

Response to events that fall into the emergency classifications listed above require the commitment of significant resources. The authority to commit such resources often lies with senior management. During the onset of an emergency it is not always possible to initiate actions and mobilize resources in a timely fashion while still complying with the standard management approval process. The system of EALs and event classification has been created to ensure rapid recognition of accidents and timely commitment of resources. The system constitutes a structure of pre-approved decisions agreed upon by senior management that allow on-site supervisory personnel to make rapid decisions affecting personnel, facilities, and resources in response to an emergency. The immediate action of Professional Emergency Response Groups are summarized as follows: *Alert* in Table 4-2, *Site Area Emergency* in Table 4-3, and *General Emergency* in Table 4-4.



Table 4.1. Emergency Action Levels (Event Based).

Event Classification	Structure Fire	Wild land Fire	Earthquake	Hazardous Material Radiological Release /Spill	Security	Other
Alert	Major structure fire with actual/potential degradation of safety levels. Fire uncontrolled >30 minutes	Offsite wild land fire that threatens the main site or off site facilities. Fire could reach lab facilities within 3 hours	Major earthquake > 6.0 magnitude affecting the Bay Area. Structure damage to facilities. Potential degradation to safety systems.	Uncontrolled release of hazardous or radiological material resulting in onsite exposures limited to small fractions of PAG/ERPGs.	Imminent loss of physical control of a facility containing hazardous material. Potential releases expected to be a small fraction of PAG/ERPG onsite	Any act or event not covered in this table. Consequences of the event meet the criteria of the Emergency Action Level described in paragraph 4.1 in Chapter 4 of this plan.
Site Area Emergency	Major structure fire threatening the safety of onsite personnel. Any releases of hazardous materials not expected to exceed PAG/ERPG exposure levels offsite	Offsite wild land fire that threatens the main site or off site facilities. Fire could reach lab facilities within 2 hours.	Major earthquake > 6.0 magnitude affecting the Bay Area. Structure damage to facilities. Actual on likely degradation of safety systems. Possible releases of hazardous materials onsite. Releases offsite not expected to exceed PAG/ERPG exposure levels.	Uncontrolled release of hazardous or radiological material resulting in offsite releases not expected to exceed PAG/ERPG levels offsite.	Malevolent acts resulting in major failures of protective systems resulting in loss of control of a building containing hazardous material. Releases could exceed PAG/ERPG levels onsite.	
General Emergency The initial screening of threshold planning quantities indicate that LBL has no potential for a General Emergency.						

Table 4.1. Emergency Action Levels (Event Based), continued.

Event Classification	Structure Fire	Wild land Fire	Earthquake	Hazardous Material Radiological Release /Spill	Security	Other
Alert	Major structure fire with actual/potential degradation of safety levels. Fire uncontrolled >30 minutes	Offsite wild land fire that threatens the main site or off site facilities. Fire could reach lab facilities within 3 hours	Major earthquake > 6.0 magnitude affecting the Bay Area. Structure damage to facilities. Potential degradation to safety systems.	Uncontrolled release of hazardous or radiological material resulting in onsite exposures limited to small fractions of PAG/ERPGs.	Imminent loss of physical control of a facility containing hazardous material. Potential releases expected to be a small fraction of PAG/ERPG onsite	Any act or event not covered in this table. Consequences of the event meet the criteria of the Emergency Action Level described in paragraph 4.1 in Chapter 4 of this plan.
Site Area Emergency	Major structure fire threatening the safety of onsite personnel. Any releases of hazardous materials not expected to exceed PAG/ERPG exposure levels offsite	Offsite wild land fire that threatens the main site or off site facilities. Fire could reach lab facilities within 2 hours.	Major earthquake > 6.0 magnitude affecting the Bay Area. Structure damage to facilities. Actual on likely degradation of safety systems. Possible releases of hazardous materials onsite. Releases offsite not expected to exceed PAG/ERPG exposure levels.	Uncontrolled release of hazardous or radiological material resulting in offsite releases not expected to exceed PAG/ERPG levels offsite.	Malevolent acts resulting in major failures of protective systems resulting in loss of control of a building containing hazardous material. Releases could exceed PAG/ERPG levels onsite.	
General Emergency  The initial screening of threshold planning quantities indicate that LBL has no potential for a General Emergency.						

Table 4.2. Alert: Response Action Guideline.

EVENT	RESPONSE	ACTION
Fire, Haz Mat or Security	Incident Comdr.	Partial or full ECC activation and management
	FIRE	Respond to and mitigate localized emergency
	UCBPD	Respond for security and crowd control
	EH&S Emerg. Prep	Haz Mat clean up and corrective measures Assists ECC management and coordinates ECC support
	BET	Assist with evacuation and/or crowd control
	M&O	Alarm maintenance and necessary repairs & utility operations
	FAE	Hazard Assessment: structural and roads
	Medical	Necessary first aid or medical assistance
	Cog. Div. Dir.	Restoration of facility, personnel and operations
	Pub Info Dept.	Prepare response to information requests
	Radio/PA	Assess system status, assist with evacuation and public information
	ICS	Assess system status and assist emergency communication/response
	Logistics	If necessary address resource requests

Table 4.3. Site Emergency: Response Action Guideline.

EVENT	RESPONSE	ACTION
Fire, Haz Mat or Earth Quake	Incident Comdr.	ECC activation and management
	FIRE	Respond to and mitigate SITE emergency, coordinate mutual aid
	UCBPD ATOMS	Respond for security and crowd control Assist with traffic and crowd control
	EH&S Emerg. Prep	Haz Mat clean up and corrective measures Assist ECC management and coordinates ECC support
	BET	Assist with evacuation and/or crowd control
	A&E	Road clearance and essential repairs utility operations
	PLANT ENG. Damage Assess	Hazard Assessment: structural and roads Responsible for initial damage assessment
	MEDICAL	First aid, medical assistance, triage and assist with transport
	STAT/PLAN	Coordinate emergency information and planning
	LOGISTICS	Coordinate resource status, requests and response
	Cog. Div. Dir.	Restoration of facility, personnel and operations
	PUB INFO	Prepare for information requests from Media and public
	RADIO/PA	Assess system status, assist with evacuation and public information
ICS	Assess system status and assist emergency communication/response	

Table 4.4. General Emergency: Response Action Guideline.

EVENT	RESPONSE	ACTION
Fire, Haz Mat or Earth Quake	Incident Comdr.	ECC activation and management
	FIRE Aux. Fire Team	Respond and mitigate GENERAL emergency, coordinate mutual aid Assist with emergency mitigation and rescue
	UCBPD ATOMS	Respond for security and crowd control Assist with traffic and crowd control
	EH&S Emerg. Prep	Haz Mat clean up and corrective measures Assist ECC management and coordinates ECC support
	BET	Assist with evacuation and crowd control
	FMO	Road clearance and critical structural/road repairs and utility operations
	FAE Damage Assess	Hazard Assessment: structural and roads Responsible for initial damage assessment
	MEDICAL Ambul. Team	First aid, medical assistance, triage and assist with transport Assist Medical personnel with emergency transport
	STAT/PLAN	Coordinate emergency information and planning
	LOGISTICS	Coordinate resource status, requests, response and staging area
	Cog. Div. Dir.	Restoration of facility, personnel and operations
	PUB INFO	Prepare briefing for Media and public
	RADIO/PA HAM Oper.s	Assess system status, assist with evacuation and public information Provide back up communications
ICS	Assess system status and assist emergency communication/response	



## **5. NOTIFICATION AND COMMUNICATION**

### **5.1 General**

Recognition of emergencies and the importance of timely notification is the responsibility of LBL employees, guests, and contractors. In accordance with LBL Health and Safety Policy, each employee, guest, and contractor must be familiar with the Building Emergency Plan for the building or complex in which he or she works. These plans contain information on notification procedures. Employees normally report emergencies by dialing 7911 or by pulling fire call boxes. Once the incident is reported to the professional first responder, reporting requirements are in accordance with DOE Orders 5000.3A and 5500.2B.

### **5.2 DOE 5000.3A Notification**

Incidents or events not classified as operational emergencies in accordance with DOE 5500.2B must be reported as prescribed by DOE 5000.3A. LBL Occurrence Reporting and Procedures are contained in Chapter 4 of the LBL Health and Safety Manual (Pub-3000).

### **5.3 DOE 5500.2B Notifications Offsite**

All operational emergencies (alert, site area alert, and general emergencies) will be classified in accordance with DOE 5500.2B. These emergencies require activation (full or partial) of the emergency command center. The IC is responsible for ensuring notifications are made to the following agencies/organizations:

DOE/SF  
Alameda County  
Cities of Berkeley and Oakland  
State OES Coastal Region

### **5.4 DOE 5500.2B Notifications Onsite**

The communications system described in this chapter may be used to notify the general Laboratory population of any emergency. These systems may also be used to notify the emergency response organizations and provide instructions to employees. Should an emergency occur during other than normal working hours, employees may call toll free 1-800-445-5830 for recorded emergency information pertaining to the Laboratory. Messages for emergency response team members may also be recorded at this number.

## **5.5 Communications**

### **5.5.1 Communication Systems/Equipment Description**

The Laboratory Communications Systems include a VHF multi-channel radio system, a site wide-radio paging system with telephone access, a site-wide public address system, an in-house telephone system with battery backup, and a backup microwave link to LLNL. In addition to these electronic means of communication, messengers are available.

### **5.5.2 Emergency Alarms**

Alarms reported via telephone through the emergency extension 7911 are handled by the Fire and UC Police Services Dispatchers, who then alert the appropriate response unit. Automatic alarms are handled by either the Fire or UC Police Services.

### **5.5.2 Tactical Communication Systems**

#### ***UCB Police Department***

The UC Police Department operates independently from LBL. However its dispatch center has an LBL telephone extension installed. Its dispatch radio console is also connected directly to the LBL Fire Department and Facilities radio base stations. The UCBPD officers and mobile units are unable to communicate with LBL directly by radio; however the patrol vehicle is equipped with a cellular telephone.

#### ***LBL Fire Department***

LBL fire engines, the ambulance, and dispatch center are equipped with the following high-band VHF channels:

- LBL Fire Channels 1 and 2
- Building Manager
- Berkeley Fire Channels 1 and 2
- Facilities Channel
- UCPD Channel 1
- Oakland Fire Channels 1 and 2
- Fire White Channels 1, 2 and 3

The LBL fire engines also have low-band VHF radios provided by the Contra Costa County Fire Department to be used for communications with the Orinda Fire Department and the East Bay Regional Parks District. The LBL ambulance is also equipped with Alameda County VHF Med Net frequencies, but does not have a low-band VHF radio.

The LBL Fire Chief's car and the staff car are equipped with all the above channels and either can be used as a mobile command center if necessary.

All LBL fire fighters carry portable scanning receivers that operate on all the above channels.

#### ***Medical Services***

The LBL Health Services Group is equipped with several remote desk sets tied directly into the Fire Department Base Station. These desk sets can transmit and receive on the Fire Department channels. The Health Services Group also has several portable radios with the Fire Department channels and the Building Manager channel.

#### ***ECC and Building Managers***

Each of the above are equipped with radios on LBL Emergency Channel G.



## ***Maintenance and Operations (FMO)***

Radio communications include base stations on FMO channels and the Building Manager channel. Supervisors and lead personnel carry portable transceivers equipped with the Fire, Police, Medical, and radio pager channels. Cellular telephones and electronic mail are also available.

### **5.6 Communication Systems/Equipment**

#### **5.6.1 Primary System**

The primary LBL communication system consists of a multi channel VHF FM radio network, the site-wide public address system, the LBL phone system, and a digital data network that connects the Laboratory computing resources. The phone system provides general voice communications and some digital data transfer via modems. The LBL digital data networks includes both circuit and packet switched networking in support of computer system interconnection, terminal access, distributed file and print services, and access to external (off-site) networks.

#### **5.6.2 Alternate/Backup System**

All critical radio base stations can be switched to emergency power. The Fire Department radio systems are provided with battery backup as well. All critical radio systems, such as the Fire Department and Building Managers' systems have alternate or backup power. All LBL communication nodes have more than two hours of emergency power and an automatically started generator. These generators are provided with 24 hours of fuel and an alarm system, with annunciators in the UC Police Berkeley Department to indicate operation on battery or that the generator has started.

#### **5.6.3 System Dedication**

The ICS system utilized at LBL, based on the IBX S/80 switch, is non-blocking so it can support all the communication paths possible between installed ports. Because of the expected increased load during an emergency, certain ports have been assigned a priority status referred to as *Key Personnel and User Group Priority*. The levels of priority, as designated by the Emergency Coordinator, are in four categories in descending order: (0) LBL operators, (1) 7911 ports, (2) key personnel ports, and (3) all others.

#### **5.6.4 Systems/Equipment Testing**

##### ***Testing***

The Building Managers' and Site-Wide Public Address Systems are tested on a monthly basis. Other systems are in daily operation and are tested by actual usage.

The ICS IBX S/80 and the VMX 5000 are maintained under a contract with Technical Resources International (TRI) which has assigned a full-time dedicated field engineer (FE) to LBL. This FE performs all of the recurring and special preventive maintenance procedures in accordance with the recommendations of the manufacturers. The FE's preventive maintenance activities are overseen by the ICS Operations Engineer who ensures that the equipment is being maintained in strict accordance with manufacturers' specifications. Support power, HVAC, fire alarm, and emergency generator equipment are maintained by the Laboratory's Facilities Department, in accordance with

scheduled inspection and preventive maintenance programs. Uninterruptable power supply (UPS) batteries are maintained under a contract with the Best Power Company. This activity is overseen by the LBL Communications and Networking Facilities Office (CNFO)

### ***Problem Resolution***

Issues affecting ICS are directed to the TRI FE 24 Help Line, or to the TRI supervisor. For issues affecting underground cables LBL CNRD personnel should contact Transpac Fiber Optics and Telecommunications or the Tekon Corporation.

## **5.7 Offsite Communications Systems**

### **5.7.1 System Description**

The LBL Fire Department has offsite communications capability with the Cities of Oakland and Berkeley, UCPD, the Orinda Fire Department, East Bay Regional Parks District, and regional mutual aid channels. UCPD has links to the Alameda County Sheriff's Office and the California Highway Patrol through the California Law Enforcement Telecommunications System. LBL has direct radio communication with the DOE San Francisco Operations Office (DOE/SF) and with Lawrence Livermore National Laboratory (LLNL). In addition, LBL and LLNL are connected by a secure voice digital microwave link.

The ICS utilizes the services of AT&T, FTS2000 (with 24 trunk lines connecting LBL to the Federal Telecommunication System), Pacific Bell, and Cellular One.

### **5.7.2 Memoranda of Agreement/Understanding (MOA/MOU)**

Various organizations have formal agreements or understandings with LBL concerning emergency coordination, that apply to the Laboratory's off-site communication interface.(see Sections 3.7.1-.9). The specific parameters and or procedures are derived from and described in specific memoranda (MOA/MOUs), which are on file in the Emergency Preparedness Office (Building 48, Room 102).

### **5.7.3 Testing Procedures**

#### ***Schedule/Procedure***

The Alameda County Office of Emergency Services exercises and tests the County Mutual Aid Plan on regular basis. LBL takes part in these functional exercises in order to ensure acceptable communication and coordination during an emergency.

#### ***System Coordination***

The Alameda County Mutual Aid Plan is based on an Incident Command System which is integrated within three divisions as functional mutual aid zones. These divisions are designated as North, South, and East. Coordination is initially based within a zone and then, if necessary, with the incorporation of either or both of the other zones, as well as additional assistance from Contra Costa County, other Bay Area counties and the state, as described in the Master Mutual Aid Agreement.



## 6. CONSEQUENCE ASSESSMENT

### 6.1 General

Consequence assessment evaluates and interprets radiological or other hazardous material measurements and/or other information to provide a basis for decision making. As used in DOE Orders and this Plan, the DOE Emergency Management System is comprised of several concepts including planning, preparedness, and response. These terms can be used to define and identify provisions and chronological steps for a consequence assessment capability. In this context, planning includes 1) developing and preparing postulated scenarios and default onsite and offsite consequence projections for hazards assessment, 2) developing plans and procedures for consequence assessment during an emergency, and 3) identifying personnel and resources to provide an effective response. Preparedness includes personnel training, acquisition and resource maintenance, exercises, and essential procedures, personnel, and resources for consequence assessment. Response involves the effective decisions, actions, and applications of resources required to perform consequence assessment both initially, based on limited information and default parameters, and continuing as additional information is received.

### 6.2 Initial Assessment

Initial assessment will be performed by the first professional responder. This will probably be the UCBDP or the LBL Fire Department Shift Captain. Using the event based EALs, incidents classified as operational emergencies will be reported rapidly to the Incident Commander, who will activate the ECC. Initial assessment capability will be determined by several factors including the nature of the event, its location, available information sources, and resources on scene. The initial assessment will be event based and thus correspond to an EAL. Depending on the classification of the event, the predetermined response actions will be accomplished in accordance with the response action guides in Tables 4.2, 4.3, and 4.4.

### 6.3 Extended Assessment

As an emergency escalates or changes, consequence assessment will provide for continuing timely assessment of the effects of the incident. During extended emergencies, backup personnel and equipment will be required for continued assessment operations. The IC will ensure resources are adequate for continuing assessment. As the severity of the emergency lessens, recovery planning begins. The post emergency assessment provides the basis for decisions about re-entry, recovery, and return to normal operations. The post emergency assessment is helpful for the analysis of actual accident conditions for the purpose of critique and lessons learned. Collection and retention of data compiled during the emergency provides valuable assessment of the decisions and actions taken.



## 7. PROTECTIVE ACTIONS

### 7.1 General

LBL is responsible for ensuring that appropriate protective actions are taken for onsite personnel and for recommending protective actions to offsite agencies in response to emergency conditions involving hazardous materials (radiological and non-radiological). Exposure can be limited by some form of intervention or protective action. These protective actions include but are not limited to sheltering in place, building evacuation, site evacuation, decontamination, and medical treatment. Protective Action Guides (PAGs) and Emergency Response Planning Guidelines (ERPGs) provide guidance to the Incident Commander as to what essential actions are required. During the early phases of response when precise measurements are not available, protective actions will be determined on the basis of available information and updated as the situation changes.

Protective actions might be implemented only in those buildings or areas that are threatened or implemented Laboratory wide. Notification of protective actions will be announced over the public address system. Follow-up to this announcement will be made over the Building Manager radio network. Offsite notifications will be in accordance with Chapter 5 of this plan.

### 7.2 Protective Action Guidance and Policy (Radiological)

#### 7.2.1 Basic Policy

All Laboratory operations must be planned to prevent exposure of personnel to ionizing radiation above the limits stated in DOE 5840.11 and Occupational Safety and Health Standards 29 CFR 1910.96, which give radiation dose-equivalent limits for both radiation and non-radiation workers. It is also LBL policy that exposure to ionizing radiation associated with Laboratory operations be maintained *as low as reasonably achievable* (ALARA). The ALARA policy means that subject to programmatic and economic limitations, radiation dose equivalents to employees and radiation levels at the perimeter fence should be the minimum attainable. This policy requires that each operation involving radioactive material or the production of radiation be evaluated individually to ensure that the resultant personnel exposures are as low as is reasonably achievable. For external radiation, protection is provided by time and distance restrictions, source intensity limitations (beam current for accelerators), and shielding. For internal radiation, protection is normally provided by preventing the escape of radioactive material into the working environment. LBL work with radio nuclides must be restricted to locations specifically designed for such work.

#### 7.2.2 General

The protection guides for the control of external and internal dose equivalents are based on the standards listed in DOE Order 5840.11, Table 21-1. Supervisors must ensure that the ALARA policy is followed. Assistance is available from the EH&S Division.

#### 7.2.3 External Radiation

Whole-body dose equivalent increments of over 100 mrem (1 mSv) received in short periods should be avoided. This is an LBL administrative restriction that requires a review of the operation—not a limit for occupational workers. Consult with EH&S personnel when it appears

likely that certain procedures can lead to a dose equivalent accumulation of over 100 mrem (1 mSv) in a single exposure or in a series of exposures occurring in a period over a few days.

#### 7.2.4 Internal Radiation

It is LBL policy that all radioactive control areas be kept as free as possible of airborne radioactivity and contamination. Where inhalation or ingestion of radio nuclides is possible the DOE protection guide must be followed. The protection guide for the control of internal dose at LBL is based on the DOE Annual Limit on Intake (ALI) values. The ALI is that quantity of a single radio nuclide that, if inhaled or ingested, would irradiate a person to the limiting value of control of the work place. The Derived Air Concentration (DAC) is the quantity obtained by dividing the ALI for any given radio nuclide by the volume of air breathed by an average worker during a working year. DACs are listed in DOE Order 5840.11, Appendix 1.

#### *DAC Values*

DACs are intended to ensure that no significant injury will occur to an individual after continual exposure at that level for many years. Nevertheless, personnel must not be exposed for extended periods at the limit values when reasonable means exist for avoiding such exposures. When the DAC value for an individual (which is based on continuous exposure for one year) is exceeded, the exposure time for this individual must be limited. If external radiation is also present, the permissible internal concentration values must be reduced to prevent the dose to the whole body or a particular organ from exceeding the combined basic dose limits.

#### *DAC Control System*

Maintaining airborne radioactivity below DACs often involves complex enclosure systems and careful planning for experiments. Failure of a control system for an experiment involving a large amount of radioactivity could result in exceeding the DACs for both onsite and offsite. Any operation involving unencapsulated radioactive material must be planned with EH&S assistance.

#### 7.2.5 Off-Site Protective Action Guidelines

The radiation standards for protection of the general public in the vicinity of a DOE facility are as follows (natural background and medical exposures excluded)

#### *Dose Limits*

All Pathways	Effective Dose Equivalent	
	(mrem/yr)	(mSv/yr)
Occasional annual exposure	500	5
Prolonged Exposure(5 yrs.+)	100	1

No individual organ may receive an annual dose equivalent of over 5 rem/yr (50mSv/yr).

Air Pathways only	Effective Dose Equivalent	
	(mrem/yr)	(mSv/yr)
Whole-body	25	0.25
Any organ or tissue	75	0.75

### **Action Levels**

To prevent an individual in the general population from receiving a dose equivalent of more than 100 mrem/yr (1 mSv/yr), a DOE administrative action level is established at 10 mrem/yr. (0.10 mSv/yr) This dose value is not a limit but an administrative reporting level intended to ensure that the 100 mrem/yr limit is not exceeded.

### **7.3 LBL Radiation Monitoring System**

EH&S maintains a workplace monitoring program to ensure that the dose equivalent rates and the concentration of airborne radioactivity in areas occupied by people do not exceed the radiation protection guide values and that ALARA policy is being followed.

#### **7.3.1 On-Site Monitoring**

LBL policy states that the external intensity of radiation producing machines must be measured in accordance with the schedule stated in the Operational Safety Procedure and whenever a significant change is made in the equipment or mode of operation. The following procedures must be carried out in areas containing radioactive material:

- (1) Employees using radioactive materials must conduct and record radiation surveys to ensure that the radiation controls are adequate. External radiation must be measured and all areas must be surveyed for contamination before, during, and after all daily operations and after any suspected spill. EH&S must be notified of radiation levels or contamination that could cause significant personnel exposure. EH&S will aid in difficult or unusual daily operations, help in planning procedural changes, and be in charge of post-radiation-incident operations.
- (2) Continuous air sampling must be performed within the areas where there is potential for airborne radioactive contamination and ventilation exhaust system serving such areas.
- (3) Radiation contamination surveys of all radioisotope work areas must be made each month by EH&S Operation Group personnel. External radiation must also be measured to evaluate personnel exposures and to determine the adequacy of shielding.

#### **7.3.2 Radiation Areas/Detecting Instruments**

##### **Radiological Areas**

###### **Radiation Area**

Any area in which an individual can receive a dose equivalent greater than 5 mrem (50mSv) but less than 100 mrem (50 mSv) in 1 hour at 30 cm from the radiation source or from any surface through which the radiation penetrates.

###### **High Radiation Area**

Any area in which an individual can receive a dose equivalent of 100 mrem (1 mSv) or greater but less than 500 rads (5 Gy) in 1 hour at 30 cm from the radiation source or any surface through which the radiation penetrates.



## Very High Radiation Area

Any area in which an individual can receive a dose equivalent of 500 rads (5 gy) or greater in 1 hour at 30 cm from any surface through which the radiation penetrates.

### Radiation Detecting Instruments

LBL maintains radiation detecting and measuring instruments that are assigned to controlled areas as needed. EH&S aides in the selection of portable instruments and distributes them. The Instruments Support Group provides maintenance.

#### 7.3.3 Personal Radiation Monitoring(General)

A *radiation worker* is an occupational worker whose job assignment involves operation of radiation producing devices, who works with radioactive materials, or who is likely to be routinely occupationally exposed to more than 0.1 rem (1 mSv) per year. All radiation workers at LBL must participate in radiation protection training and in the Laboratory's bioassay program and/or its personal dosimeter program. Personnel exposed to external ionizing radiation will be issued a personal dosimeter, which records their exposure to radiation. Radiation workers exposed to radioisotopes with the potential for ingestion must participate in the bioassay program. DOE requires monitoring of radiation workers who have the potential to exceed any one of the following doses from external sources.

- (1) 100 mrem (1.0 mSv) per year effective dose equivalent to the whole body
- (2) 5 rem (0.05 Sv) per year to the skin
- (3) 5 rem (0.05 Sv) per year to anyone of the extremities
- (4) 1.5 rem (0.015 Sv) per year to the lens of the eye

#### 7.3.4 External Exposure- Dosimetry Program

Radiation workers are issued two dosimeter holders with identification labels showing the employee's name and employee number. Wearers alternate holders monthly or quarterly at exchange points located throughout the Laboratory, or via LBL mail. Gamma dosimeters are issued monthly or quarterly to those who work with the following radiation-producing items:

- (1) Particle accelerators (10 hours or more per month).
- (2) X-ray generators
- (3) Irradiators
- (4) Radioisotopes (does not apply to exclusive users of low energy beta emitters)  
Neutron dosimeters are issued monthly to personnel working at accelerator sites:
- (5) Operation and maintenance personnel who work 35 hours or more per month
- (6) Users (experimenters, radiation-therapy personnel)
- (7) Special cases as determined by EH&S on an individual basis

#### 7.3.5 Internal Exposure- Bioassay Program

The program to measure internal radiation dose equivalents to LBL employees is administered by the Health Services Group, with the support from EH&S. Participation in the LBL bioassay program is required for radiation workers who handle dispersible radio nuclides; such workers must provide bioassay samples, as appropriate. The bioassay program consists of in-vivo counts at Donner Laboratory's whole-body counter and radiochemical analyses of urine samples. Workers in the bioassay program must submit urine samples and have whole-body counts once a

year, or more frequently if appropriate. Persons only working with low energy beta emitters are not included in the whole-body count program. Results of all bioassay tests are kept in the individual's LBL medical and personal dosimetry file. In all cases of known exposure to internal radiation the absorbed dose equivalent must be measured by the most appropriate method available. Biological elimination rates of radioisotopes must be monitored as long as the rates are relevant.

### 7.3.6 X-Ray Safety Policy

This policy defines general requirements for all x-ray equipment at LBL. Specific requirements are given for x-ray machines, which are classified as analytical (open and enclosed beam), portable, therapeutic, diagnostic, or photo emissive. Safety requirements are based on ANSI Standards N43.2 and appropriate sections of the *National Council for Radiation Protection Publications NCRP Reports No.s 102 and 49*. This policy establishes responsibilities, specific authorization of users, and requirements for x-ray machine operation and maintenance. Logbooks must be used to keep records of operation and maintenance. Interlocks, where required, must be redundant and fail-safe. An OSP must be established for each x-ray machine. The X-Ray Safety Officer periodically reviews the policies and revises them as necessary. He/she continually reviews the quality of the x-ray safety program.

All x-ray machines are controlled items, requiring complete property management accountability records. All x-ray machines have a User's Logbook and Maintenance Logbook located near the machine. The latter is for the routine logging of use and the former is to record any abnormality and to record scheduled or necessary unscheduled maintenance. The User's and Maintenance logbooks may be combined if deemed appropriate by the System Supervisor. This combined logbook will be located near the machine and must contain all of the information required for both individual logbooks.

## 7.4 Emergency Response Planning Guidelines (ERPG)

ERPGs are planning values intended to provide estimates of concentration ranges above which one could reasonably anticipate observing adverse effects as a consequence of exposure to a specific substance, as described in the definitions of the ERPG levels. The *American Industrial Hygiene Association* stresses that, since human exposure response varies over a wide range, ERPGs are planning guidelines and as such should not be used as exposure guidelines. They are defined (by the AIHA) as follows:

**ERPG-1.** The maximum airborne concentration below which it is believed that nearly all individuals could be exposed to for up to 1 hour without experiencing other than mild transient adverse health effects or perceiving a clearly defined objectionable odor.

**ERPG-2.** The maximum airborne concentration below which it is believed that nearly all individuals could be exposed to for up to 1 hour without experiencing or developing irreversible or other serious mild health effects or symptoms that could impair their abilities to take protective action.

**ERPG-3.** The maximum airborne concentration below which it is believed that nearly all individuals could be exposed to for up to 1 hour without experiencing or developing life-threatening health effects.

### 7.4.1 LBL Policy

In compliance with DOE Order 5500.3A the Laboratory has established pertinent guides for specific substances identified as potential hazards [see the LBL Health and Safety Manual (Pub-3000)]. The Laboratory adheres to the AIHA's ERPG standards as defined above when they are applicable to LBL programs. Any task requiring the use of chemicals must be evaluated for potential hazards associated with the work. This hazard evaluation (and on-going review thereof) must include the chemical or combination of chemicals that will be used in the work, as well as other materials that will be used in the vicinity. AIHA's ERPGs have been developed to aid in on-site response. It is the Laboratory's policy to adhere to these recognized standards and fully cooperate with other federal, state and local agencies if the emergency level has off-site impact.

### 7.4.2 Airborne Hazard Concentrations

Exposures by inhalation of airborne contaminants (i.e., gases, vapors, fumes, dusts, and mists) must not exceed the levels listed in the latest edition of *Threshold Limit Values of Airborne Contaminants* (TLV) published by the American Conference of Industrial Hygienists. These TLV levels refer to airborne concentrations of substances and represent conditions under which it is believed that workers may be repeatedly exposed without adverse effect. In all cases of potentially harmful exposure, feasible engineering or administrative controls must be first established. In cases where respiratory equipment, alone or with other control measures, is required to protect employees, the protective equipment must be approved by the Industrial Hygiene Group.

## 7.5 Security Program

An appropriate entry-control program has been established for all radiation areas. The level of control must be consistent with the degree of the hazard. Signs and barricades, control devices on entrances, conspicuous visual or audible alarms, and/or administrative procedures must be used as appropriate to control personnel entry into restricted areas. For *Very High Radiation Areas* the entry procedure must include at least one of the following:

- (1) Control devices on each entrance or access point that automatically prevent entry when radiation level is above 0.1 rem (0.0001 Sv) per hour or prevent operation of the radiation source.
- (2) A control device that energizes a conspicuous visible and/or audible alarm that warns anyone entering the area of the radiation level and informs radiation protection personnel of the entry.
- (3) Locked entry ways, except during periods when access to the area is required, with positive control over entry, and with radiation surveys made for the initial entry and periodically thereafter as necessary.
- (4) Control devices that automatically generate conspicuous audible/visible alarms before operation of the radiation source to permit evacuation of the area or that prevent operation of the source when anyone is in the area.

## 7.6 Records

### 7.6.1 ALARA Documentation Program

The following methods are used to document the *As Low as Reasonably Achievable* program:

- Personal dosimetry exposure reports
- Hand dosimetry exposure reports.
- Air sampling data reports
- Area monitoring reports.

### 7.6.2 Training

DOE orders and other federal regulations define several specific health and safety training requirements for special hazards. These include but are not limited to radiation safety, hazard communication for exposure to hazardous substances, asbestos exposure, respirator use, the ability to hear conversation in the working environment, laser safety, confined space hazards, and certification for using mechanical equipment such as forklifts and overhead cranes. All health and safety training at LBL is documented in the FOCUS Training Data Base. Training reports from this data base are available upon request.

## 7.7 Emergency Planning Zones

Emergency planning zones (EPZs) are zones (areas) for which planning is necessary to ensure that prompt and effective action can be taken to protect onsite personnel, the public health and safety, and the environment.

### 7.7.1 On-Site Planning Zones

The entire LBL site is included in the on-site EPZ (see Figure 2). Protective actions respecting radiation hazards are described in Section 7.2 of this chapter for on-site personnel. Specific protective actions are also implemented for affected facilities/zones.

### 7.7.2 Off-Site Emergency Planning Zones

There is no known hazard associated with LBL that requires the establishment of an off-site planning zone.

## 7.8 Communication

### 7.8.1 Primary Communication System

The LBL primary communication system is described in Chapter 5 of this Master Emergency Plan.

### 7.8.2 Off-Site Response Interface

The LBL off-site response interface is described in Chapter 3 of this Master Emergency Plan.

### **7.8.3 LBL Hazard Communication System**

LBL, in compliance with DOE and OSHA standards, has implemented the hazard communication system (29 CFR 1910.1200). This system establishes requirements to ensure that chemical hazards in the work place are identified and that this information is transmitted, along with information on protective measures, to affected employees. Components of this system include, labeling, having access to material safety data sheets (MSDSs), and training. It is the policy of LBL that each supervisor is responsible for ensuring that hazardous materials are properly labeled, that MSDSs are available, and that the necessary training is provided to his or her employees. This system applies to all LBL activities in which employees might be exposed to hazardous materials under normal conditions of use or in a foreseeable emergency. Specific responsibilities and parameters for supervisors and management, employees, the EH&S Division, the Toxic Substances Safety Subcommittee, the Facilities Department, the Purchasing Department, and the Material Management Department are delineated in the LBL Health and Safety Manual (Pub-3000).

### **7.9 Termination/Shutdown Operation**

Specific shutdown procedures are described in applicable Operational Safety Procedures and Facilities, Function, and Project Notebooks.



## 8. MEDICAL SUPPORT

### 8.1 General

#### 8.1.1 Policy

Medical support is provided by the Health Services Group. Objectives of this group are 1) to ensure that employees are assigned duties they are physically able to perform, 2) to provide medical care and rehabilitation for occupationally ill or injured employees, 3) to provide emergency treatment of serious illnesses or injuries, 4) to encourage the overall physical and mental health of employees, and 5) to assist in maintaining a healthful and safe work environment.

#### 8.1.2 Overview

An occupational health program has been in effect at LBL for the past 30 years, with a special emphasis on problems relevant to the Laboratory's research activities. Employees receive pre-placement, periodic routine, special, and termination examinations; and emergency care and other services are provided. Potentially hazardous occupational situations and the use of chemical agents are investigated on a continuing basis in cooperation with the Industrial Hygiene, Occupational Safety, and other groups in the Environment, Health & Safety Division (EH&S). Diagnosis and treatment of non-occupational illnesses or injuries are limited to minor first aid, emergencies, and special situations for which treatment is in the best interest of the patient and the Laboratory. The LBL Bioassay Laboratory monitors internal radiation exposures to employees.

#### 8.1.3 Health Services Facility

The Health Services Facility is housed in Building 26, which includes the Health Services Group, the Bioassay Laboratory, the Employee Assistance Program (professional assistance in the resolution of work related or personal problems), the Safety Glasses Program, and the Industrial Hygiene Group. The Health Services Facility has a first aid room, clerical and administrative space, examination rooms, offices, an x-ray room with darkroom, laboratories, a two-bed holding ward, a clinical laboratory, and an area for fitting and dispensing safety glasses, examining the eyes of laser users, and performing refractions.

#### 8.1.4 Alternate Facility

Since Building 26 is at a higher elevation and some distance from the largest populated areas of the Laboratory, Building 55 has been designated as a secondary or alternate Health Services site at which additional basic first aid supplies are stored.

### 8.2 Staff

The Health Services Group is managed by the Physician-in-Charge assisted by the Group Deputy. The Occupational Health Program is under the leadership of LBL physicians who are also available to respond to emergencies. The clerical staff oversees scheduling of medical services and the medical data system. Nurses are on duty from 7:00 a.m. until 5:00 p.m. on workdays. Basic Life Support (BLS) level emergency medical care is available from the Fire Department at other times of the day/week. All LBL nurses are registered and licensed in x-ray technology, and are encouraged to be certified in Occupational Health. The clinical laboratory is staffed by licensed medical technologists. Physical examinations are done by contract and LBL physicians. The contract

physicians (internists, an ophthalmologist, and a radiologist) and an optometrist are all in private practice and are not employees of the Laboratory. The Bioassay Laboratory is supervised by a biophysicist.

### **8.3 Equipment**

#### **8.3.1 Health Services Description**

The following health services are available on-site: physical examinations, vision and hearing tests, measurement of pulmonary function, electrocardiograms, x-rays, blood counts, blood chemistries, urinalysis, and other special procedures as required. Emergency equipment also includes crash and oxygen tanks, first aid, and burn kits. For any emergency that exceeds and/or overwhelms the LBL Health Services capability the Laboratory has established a Memorandum of Understanding with the Alta Bates Hospital in Berkeley.

#### **8.3.2 Bioassay**

The Laboratory physicians and bioassay personnel are advised regarding personnel exposure to radiation by the Radiation Assessment Group. The procedure and urgency of notification and subsequent actions by the LBL physician depend on the particulars of an exposure or spill. Usually, in the event of contamination by radioactive isotopes or possible activation by a high-energy beam, an employee will receive a whole-body count and bioassay analysis of excreta. Dose estimates are the joint responsibility of the EH&S and Health Services Groups. Health Services is prepared to assist in decontamination of personnel when necessary--especially contaminated wounds. The Laboratory has a written mutual aid agreement with a local hospital to admit and care for contaminated/injured personnel.

### **8.4 Transportation and Evacuation**

During a disaster, when ambulance service is in great demand, injured employees who are able to walk will be encouraged to proceed to either to the first aid facilities at either Building 26 or 55. Employees injured severely or who become seriously ill at work must be transported by the LBL ambulance (operated by the Fire Department), unless other transportation is specifically approved by Health Services. If necessary, the LBL ambulance is used to transport patients to nearby hospitals or clinics. Large scale evacuation would be coordinated with the LBL Director or designee as the situation dictates.

### **8.5 Communications**

All emergency (7911) calls are monitored at the Fire Department, Health Services, and EH&S Groups in Building 75 by means of a direct-wired audio system. In addition, the Health Services Group has several desk type radio remote sets that are connected to the Fire Department communications, allowing direct monitoring of the fire radio channel. This monitoring provides the medical staff with information regarding the number and location of casualties, the severity of injuries, and the availability of the LBL ambulance or other vehicles that could be used to transport injured personnel.

The UC Police may be contacted by telephone for information on the condition of roads and of the status of the secondary first aid station in Building 55. Amateur radio teams will also support medical communication needs. If the radio system is inoperable or unsatisfactory, messengers will be dispatched to obtain necessary information.





## 9. RESTORATION AND RECOVERY PLAN

Restoration and recovery (R&R) is the process of putting the Laboratory back on line (i.e., restoration of utilities, systems, and buildings to servcability) following the response phase of an emergency incident. This R&R Plan thus becomes a part of the Master Emergency Plan. It should be noted that the Incident Commander may change as the emphasis goes from response to recovery, but the Emergency Command Center will still fulfill its command decision making and authorization role until normalcy is restored.

### 9.1 Emergency Termination or Downgrade

The Incident Commander (IC), with advisory support from the Emergency Command Center (ECC) Team, will terminate the response phase of the emergency when all injured have been treated, all deceased have been recovered and turned over to the coroner, and all fires, toxic and radiation hazards are controlled to the extent that there is no remaining danger to LBL employees or the public. It should be noted that it is likely that various stages of response and recovery will exist at the same time in different buildings or facilities (i.e., one building may still be in the response phase while others have already begun recovery). The emergency is considered terminated when the restoration and recovery phase IC determines that all personnel and facilities have returned to a normal operating condition.

### 9.2 Reentry

Following an emergency, the Building Managers, the LBL Fire or UCB Police Departments will evacuate and/or cordon off entrances (no reentry) to all buildings where a potential hazard exists. The ECC will dispatch facility inspection teams (FITs) to assess damage. Each FIT consists of a structural engineer, an EH&S specialist, a mechanical and an electrical engineer or technicians from Facility Maintenance and Operations. These teams will survey a building exterior to determine if it is safe to enter the building. If the building contains known hazardous materials the team may ask Fire Department personnel equipped with self contained breathing apparatus to check for spills. If so requested, the Fire Department personnel will assess conditions inside, open windows for ventilation, and determine when it is safe for the inspection team to enter and complete their survey. Teams will then complete the assessment of each damaged building and make a recommendation to the Incident Commander regarding occupancy. The IC, in consultation with ECC Operations personnel, will make final decisions regarding reentry.

If reentry is not possible, thus preventing an employee from attendance at or continuance of work in a normal manner, the cognizant Division Director may request that the Associate Laboratory Director for Administration grant leave with pay to such an affected employee (see LBL Regulations and Procedures Manual).. Such leave would be granted in the following circumstances:

Public Emergencies: fire, earthquake, riot, sabotage, explosion, and other comparable occurrences.

Civil Disaster Units (CDUs): search and rescue or disaster control work by an employee as a member of an organized civil disaster unit. (CDUs do not include auxiliary and/or volunteer LBL emergency teams.)

Anticipated Power Interruptions: periods of reduced and/or interrupted power which prevent an employee from performing his or her work.

### 9.2.1 Protective Clothing

The Fire Department and inspection team personnel must always wear appropriate protective clothing and use breathing apparatus commensurate with the potential hazards that exist in a building to be entered. Health Services personnel will be available for assistance or consultation during the recovery phase.

### 9.2.2 Facility Inspection Team Assessment Procedure

#### *Buildings*

(1). Assess damage by inspecting exteriors. If warranted and deemed safe, assess damage inside. Complete assessment form ATC-20. Make special note of usable office space.

(2) Post signage at building entrances as necessary using following types of signs:

*Red* for NO ENTRY (chain/padlock all).  
*Yellow* for LIMITED ENTRY (with escort).  
*Green* for UNLIMITED ENTRY.

(3). Barricade all exterior falling or facility hazards.

#### *Facilities*

**Roads and Bridges:** Assess damage to roads and bridges and provide a report to the ECC. Unusable roads and/or bridges must be barricaded to prevent use.

**External Plant:** Inspect site for outdoor physical plant damage due to ground motion; (i.e., water lines, sewers, power lines and underground rights of way). Assess damage, isolate damaged systems if possible and report to ECC.

## 9.3 Recovery

### 9.3.1 Transition

The transition process from the response phase to recovery phase involves a change of emphasis from response to restoration of the Laboratory to pre-emergency operations. Fire, spills, and other hazards will be contained and mitigated. Restoration will involve all response groups (i.e., the ECC team, the Fire and U.C. Police Departments, the EH&S Division, and the Facilities Department) as well as administrative groups such as Personnel, Payroll, Purchasing, Data Processing, Finance Operations Departments, and the programmatic divisions' management and leadership. The IC, supported by the ECC operations team, remains in charge.

### 9.3.2 Verification of Safety

Prior to entry for restoration operations, utmost care must be used in restoring all buildings assessed as unsafe. Exterior bracing may be required prior to reentry when structural integrity is in doubt. EH&S, in conjunction with the occupant programmatic leadership, will provide monitoring of radiation and toxic gas sources during restoration. Contracts are in place for professional support from specific vendors if hazmat cleanup assistance is necessary following large spills.

### **9.3.3 Restoration of Vital Systems**

Upon completion of the assessment process, those buildings or facilities found to be unsafe must be isolated from power, water, and gas service by Maintenance and Operations Department personnel. For those buildings deemed safe for occupancy, M&O may carefully restore power, gas and water, building by building, after checking for obvious malfunctions or discontinuities within each building. M&O will keep the ECC apprised of system status as service is restored. No effort will be made to restore vital systems in any unsafe building until it can be made safe for entry.

### **9.3.4 Security Procedures**

LBL has no classified operational areas. Therefore security measures need only protect personnel from entering normally restricted and now unsafe areas. (See: assessment, posting, and barricading procedures in Section 9.2.1 above.)

## **9.4 Recovery Organization**

The recovery organization includes the ECC team, all response groups plus administrative groups such as Personnel, Payroll, Purchasing, Data Processing, Finance Operations Departments, and the programmatic divisions' management and leadership.

### **9.4.1 Authority and Responsibility**

Authority is vested in the IC and the ECC team by the Laboratory Director. These also have access to the Laboratory Director via the Associate Director for Operations. Responsibility proceeds from the IC down through the normal management line of all involved divisions and groups.

### **9.4.2 Public and Media Information**

Planning for information transfer is accomplished by the Public Information Office (see Chapter 10 of this Master Emergency Plan).



## 10 PUBLIC INFORMATION

The Public Information Department is responsible for the dissemination to the public of information about all activities occurring at the Laboratory. In an emergency, unless authorized by the Laboratory Director or ECC staff, no other personnel may give information to the news media or general public. In supporting the ECC during an emergency, the Public Information Officer and staff will develop appropriate information, obtain official clearance for its release, deliver this information to the news media and/or public, and respond to specific requests from the news media and the public. In addition to its emergency functions as described here, PID also handles routine publicity for the Laboratory.

### 10.1 Public Information Organization

The PID is an integral part of the ECC support staff. Direction and authorization for its activities during an emergency derives from the ECC. Thus information being developed for release to the news media or the public must be coordinated with the ECC and with the responsible DOE official(s). The PID Department Head is designated as the Public Information Officer (PIO) during an emergency. If the PID Department Head is not available then the Media Relations Coordinator or Publications Coordinator, in this order, will act as PIO. The PIO will have three designated public information telephone lines and one within the ECC, to serve as primary conduits for releasing and receiving information or requests from off site. The PID will work closely with all members of the ECC team but will be under the direct command of the Incident Commander.

### 10.2 Public Information Facilities

The PIO's representative to the ECC will be located in Building 48, Room 108. If Building 48 cannot be occupied, phone services will be patched through to another secure location. News conferences will be held in the Building 50 Auditorium or as an alternate location in the Building 66 Auditorium.

If the LBL telephone system is out of service emergency communications will be established through the LBL emergency radio system, available microwave links or amateur radio operators.

### 10.3 DOE Field/HQ Coordination: Joint Information Center

A DOE Field Representative will serve as DOE liaison in the ECC. The PIO will coordinate all information, and any release of it with the IC and will keep the DOE Field Representative informed. The DOE Site Office representative is responsible for coordination with DOE/SF. If the Site Office representative is not available the ECC will interact directly with DOE/SF. If the nature of the emergency and the number of organizations affected by it make it advisable, the PIO may establish a Joint Information Center (JIC) with these agencies and organizations.

### 10.4 Public Inquiries

The following LBL management must be notified of public inquiries: the Laboratory Director, the Laboratory Deputy Director, the Associate Laboratory Director for Operations, the Laboratory Counsel, and involved Division Directors.

In an emergency the PIO coordinates all requests for information from the public. After confirming information being considered for release and obtaining authorization for the release, the

PIO may release it to the news media and the public. Each request for information from off site must be handled individually. If confirmation and/or authorization are not obtainable then no information will be released. (LBL will hold briefings for local news media on its procedures for releasing information about incidents or emergencies that concern the Laboratory.)

### **10.5 Security of Classified Material**

LBL maintains no classified material or information; therefore there is no potential for a breach of security.

### **10.6 Emergency Information Number. (1-800-445-5830)**

The Public Information Officer is responsible for updating emergency information recording accessible via the above toll free number. Employees should use this number to ascertain the status of the Laboratory, and whether, or when, they should report for work following a disaster or other unusual event. (The main Laboratory number should not be used for this purpose.).





## **11. EMERGENCY FACILITIES AND EQUIPMENT**

### **11.1 Emergency Facilities**

The Laboratory has extensive emergency facilities, equipment, and materials. These are established and maintained to adequately support the Laboratory's emergency response. The Incident Commander and the ECC staff will ensure that these resources are used and allocated properly to mitigate the effects of an emergency and to return the Laboratory to normal operating conditions as soon as possible.

#### **11.1.1 Emergency Command Center (ECC) Activation**

The EEC is located in the LBL Fire Station (Building 48), and will be activated under the following conditions:

1. On the request of the on-scene commander (OSC) when the incident requires more resources than those normally or routinely available.
2. On the order of the Associate Laboratory Director for Operations.
3. On the order of the Laboratory Director or delegated successors.

#### **11.1.2 Alternate or Secondary ECC**

The alternate ECC is located in Building 90, Room 0020.

#### **11.1.3 Joint Information Center (JIC)**

The LBL Master Emergency Plan does not presently include the JIC concept; however, should the need arise, a JIC could be established with the appropriate agencies.

#### **11.1.4 Off-Site Communication Center (OCC)**

A microwave link between LBL and LLNL offers redundancy in telephone communications the local telephone company services are disrupted.

#### **11.1.5 Decontamination Facilities**

The LBL Health Services building (building 26) serves as the primary site for decontamination. (See Chapter 8, Medical Support, in this Master Emergency Plan.) In addition, the Fire Station (Building 48) houses Radiological Assistance Team kits and Building 75 houses supplies and equipment for radiation emergencies.

#### **11.1.7 Medical Facilities**

The primary LBL medical facility on site is the clinic in Building 26. An alternate site is Building 55 where auxiliary medical supplies are stored. (See Chapter 8, Medical Support, in this Master Emergency Plan.)

### 11.1.8 Security Control Center

UC Police Department provides security services to LBL. Its Department headquarters and dispatch center is located on the UC Berkeley campus in Sproul Hall, which is adjacent to LBL.

## 11.2 Emergency Equipment

All facility communication and alarm systems, fire protection, spill control and decontamination equipment must be tested and maintained as necessary to ensure its proper operation in time of emergency.

### 11.2.1 Communication Equipment

A complete description of the Laboratory communication system is provided in Chapter 5.0, Notification and Communication.

### 11.2.2 Heavy Construction Equipment

The following equipment is available from the Facility Maintenance and Operations Department.

Cranes	Shovels	Jack hammers
Bulldozer	Picks	Hydraulic jacks
Back hoe	Axes	Lifts (riser equipment)
Dump truck	Compressors	
Fork lift		

### 11.2.3 Decontamination Equipment

Decontamination is the responsibility of the EH&S Division and the Health Services Group. Building 75 is the storage area for decontamination equipment. (See the LBL Contingency Plan, pp. 22-4.) Building 26 is the primary location for Health Services equipment storage.

### 11.2.4 Alarm Equipment

A Class A proprietary fire alarm system is installed throughout the Laboratory. All buildings and automatic extinguishing systems are connected to this alarm system. Alarms are initiated by manual pull-down boxes, automatic smoke detectors, heat detectors, water flow switches and other such devices. The primary terminal is located in the Fire Station Alarm Room (Building 48). A secondary system is also provided in the Fire Station Alarm Room. Auxiliary equipment is also maintained at the UC Police Department. Testing and maintenance of fire alarms and sprinkler systems at LBL are accomplished by the Facilities Department.

### 11.2.5 Rescue Team Equipment

LBL Fire Department personnel constitute the Laboratory's primary rescue team. Rescue equipment is stored in 22 Rescue Boxes located throughout the Laboratory. Locations of these rescue boxes are shown in the LBL telephone directory.

### 11.2.6 Transportation Equipment

The LBL Business and Material Department maintains a fleet of vehicles available for and can be adapted for emergency use. These vehicles include buses, delivery vans, trucks, and passenger automobiles.

### 11.2.8 Personnel Protection Equipment

The Laboratory provides suitable equipment to protect its employees from hazards in the workplace. The EH&S Division will advise as to what protective equipment is required for a task, but the supervisor of the operation must obtain the equipment and see that it is used. Listed below are the categories of equipment provided for personnel protection:

- Protective clothing
- Hand protection
- Head protection
- Eye protection
- Ear protection
- Respiratory protection

### 11.2.9 Fire Fighting Equipment

In addition to the alarm system described above, the LBL Fire Department maintains the equipment listed below:

<i>Designation</i>	<i>Description</i>
2395 Chief's car	Mobile command post
2349 Engine No. 2	1200 gpm pumper truck
2348 Engine No. 1	1000 gpm pumper truck
Patrol 2388 Patrol	4x4 grass fire-fighting truck
Tanker 2397 Tender	2000 gallon tanker truck
Rescue 148	Intensive care ambulance(BLS)
2396 Utility unit	1/2 ton pickup truck
2394 Staff Car	Mobile command post (secondary unit)

The Fire Department has standard turn out clothing for each fire fighter, two Acid King suits, and two butyl rubber suits that provide full encapsulation.

### 11.2.10 Standby Power Equipment

The Fire Station (Building 48) and the Health Services Building (Building 26) are provided with standby generators that start automatically if there is a power failure. There are also 19 other standby generators presently protecting other important activities at the Laboratory.



## 12. TRAINING

The LBL Emergency Preparedness Training Program is performance based and focuses on skills required to execute this plan. The program includes both individual and collective training. This training may be conducted on and off site and includes classroom work, drills, and exercises.

### 12.1 Training Documentation

The Emergency Preparedness Coordinator develops an annual training plan for the organizations that comprise the emergency response organization. This training plan includes a schedule for the training sessions, drills, and exercises. The training sessions are conducted in accordance with a lesson plan or outline as described in Appendix A. When training has been completed, it is documented by being entered in the training data base on the LBL FOCUS system. An example of a training record from FOCUS is given in Section 12.9. This documentation establishes the audit trail for emergency preparedness training.

In addition to the performance-based training for the emergency response organization, LBL complies with regulatory guidance on health and safety training. DOE and other Federal and State agencies mandate specific health and safety training as specified by the OSHA standard, Hazardous Waste Operations and Emergency Response 29 CFR 1910.120 (HAZWOPER). In compliance with OSHA specifications, LBL policy requires that all personnel, guests and visitors undergo basic introductory training and that managers ensure that all appropriate additional training is identified, conducted, continued, and documented. Listed below are examples of training courses offered to all personnel and those required for management and/or emergency personnel. (For a complete listing and descriptions see the current quarterly issue of the EH&S Division Health and Safety Education: Course Information.)

### 12.2 Courses

- Earthquake Safety
- Radiation Safety Orientation
- Radiation Protection: Radio nuclides
- Risks Associated with Occupational Radiation Exposure
- Hazardous Waste Generators
- Radio Active and Mixed Waste
- Half and Full Face Mask Respirator Training
- Laser Safety
- Chemical Safety for Semiconductor Operations
- New Employee Health and Safety Orientation /Training
- Emergency Team Training
- First Aid
- CPR
- Fire Extinguisher Use
- Hazard Communication for Supervisors
- Self Contained Breathing Apparatus

### 12.3 Training Requirements (Regulatory)

As specified in OSHA HAZWOPER, emergency response training levels are categorized into five areas. The levels and personnel expected to meet the training requirements at each level are specified below:

### **12.3.1 First Responder Awareness Level**

This level includes all occupants of a building who may discover a hazardous material release. Training for these employees must focus on *recognizing* problems and initiating the emergency response sequence. Completion and documentation of training are the responsibility of the line management of operations that use hazardous materials. (Minimum requirements are established by HAZWOPER.) Additional training is required when systems, conditions, procedures, and/or hazards change.

### **12.3.2 First Responder Operations Level**

Personnel at this level are employees who make the initial response to releases of hazardous materials and, as part of this initial response, take defensive actions to protect nearby personnel, property, or the environment. These first responders include selected Building Emergency Teams (BETs), which include the Building Manager, Deputy Building Manager, any Assistant Building Managers, and at least two staff members from each laboratory using hazardous materials that require an OSP. Laboratory staff members of the BET must be trained and prepared to accompany hazardous materials technicians in order to provide advice and information on the hazards and the operation of safety devices in their facilities. Eight hours of initial training are required for qualification at this first responder level.

### **12.3.3 Hazardous Material Technician Level**

Hazardous Material Technician Level personnel are professional response personnel who respond to a release of hazardous materials with the intent of stopping the release. Twenty four hours of initial training are required for qualification at this level.

### **12.3.4 Incident Commander Level**

The Incident Commander is the ranking LBL Fire Department officer on scene, who takes command from the initial response to an incident through stabilization of the incident. Twenty four hours of initial training are required for qualification at this level, with an additional requirement for an annual demonstration of competency.

### **12.3.5 Hazardous Materials Specialist**

Hazardous Materials Specialists respond with, and provide technical guidance and expertise to the Hazardous Materials Technicians and the Incident Commander. Twenty four hours of initial training are required for qualification at this level, with an additional requirement for an annual demonstration of competency.

## **12.4 Emergency Response Organization Training**

### **12.4.1 Building Manager/Emergency Team Leader Training**

Building Managers, Emergency Team Leaders, and their deputies and assistants are required to complete the following training: Emergency Team Training, First Aid, CPR, and Fire Extinguisher Training.

This training is in addition to LBL employee orientation, which includes Hazard Communication training. This training is supplemented by annual drills that include demonstrating proficiency in building search and evacuation. Building Manager communications exercises are conducted monthly. If required, specialized training is conducted by Building Managers for emergency team members. Building Manager training is conducted at least once annually by the Emergency Preparedness Coordinator. This training normally consists of assembling all Building Managers and presenting relevant program information and training then scheduling special events such as the annual exercise. Training is documented in the LBL training data base.

#### **12.4.2 Auxiliary Emergency Team Training**

Six emergency auxiliary teams participate in drills and exercises covering their assigned emergency team functions to maintain their proficiency. This auxiliary team training is described below:

##### ***Auxiliary Traffic Operational Monitors (ATOMS)***

The ATOMS are sponsored by the University of California Berkeley Campus Police Department and the Emergency Preparedness Coordinator. They receive training in traffic and crowd control procedures and meet at least once annually. To exercise these procedures, the ATOMS are used for traffic control during the annual LBL 1.8-kilometer foot race.

##### ***Auxiliary Medical Team***

The Auxiliary Medical Team, as a minimum, is trained in basic first aid, which includes 4 hours of American Red Cross Certified Training. This Auxiliary Medical Team is sponsored by the Health Services Group of the Environment, Health and Safety Division and it meets at least once annually for training.

##### ***Auxiliary Fire Department***

The Auxiliary Fire Department is sponsored by the LBL Fire Department and trains once a month at the LBL Fire Station. The Assistant Fire Chief for Operations supervises its training, which includes a training schedule adopted by the NFPA standards for a Fire Brigade.

##### ***Amateur Radio Operators***

The Amateur Radio Operators are sponsored by the Emergency Preparedness Coordinator. This group conducts a weekly radio check for the purposes of training and equipment check.

##### ***Facilities Inspection Teams***

Four Facilities Inspection Teams are sponsored by the Facilities Department. They meet at least once annually for orientation and training.

##### ***Auxiliary Ambulance Team***

The Auxiliary Ambulance Team is sponsored by the Fire Department and trains monthly with the Fire Department. The Assistant Fire Chief for Operations supervises the training of this team. The minimum training level is American Red Cross Advanced First Aid Certification.

### **12.4.3 Command Center Team Training**

Members of the Emergency Command Center team are provided with emergency preparedness implementing procedures (EPIPS) that outline their duties and responsibilities in the ECC. ECC team members receive refresher training at least once annually in command center procedures and by participating in an exercise involving command center activation they demonstrate their proficiency.

### **12.4.4 Professional Response Group Training**

The professional response groups for LBL are the Fire Department, the UC Police Department, the Health Services Group, the Facilities Department and the Departments within the Environment, Health and Safety Division. Each department is highly specialized and conducts its own internal training program. The Emergency Preparedness Coordinator is responsible for the coordination and integration of these internal training programs to ensure that they meet the requirements of the LBL Master Emergency Plan.

### **12.4.5 Remedial Training**

All training and exercises will be critiqued to identify plans and procedures that have worked well and, more importantly, those that require changes or additional training. Annual training plans will include needed remedial training as identified during drills and exercises.

## **12.5 Examination**

Courses requiring competency levels, such as CPR and First Aid, also require written examinations before certification. The standards for and content of these examinations are developed and maintained by the outside agency that administers the course.

## **12.6 Record Keeping**

All training given at LBL is tracked on the LBL FOCUS data base, on a mainframe at LBL. Periodic reports are forwarded to division management and the LBL Safety Coordinators to inform them of the training status of their personnel. Personnel who are not in compliance with training requirements can then be identified and scheduled for classes. LBL is introducing a new documentation and scheduling process for its classes. LBL is also implementing a new documentation system of facility and project notebooks that will include training requirements and standards.

## **12.7 Nonemployee Personnel**

LBL policy states that all nonemployees such as guests, visitors, and subcontractors must have an appropriate level of training. It is the responsibility of the cognisant line manager to ensure that this training is current and commensurate with the level of risk associated with the activities of these nonemployees.



## 12.8 Training Lesson Plans

Lesson Plans broken down by categories are described below.

**Purpose:** What regulations, standards, safety and emergency preparedness issues are addressed; what this training will accomplish.

**Objectives:** What information and skills participants will know after training is complete.

**Audience:** Nature of work or group being addressed for example Emergency Command Center Team or Traffic Control Group.

**Course Title and Number:** identify the Title and number so it will be a distinct entry in the training data base.

**Instructor/s:** Name and Title.

**Course Outline:** Material covered.

**Handouts:** Copies of any material used as a handout.

**Training aids:** Identify any audio-visual equipment for props required to conduct the training.

**Evaluation:** Describe how the effectiveness of the training will be evaluated. This could be by written tests, participation in classroom exercises or performance during drills and exercises.

## 12.9 FOCUS Training Data Base (To be provided)



## **13. DRILLS AND EXERCISES**

### **13.1 Description**

Drills and exercises are an integral part of the LBL emergency preparedness program. They are conducted to provide emergency response training and to evaluate the Laboratory's capability to respond effectively to an emergency. Analysis of the results from an exercise provides the necessary information for improving weak areas and emphasizes actions that are required in emergency situations. Emergency drills and exercises require substantial effort to plan and coordinate effectively. To adequately train personnel or validate the adequacy of operational procedures and emergency plan implementation procedures, a realistic scenario and proper control must be used for drills or exercises. LBL uses the following definitions to distinguish between the significant differences between drills and exercises:

#### **13.1.1 Drills**

A drill is a supervised hands-on event that develops, tests, or maintains a specific operational or emergency response capability. The scope of LBL drills includes operational aspects in support of the Master Emergency Plan, its implementation procedures, and operational training. LBL drills include specific activities, such as notification, emergency communication, fire, medical emergencies, hazardous material detection and monitoring, environmental sampling and analyses, security, personnel accountability, evacuation, emergency categorization, decontamination, facility activation, public information, and health physics.

#### **13.1.2 Exercises**

Exercises are comprehensive performance tests of the integrated capability of most aspects of the emergency management program associated with the Laboratory. LBL exercises test the adequacy and effectiveness of: organizational command and control, implementation procedures, notifications and communications networks, emergency equipment, response organization personnel performance, and the overall emergency response program performance. Exercises must be designed and conducted for maximum realism and must attempt to duplicate the sense of stress inherent to an actual emergency situation.

### **13.2 LBL Drill and Exercise Program.**

#### **13.2.1 Exercises**

Laboratory exercises must be conducted annually. All first responder organizations will be integrated into the exercise, and the emergency command center will be activated. At least once annually, there will be an exercise involving an evacuation of all buildings Laboratory-wide. This evacuation exercise will either be in conjunction with Earthquake Preparedness Month activities in April or Fire Prevention Week in October. Exercise planning will begin 6-9 months before the scheduled date for the exercise. Exercises will normally focus on one major event in a scenario. Coordination with local jurisdictions and DOE/SF will be established.

#### **13.2.2 Drills**

Drills will be conducted quarterly. Drills will focus on a building or facility and will involve emergency response organizations and selected personnel from the affected building or complex.

### 13.2.3 Participants and Non-Participants

With the exception of the annual evacuation drill, the LBL exercises and drills will be transparent to many LBL employees. During the quarterly drill, those people occupying affected buildings will participate to the extent necessary to make the drill realistic. The exercise coordinator will determine the necessary participation of personnel. If an evacuation is required, the occupants may be allowed to return to the building when the exercise objectives are met and it is safe to do so. Consequently, drills and exercises will be designed to allow for building occupants to respond appropriately and then return to work. First responders and Building Emergency Teams will participate for the full duration of the exercise.

### 13.2.4 Safety

The safety of personnel and the facility is paramount during drills and exercises. The planning and management of drills and exercises must ensure that sufficient precautions and limitations are established and adhered to for their safe conduct. A member of the Occupational Safety Department will be assigned to the planning group to ensure safety is observed during the planning and conduct of the exercise. This representative will have authority during a drill or exercise to halt all activity if unsafe practices are observed.

## 13.3 Drill and Exercise Planning Process

### *Drill and Exercise Coordination*

A member of the Emergency Preparedness Office will be the coordinator for drills and exercises. This coordinator will establish a planning and coordinating committee to establish the goals and objectives, determine resource requirements, including evaluators and controllers, and coordinate with all involved on/off-site agencies. Members from the Laboratory divisions will be asked to participate in this planning and evaluation process as necessary.

### *Drill and Exercise Schedule*

A schedule for drills and exercises will be published annually in July and will include a two year planning window. The first year will be a firm schedule and the second year will be for planning. The schedule will include the month of the drill/exercise, the locations by building or complex and the general scenario. The Associate Laboratory Director for Operations will approve this schedule.

### **Drills**

In accordance with the established schedule, objectives will be established for the drill to be staged at a building/complex 3 months in advance. The objectives will be developed by the planning committee and line management of the affected building. Drills will be planned around the specific activities and hazards associated with a building/complex. Objectives of the drill should focus on an integrated response by first-responding organizations and the Building Emergency Team. The Incident Command System will be used in all drills.

### **Exercises**

Planning will begin at least 6 to 9 months before the exercise. Since the scope of exercises is broader than drills, the requirement for resources, planning and coordination will be much greater. As with drills, exercises will be based on specific objectives but will include a scenario that covers the entire Laboratory both on and off site. The exercise will be coordinated with the emergency

managers of the Cities of Berkeley and Oakland and with Alameda County. The LBL Emergency Command Center will be activated during all exercises.

## **13.4 Evaluations**

### ***Evaluation and Critique***

Drills and exercises provide feedback to resolve deficiencies and incorporate improvements into the emergency management program. Evaluators monitor the performance of players to determine if procedures, equipment, communications, references, maps, and other material meet designed purposes. All evaluations will be made using defined criteria such as the Master Emergency Plan, Master Emergency Plan Implementing Procedures, exercise objectives and DOE Orders or industry standards.

### ***Evaluators***

Evaluators will be provided with an exercise package that includes the scenario and master events list (MEL). A communications network will be established for evaluators and controllers. A checklist will be provided to ensure standardization of the evaluation process. All comments will be in written form. Evaluators will be assigned specific locations that will allow them to effectively evaluate the drill or exercise.

## **13.5 Critiques**

Critiques, both verbal and written, will be conducted after each drill or exercise. All participating groups such as Fire, Police, Building Emergency Teams, Auxiliary Teams, and any others will conduct a verbal critique immediately following the drill or exercise. Evaluators will take part in these critiques. These groups will designate a recorder and the written results will be forwarded to the Emergency Preparedness Coordinator within 2 days. The evaluators and controllers will also provide their written evaluations to the EPC within 2 days. The EPC will track corrective actions to ensure they are complete.

## **13.6 Off-Site Coordination**

The LBL Emergency Preparedness Coordinator is a member of the Alameda County Emergency Managers Association and "Town and Gown"(which consists of: UC Berkeley, the City of Berkeley, the State Office of Emergency Services, and the LBL Emergency Preparedness Organization). Drills and exercises will be coordinated through these professional groups. Coordination with the DOE will be through the on-site DOE/SF Office. DOE/SF will be invited to observe drills and participate in exercises.



## 14. EMERGENCY MANAGEMENT ADMINISTRATION

### 14.1 Emergency Management Administrator

The Laboratory Director is responsible for ensuring that LBL Health, Safety, and Emergency Preparedness policies are carried out. The LBL Associate Laboratory Director for Operations has been delegated the authority to develop and administer the Laboratory Health and Safety program. In turn the Associate Director for Operations has delegated responsibility for Health and Safety administration and policy to the EH&S Division Director, under whom are the heads of the Environment, Health and Safety Division departments. Responsibility for the overall administration of the Emergency Management Program, including this Master Emergency Plan (MEP), the Emergency Readiness Assurance Program (ERAP), and annual updates for both, has been delegated to the Emergency Preparedness Coordinator, who is located in LBL Building 48, Room 108 [phone number (510) 486-6016]. Therefore, development of procedures and/or implementation guides, as well as training and exercises pertinent to either the MEP or ERAP, are the responsibility of the Emergency Preparedness Coordinator. The Laboratory Director has delegated the responsibility and authority necessary to implement emergency preparedness policy adherence to the pertinent supervisory personnel in their specific areas of Health, Safety and Emergency Preparedness as described below [see the LBL Health and Safety Manual (PUB-3000), Chapter 3].

**Division Directors** are responsible ensuring that LBL health, safety and emergency preparedness policies are observed within their divisions.

**Building Managers** are responsible for assisting with preparation and update of Building Emergency Plans.

**Laboratory Line Management** is responsible for ensuring that employees are properly trained in safety and emergency procedures.

**The EH&S Division** is responsible for assisting divisions to comply with all applicable safety rules and standards, for providing appropriate technical support, and the Emergency Preparedness Coordinator (within the EH&S Division) is responsible for monitoring compliance with all LBL emergency preparedness policies.

**The Office of Assessment and Assurance** ensures that the environment, health, and safety management systems and procedures are in place and implemented.

**The Facilities Department** is responsible for ensuring that all LBL facilities comply with the Life Safety Code and other pertinent building codes.

**The Engineering Division** is responsible for technical assistance to code-compliance officials.

### 14.2 Self Assessment

#### 14.2.1 Laboratory Assessment and Assurance

The Office of Assessment and Assurance (OAA) independently reviews all areas of Laboratory activity. (This includes auditing the Emergency Preparedness Program and Office-Coordinator.) The OAA recommends quality assurance methods directly to the LBL Director. The assessment process is on-going and it is the responsibility of the pertinent supervisor or manager to ensure that identified deficiencies in quality and/or safety are corrected in a timely manner.

## 14.2.2 Office of Emergency Preparedness

As part of the LBL continuous improvement process, emergency preparedness is an integral part of the LBL program for self-assessment and quality assurance. The Office of Emergency Preparedness has provided performance objectives and criteria to be included in the on-going self-assessment program. In a related effort, the Office of Emergency Preparedness is participating in establishing the detailed requirements for the Laboratory's Quality Assurance and Conduct of Operations program. Three types of documentation are used to ensure quality in LBL operations. These are the Project Notebook, the Facility Notebook, and the Function Notebook. These documents provide the basis for detailed emergency response procedures for individual laboratories, shops, offices, or other work stations. These documents, when combined with the Master Emergency Plan and individual building emergency plans, comprise the LBL written emergency preparedness program. They are to be used in the self-assessment program to determine the effectiveness of the Laboratory's Emergency Preparedness. A system for physical inspections is included in the self-assessment program. Not only are occupants of LBL buildings required to be aware of safety issues but routine fire department inspections include the reporting of any egress issues in support of the emergency preparedness program. This coupled with the required internal independent management reviews performed every three years provides the quality assurance and controls needed to comply with DOE requirements for Conduct of Operations, Quality Assurance, and Self-Assessment as well as Emergency Preparedness.

## 14.3 Documentation

### 14.3.1 Master Emergency Plan

This plan contains elements that describe the emergency management program, overall response capabilities, and all pertinent diagrams, maps or illustrations. Supporting documentation is referenced and available to emergency response personnel. The LBL MEP includes a site and facility description that incorporates all pertinent topographical, demographic, transportation, and land use information. In addition the MEP also contains descriptions of facilities, site specifications, and jurisdictional boundaries. By integrating both local and federal requirements for event level classification and response the LBL MEP is made consistent with the County of Alameda's, the State of California's and DOE's emergency planning specifications.

### 14.3.2 Emergency Program Implementation Procedures (EPIPs)

The LBL EPIPs were developed with and are in compliance with DOE specifications. They integrate event classification (EALs), notification procedures, ECC protocol, and other pertinent procedures that would be utilized during emergency response activities.

### 14.3.3 Emergency Records

LBL emergency policy, planning, procedures, implementation, and review records are coordinated by the Office of Emergency Preparedness. All documentation is the responsibility of and maintained by the Emergency Preparedness Coordinator.



#### **14.4 DOE Order 5500.7B, Emergency Operating Records Protection Program**

The provisions of this Master Emergency Plan implement DOE Order 5500.7B, Emergency Operating Records Protection Program, by:

Designating and listing key personnel responsible for disaster response and recovery.

Storing emergency mission records at the Emergency Command Center.

Providing delegation of authority and succession of command during disasters.

Providing listings of personnel, property, and activities sufficient to provide a basis for damage assessments.

Planning for recovery as described in Chapter 9 of this Master Emergency Plan.

The LBL Archivist assists with the inventory and identification of emergency operating records in accordance with DOE 5500.7B.



## APPENDIX A: EMERGENCY COMMAND CENTER ACTIVATION

### 1. Description/Responsibilities

The Emergency Command Center is located in the Firehouse, Building 48, Room 108 and is activated under the following conditions:

Upon request of the On-scene-commander due to an incident requiring resources much greater than those normally employed during response.

The Associate Laboratory Director for Operations, or his designee, may activate the Command Center based on the emergency situation.(i.e. *Alert, Site or General*)

The Director may activate the Command Center.

The members of the Emergency Command Center staff and details of their primary functions are listed in the *Emergency Program Implementing Procedures (EPIPs)*. The first arriving members of the ECC Team may be required to set up the ECC. The ECC checklist below should be followed.

### 2. Objectives

Support LBL emergency response by locating the storage and predesignated emergency locations of the supplies, equipment and reference materials necessary for the activation and support of the ECC. The supplies and materials' locations (see Figure A-1) are as follows:

- (1) Tables: are stored under the stationary tables located on the south wall. Set up in "horse shoe" with the open end facing west. See Figure A-1 for the specific location of Coordinator assignments.
- (2) Chairs: are located on the north wall. Set up one chair for each Coordinator and the IC (10 total)
- (3) Command Center Team's phones: are stored in the labelled storage boxes with other administrative supplies. Set up one for each Service Coordinator and the IC.
- (4) Command Center Team's phone lines: each Service Coordinator will have a line located in the ceiling directly above his/her assigned location. Open the latched box, the phone lines will fall from the ceiling storage box. The lines are labelled and correspond to a telephone located in the storage boxes.
- (5) Status Overhead/Screen: set up the overhead directly in front of the window located on the west wall(next to Status Planning Board). Pull down the screen located above the window.
- (6) Command Center Administrative Supplies: are located on either side of the "hall door." Locate and distribute the supplies located in the two cabinets. Each service Coordinator has a storage box labelled and containing material and supplies.
- (7) Reference Materials: check the inventory of reference materials stored directly above the stationary tables on the west wall of the ECC.

### 3. Organization

The ECC functions performed by *Service Coordinators* are: Medical, Environment, Health and Safety, Fire, Police, Telephone Communications, Facilities, Logistics, Public Information, Status and Planning, and Radio Communications. The specific responsibilities and procedures for the IC and Service Coordinators are described in the *Emergency Program Implementation Procedures* (EPIP). The Emergency Management Team will gauge response based on the emergency classification criteria and determination procedures described in MEP Chapter 4, Event Classes.

### 4. Coordination

The Service Coordinators, in support of the OSC's response activities, will advise the IC on the management of a multi-event incident by establishing an assessment function and providing that information to the appropriate SCs. Communication concerning resource requirements, allocation priorities and tracking will be coordinated by the SCs. The logistical systems necessary for this function will be established in the ECC by the SCs. These functions are consistent with and in some cases supplementary to those described in their respective EPIPs.

**EMERGENCY COMMAND CENTER ACTIVATION CHECKLIST****Date/Time Initials**

\_\_\_\_\_ Upon the determination of an actual emergency the ECC will be activated. The first member of the ECC Team to arrive will begin notification of the other members during working hours by using the PA system or after hours through the Emergency Contact and Key Personnel Wallet Directory.

\_\_\_\_\_ Confirm status and location of emergency supplies and material for the ECC

- Tables are set up in horse shoe fashion.
- Chairs are distributed to all members of the ECC Team
- ECC Team phones are properly distributed
- Phone lines are located, brought down and properly attached
- Status Overhead and Screen are located and properly positioned
- ECC administrative supplies are properly and adequately distributed
- Reference materials have been inventoried, and any required material is located and provided as necessary

\_\_\_\_\_ Establish an ECC Activity Log. This becomes the IC Activity Log. Document to include:

- Messages received and response.
- Actions taken, i.e. open communications, damage assessment, etc.
- Requests for resources, and requests filled.(internal)
- Contact with Local, State and Federal Agencies
- Request for mutual aid from Alameda County or local agencies
- Time on duty(ECC personnel)

Request similar information be required from Service Coordinators/Staff

\_\_\_\_\_ Inform Director or Alternate of situation. Confirm status. Identify IC.

\_\_\_\_\_ Confirm that SC's have been notified and reporting to ECC. SC's will:

- Identify staff and establish ECC operational station
- Review departmental emergency plans
- Review EPIP's and SOPs
- Review technical/site material and resource lists
- Review emergency associated operational sites and areas
- Submit relevant information and coordinate response efforts

\_\_\_\_\_ Request that Public Information policy be established and implemented. Issues to be included, but not limited to, are:

- Notification of local, state, federal and other relevant agencies.
- Media information and site access
- Public information/warning dissemination
- Damage assessment and personnel/public status

# LBL Command Center Layout

## Bldg 48, Room 109

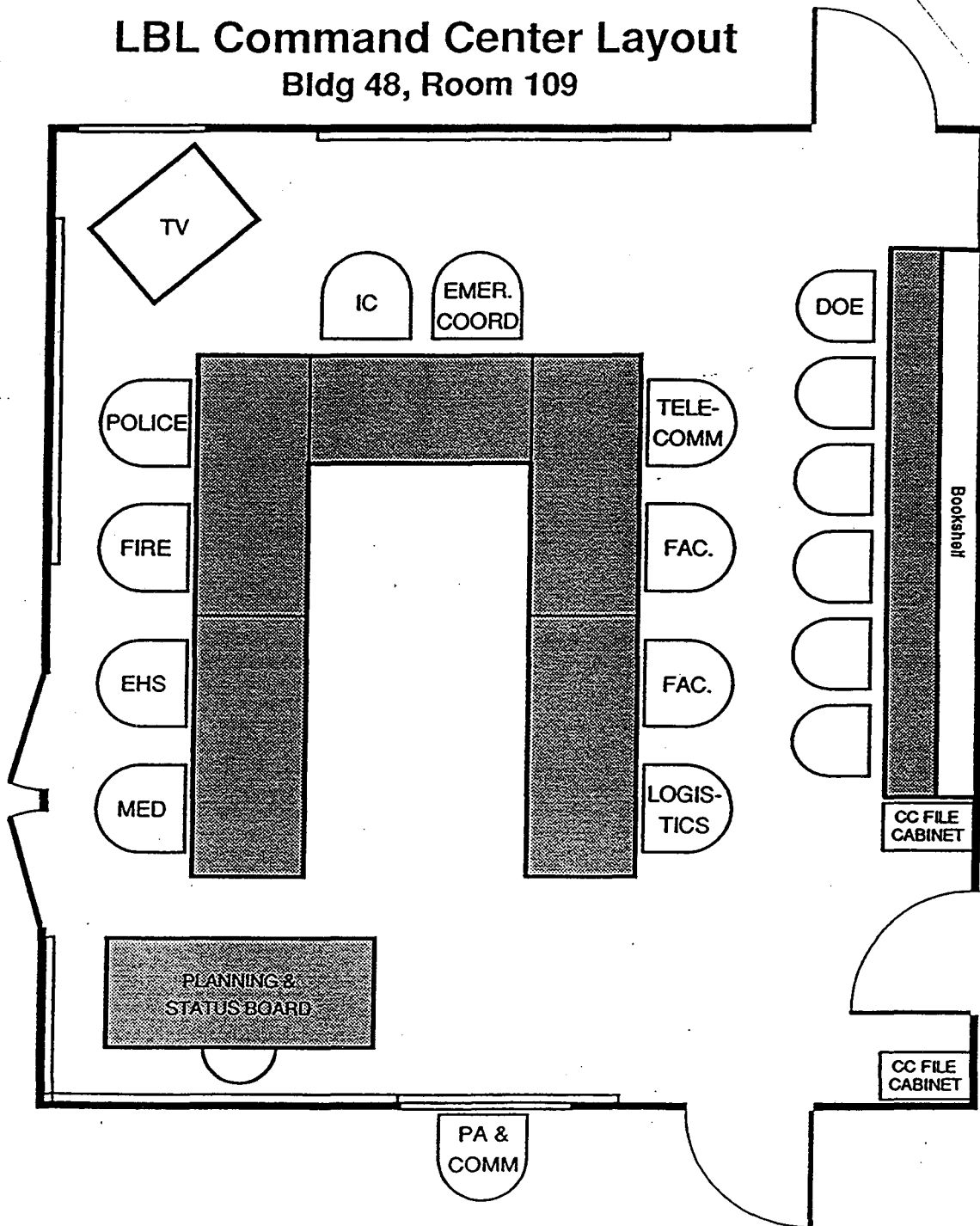


Fig A-1. Emergency Command Center floor plan.

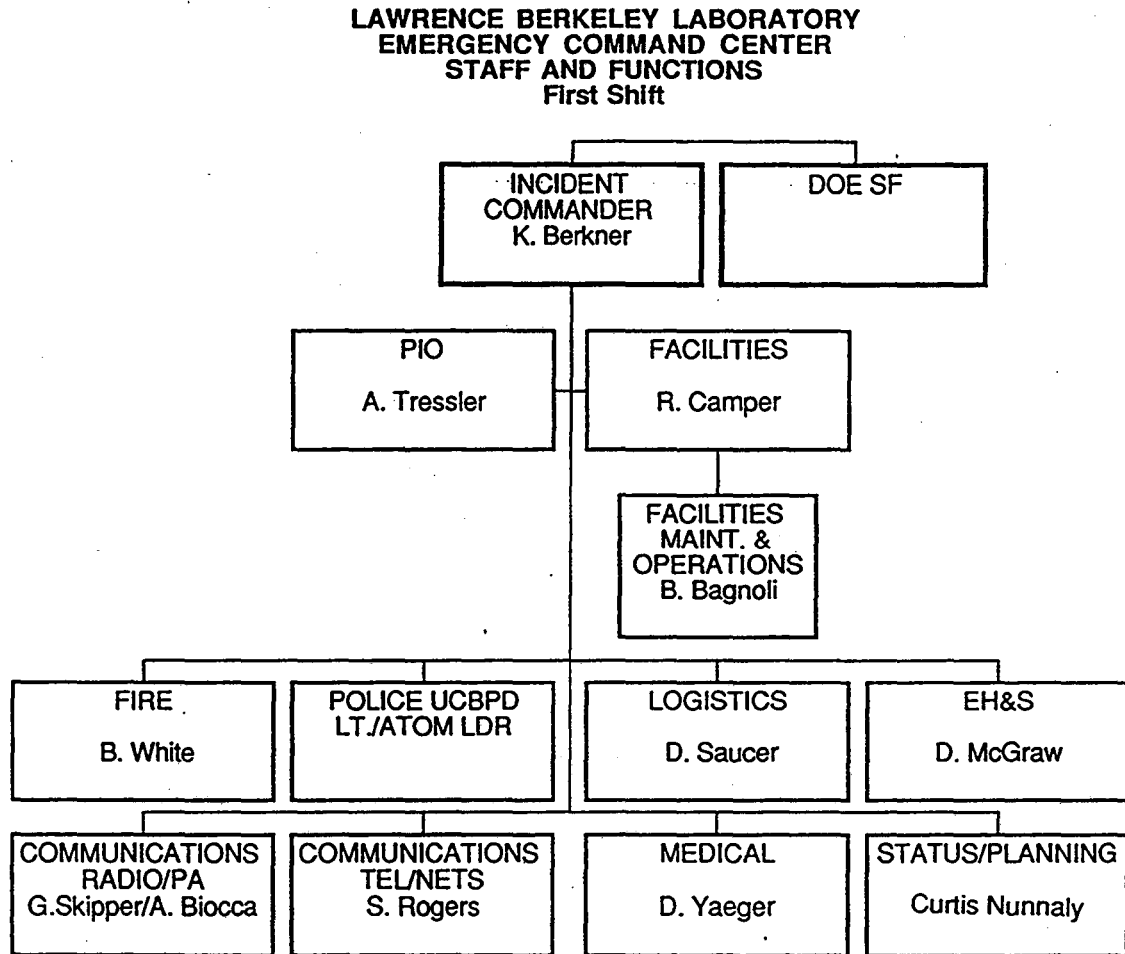
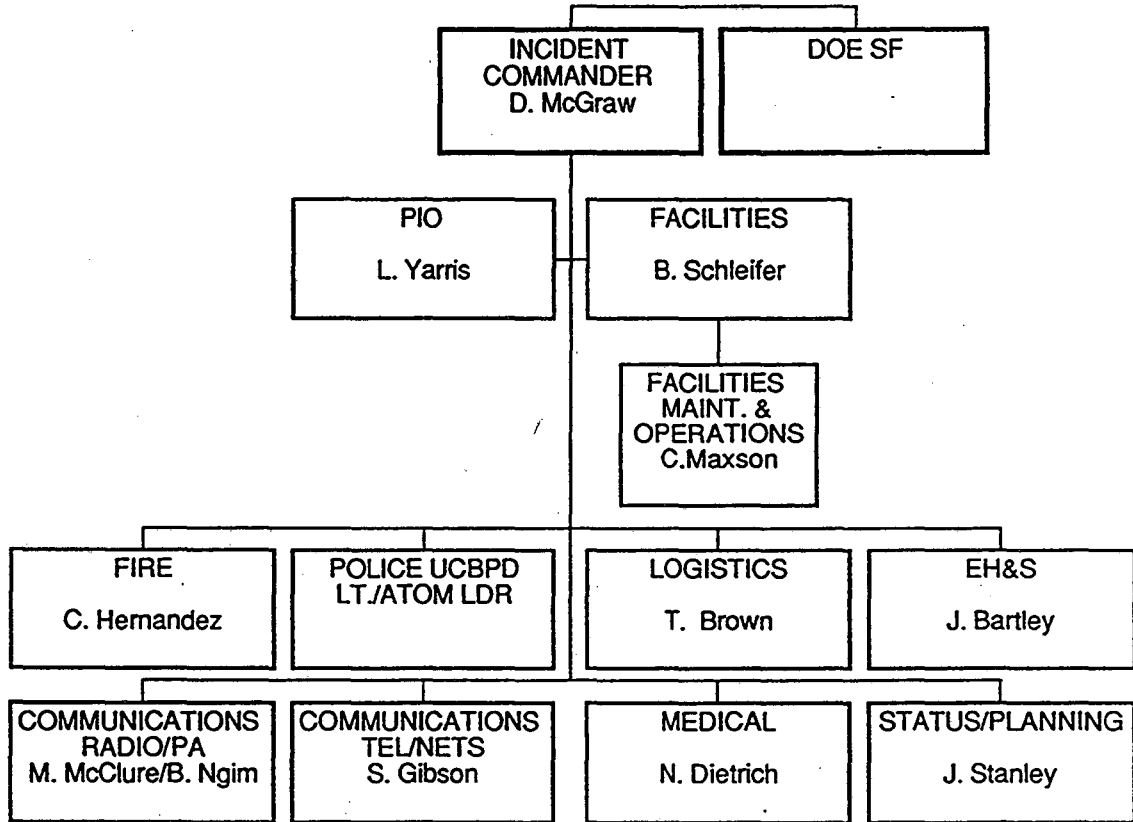


Fig A-2. Emergency Command Center Staff Shift 1.

**LAWRENCE BERKELEY LABORATORY  
EMERGENCY COMMAND CENTER  
STAFF AND FUNCTIONS  
Alternates/Second Shift**



**Fig A-3. Emergency Command Center Staff Shift 2.**





## APPENDIX B: GLOSSARY

**Drill** A supervised hands-on event that develops, tests, or maintains a specific operational or emergency response capability. The scope of LBL drills includes operational functions to support the Master Emergency Plan, its implementing procedures, and operational training. Laboratory drills include specific activities such as notification, emergency communication, fire, medical emergencies, hazardous material detection and monitoring, environmental sampling and analyses, security alerts, personnel accountability, general evacuation, emergency categorization, decontamination, facility activation, public information, and health physics.

**Emergency** Any significant deviation from planned or expected behavior or course of events that could endanger or adversely affect people, property or the environment.

**Emergency Action Level (EAL) Criterion** A specific, predetermined, and observable criterion used to detect, recognize, and determine the emergency class of an operational emergency. An EAL can be an instrument reading; an equipment status indication; a measurable parameter from either on site or off site; a discrete, observable event; results of analyses; or another observed phenomenon that indicates entry into a particular emergency class.

**Emergency Classes** Three emergency classes have been established. Alert, Site Area Emergency, and General Emergency. These classes are considered operational emergencies and are described in DOE Order 5500.2B. They are defined as follows:

**Alert** Events are in progress or have occurred that involve an actual or potential substantial reduction for the level of facility safety and protection. Any environmental releases of hazardous materials are expected to be limited to small fraction of the appropriate Protective Action Guideline (PAG) or Emergency Response Planning Guideline (ERPG) on site.

**Site Area Emergency** Events are in progress or have occurred that involve actual or likely major failure(s) of facility safety or safeguards systems needed for the protection of on-site personnel, the public health and safety the environment, or national security. Any environmental releases of hazardous materials are not expected to exceed the appropriate PAG or ERPG exposure levels off site

**General Emergency** Events are in progress or have occurred that involve actual or imminent catastrophic failure of facility safety systems with a potential for loss of confinement integrity, catastrophic degradation of facility protection systems, or catastrophic failure in safety or protection systems that threatens the integrity of a weapon or test device which could lead to substantial off-site impacts. Any environmental release of hazardous materials can reasonably be expected to exceed the appropriate PAG or ERPG exposure levels off site.

**Emergency Equipment** Any equipment that may be required to measure, control, or mitigate the consequences of an emergency.

**Emergency Exposure Guidance Level** A recommendation developed by the National Academy of Sciences to protect military personnel during emergencies.

**Emergency Plan** A document that describes the Laboratory's overall emergency response functions, facilities, and equipment as well as appropriate state, county, or local plans. This document is supplemented by implementing procedures.

**Emergency Resources** Any individual, group of individuals, equipment, instrumentation, or specialized services that have been assembled, organized, or developed for the purpose of assisting in alleviating the consequences of an emergency.

**Emergency Response Planning Guidelines** These are planning guideline values intended to provide estimates of concentration ranges above which one could reasonably anticipate to observe adverse effects (as described in the definitions of the ERPG levels) resulting from exposure to a specific substance. The *American Industrial Hygiene Association* stresses that since human exposure response varies over a wide range, ERPGs are only planning guidelines and as such should not be used as exposure guidelines. They are defined by the AIHA as follows:

**ERPG-1** The maximum airborne concentration to which it is believed that nearly all individuals could be exposed to for up to 1 hour without experiencing other than mild transient adverse health effects or perceiving a clearly defined objectionable odor.

**ERPG-2** The maximum airborne concentration to which it is believed that nearly all individuals could be exposed to for up to 1 hour without experiencing or developing irreversible or other serious mild health effects or symptoms that could impair their abilities to take protective action.

**ERPG-3** The maximum airborne concentration to which it is believed that nearly all individuals could be exposed to for up to 1 hour without experiencing or developing life-threatening health effects.

**Exercise** A comprehensive performance test of the integrated capability of most aspects of the emergency management program associated with the Laboratory. LBL exercises test the adequacy and effectiveness of organizational command and control; implementation procedures, notifications, and communications networks; emergency equipment; response organization personnel performance; and the overall emergency response program performance. Exercises must be designed and conducted for maximum realism and to duplicate the sense of stress inherent in an actual emergency situation.

**Hazardous Materials Technician** Individuals who have been trained to respond to hazardous material incidents in a defensive fashion and in stopping the release: that is, they can plug, patch, or otherwise attempt to stop a leak. Hazardous Material Technicians have at least 24 hours of initial training and annual re-training as defined by OSHA 1910.120

**Immediately Dangerous to Life and Health Level (IDLH)** A protective action guideline defined by the *Standard Completion Program* of the National Institute of Occupational Safety and Health. The IDLH is only for the purpose of respirator selection and represents a maximum concentration from which, in the event of respirator failure, one could escape within 30 minutes without experiencing any escape impairment or irreversible health effects.

**Off site** All areas not on site and not within the control of the Laboratory.

**On site** The area within the Laboratory over which it has authority to control all activities, including exclusion or removal of personnel and property.

**Operational Emergency** Significant accidents, events or natural phenomena that seriously degrade the safety or security of DOE facilities.

**Permissible Exposure Limit (PEL)** The limit for airborne exposure by a particular chemical to an employee as established by OSHA.

**Permissible Exposure Limit-Short Term Exposure Limit (PEL-STEL)** The concentration over which an employee's short-term time-weighted average exposure (typically 15-minutes) shall not be exceeded at any time in the work day. Exposure limits are promulgated and enforceable by OSHA standards.

**Permissible Exposure Limit-Time Weighted Average (PEL-TWA)** The time-weighted average exposure to an employee that must not be exceeded in any 8-hour shift of a 40-hour week. Exposure limits are promulgated and enforceable by OSHA standards.

**Protective Action** An action taken to avoid or reduce the projected radiation dose to individuals.

**Protective Action Guide/Guideline** A projected numerical radiation dose, toxic, or hazardous material concentration to an individual that may trigger a Protective Action. Protective Action Guides reflect a balance of risks and costs to on-site personnel, public health and safety, and the environment against the benefits gained by such actions.

**Recovery** Action taken after an affected facility has been brought to a stable or shutdown condition, including those actions taken to mitigate the emergency and return the facility to normal operation.

**Threshold Limit Value (TLV)** Employee limit for exposure to specified airborne chemicals as established by the American Conference of Governmental Industrial Hygienists (ACGIH).

**Threshold Limit Value Short Time Exposure Level (TLV-STEL)** The short-term exposure limit concentration to which workers can be exposed continuously for a 15-minute period of time up to 4 times a day without suffering from irritation, chronic or irreversible tissue damage, or significant narcosis.

**Threshold Limit Value-Time Weighted Average (TLV-TWA)** The time weighted average concentration for a normal 8-hour workday and a 40-hour workweek to which all workers may be repeatedly exposed day after day without adverse effect.

**Workplace Environmental Exposure Level (WEEL) Guide** These include 8-hour TWAs that should not be exceeded and short term TWAs (e.g., 1 min or 15 min) where these differ from the 8-hour values.

**C. ABBREVIATIONS**

**APPENDIX C: ABBREVIATIONS AND ACRONYMS**

<b>AIHA</b>	American Industrial Hygiene Association
<b>ALARA</b>	As Low As Reasonably Achievable
<b>BET</b>	Building Emergency Team
<b>BIT</b>	Building Inspection Team
<b>BLS</b>	Basic Life Support
<b>CNFO</b>	Communication and Networking Facilities Office
<b>CPR</b>	Cardio Pulmonary Resuscitation
<b>DAC</b>	Derived Air Concentration
<b>DOE</b>	Department of Energy
<b>DOE/SF</b>	Department of Energy San Francisco Field Office
<b>EAL's</b>	Emergency Action Levels
<b>EBMUD</b>	East Bay Municipal Utility District
<b>EBRPD</b>	East Bay Regional Parks District
<b>ECC</b>	Emergency Command Center
<b>EEGL</b>	Emergency Exposure Guidance Level
<b>EH&amp;S</b>	Environment, Health and Safety
<b>EMCS</b>	Emergency Management Control System
<b>EMT</b>	Emergency Medical Technician
<b>EPA</b>	United States Environmental Protection Agency
<b>EPC</b>	Emergency Preparedness Coordinator
<b>EPIP's</b>	Emergency Program Implementation Procedures
<b>ERPG's</b>	Emergency Response Protection Guidelines
<b>FA&amp;E</b>	Facilities Architecture and Engineering
<b>FAC</b>	Facilities Department
<b>FM&amp;O</b>	Facilities Maintenance and Operations

<b>HAZ MAT</b>	Hazardous Material
<b>HAT MAT TECH</b>	Hazardous Materials Technician
<b>HAZWOPER</b>	Hazardous Waste Operations and Emergency Response
<b>HMMP</b>	LBL's Hazard Materials Management Plan
<b>IC</b>	Incident Commander
<b>ICS</b>	Incident Command System or Integrated Communication System
<b>IDLH</b>	Immediately Dangerous to Life and Health Level
<b>LBL</b>	Lawrence Berkeley Laboratory
<b>LLNL</b>	Lawrence Livermore National Laboratory
<b>MEP</b>	Master Emergency Plan
<b>MOA's</b>	Memoranda of Agreement
<b>MOU's</b>	Memoranda of Understanding
<b>OAA</b>	Office of Assessment and Assurance
<b>OES</b>	California Office of Emergency Services
<b>OPRS</b>	DOE's Occurrence Reporting and Processing System
<b>OSC</b>	On-Scene Commander
<b>OSHA</b>	Occupational Safety Health Administration
<b>PAG's</b>	Protective Action Guidelines
<b>PEL-STEL</b>	Permissible Exposure Limit Short Term Exposure Limit
<b>PEL-TWA</b>	Permissible Exposure Limit Time Weighted Average
<b>PG&amp;E</b>	Pacific Gas and Electric
<b>PIO</b>	Public Information Officer
<b>PUB-3000</b>	Environment Health and Safety Manual
<b>RAG'S</b>	Response Action Guidelines
<b>SRC</b>	LBL Safety Review Committee
<b>TLV-C</b>	Threshold Limit Value Ceiling
<b>TLV-STEL</b>	Threshold Limit Value Short Time Exposure Limit

<b>TLV-TWA</b>	Threshold Limit Value Time Weighted Average
<b>TOMES</b>	Toxicology, Occupational Medicine & Environment Series
<b>TRI</b>	Technical Resources International
<b>UCB</b>	University of California at Berkeley
<b>UCBPD</b>	University of California Berkeley Police Department
<b>UPS</b>	Uninterruptable Power Source
<b>WEEL</b>	Workplace Environmental Exposure Level Guide