Ernest Orlando Lawrence Berkeley National Laboratory

EARTH SCIENCES DIVISION

Integrated Safety Management Plan

Revision 7

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Change History

This Health and Safety Plan is reviewed and modified as necessary as part of the Division's Annual Self-Assessment to assure continual improvement. The following table outlines the change history to this Plan:

Revision	Change Date	Summary of Changes
REV 7	September 30, 2007	Reflect changes to Pub 3000; provided URLs in lieu of appendices
REV 6	February, 2005	Updated department names, opportunities for improvement; clarification of line management supervisor/PI EH&S responsibilities; ergonomic injury prevention policy; SAA policy; MOU w/ UCB; Lab-space Lead PI description; lab safety primer description.
REV 5	14 July, 2003	Minor update. Expanded explanation of work authorizations and process and expectation for students. Plan modified to include updated opportunities for improvement and appendices.
REV 4	February 2002	Significant revision. Improved accident investigation process, developed ergonomics initiative, changed process to better involve line management and changed procedure for matrixed employees. Updated opportunities for improvement and appendices.
REV 3	June 2001	Minor updates including updated opportunities for improvement and appendices.
REV 2	June 1999	Minor updates including updated opportunities for improvement and appendices.
REV 1	May 1997	Initial document developed under Integrated Safety Management System

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1. INTRODUCTION

The Earth Sciences Division (ESD) at Lawrence Berkeley National Lab (LBNL; Berkeley Lab) performs fundamental and applied geosciences research related to subsurface energy resources, nuclear waste disposal, environmental restoration and ecology, and climate change. ESD maintains experimental (laboratory and field) and computational core-capabilities in the disciplines of vadose and saturated zone hydrology, fracture hydrology, atmospheric and ocean sciences, petroleum and geothermal reservoir engineering, seismic and electromagnetic geophysics, isotope geochemistry, environmental microbiology and rock and soil physics.

Each ESD staff member belongs to a Department (Geophysics, Hydrogeology, Geochemistry, Climate Science and Ecology) aligned with their professional expertise, which also serves as their administrative home. Department Heads are responsible for safety, staffing, promotions, performance evaluations, and training matters. Departments are further divided into Research Areas, each with a scientific focus, led by a Research-Area Leader. Departments provide the people (scientific expertise) and work with the Division Director and Space Coordinators to identify appropriate facilities to do the research, but do not control research funds. Administrative support is provided by Division Support Staff, led by ESD's Business Manager.

Research in ESD is conducted within six Programs (Nuclear Waste, Energy Resources, Fundamental and Exploratory Research, Environmental Remediation, Climate Change and Carbon Management, and Geologic Carbon Sequestration) that are aligned to our major DOE funding sources. Each Program is lead by a Program Head who is the principal point-of-contact between ESD research and DOE, and has a major responsibility for sustaining and building programs. Research-Area Leaders (described above) and Program Coordinators (if appointed by a Program Head) may also share in program responsibility. Members of the ESD scientific/technical staff are assigned to work on one or more projects in these six Programs. Projects are led by one or more Principal Investigators (PIs), who typically develop the research proposal and obtain the funding contract. Employees typically work on more than one project during a fiscal year, and as a consequence often work under the direction of more than one PI. In addition, an employee can be a participant on one project and the PI for another project. Regardless of how many projects an employee works on or leads, that employee has only one administrative Supervisor, or Supervisor of Record as listed in Human Resources.

The ESD Organization Chart can be found at http://www-esd.lbl.gov. Line Management with respect to an employee's safety is defined as the administrative Supervisor to Department Head to Deputy Director to Division Director to Lab Director. Line management with respect to implementing ES&H policy flows from the Lab Director, to the Division Director, to Department Heads, to Supervisors and Principal Investigators. All ESD management must ensure that work under their leadership is performed in compliance with ESD's and LBNL's Environmental Health and Safety Plan.

ESD is committed to performing work safely and in a manner that ensures protection of employees, the public, Laboratory assets and the environment. ESD's line and Program management, its staff, contractors, students, and participating guests are responsible and accountable for the safe performance of work, and will exert sufficient care, and provide resources toward the safe conduct of its operations.

2. INTEGRATED SAFETY MANAGEMENT SYSTEM (ISMS) IMPLEMENTATION WITHIN ESD

The Berkeley Lab's ES&H policies and requirements are contained in the Regulations & Procedures Manual (RPM) http://www.lbl.gov/Workplace/RPM/, the Health & Safety Manual (PUB-3000) http://www.lbl.gov/ehs/pub3000/, the Integrated Environment, Health & Safety Management Plan (PUB 3140) http://www.lbl.gov/ehs/ism/Title.html and the Self-Assessment Program Implementation Plan (PUB-5344) http://www.lbl.glv/DIR/OIA/OCA/assurance-sys/EHS/ESH_Assur.html. These policies and procedures implement the contractual requirements between the Department of Energy and University of California contained in Contract 98 http://labs.ucop.edu/internet/comix/, Appendices F (Performance Measures) and G (Directives).

This Integrated Safety Management (ISM) Plan (referred to as the Plan) explains how the Berkeley Lab's ES&H policies and procedures will be implemented in ESD and defines the roles and responsibilities for ESD employees, students, visitors, participating guests, contractors and matrixed employees. The Plan will be reviewed, and modified if necessary, as part of the Division's Annual Self-Assessment to assure continuous improvement.

This Plan covers all ESD employees, employees who are matrixed to ESD from other Divisions, students, participating guests, contractors and visiting scholars, regardless of compensation and regardless of work location. LBNL work performed at the UC Berkeley campus must conform to the *"Partnership Agreement Between UCB and LBNL Concerning Environment, Health and Safety Policy and Procedures"* (http://www.lbl.gov/ehs/ism/ucb_lbl_partnership_3_15_04.pdf) dated March 15, 2004.

The following sections of this Plan describe how ESD applies the Integrated Safety Management System (http://www.lbl.gov/ehs/pub811/index.html), using the Seven Guiding Principles to Achieve ISM (described in PUB-3000, Section 1.3) by means of the Five ES&H Core Functions (PUB-3000, Section 1.4).

2.1 Opportunities for Improvement

Through the self-assessment process, ESD continually obtains feedback and identifies opportunities for improvement of its ES&H program. These identified items are entered into the Corrective Action Tracking System (CATs), which are addressed in a timely manner.

2.2 Responsibility and Accountability

All employees in ESD, regardless of job classification, work location, seniority, or supervisory responsibilities, are to work under this Plan and are responsible for working safely. Furthermore, the Safety Line Management (the Division Director, Department Heads and Supervisors) and Program Heads, Principal Investigators (PIs), and Laboratory-space Lead PIs have a special and unique responsibility to provide safety leadership. This section discusses the safety responsibilities of all ESD employees, employees matrixed to ESD from other Divisions, students, participating guests, contractors and visiting scholars. Safety Line Management in ESD

is detailed in an At-A-Glance 1-page handout called, "Line Management," which can be viewed at this URL: http://www-esd.lbl.gov/ESDEHS/lab_safety_primer/Line_Management.aag_Jan07.pdf.

Division Director—The Division Director is responsible and accountable to the Laboratory Director for assuring that demonstrable policies and programs are established and implemented to support and comply with the Laboratory's ES&H policies and requirements.

Division Safety Coordinator (DSC)—The DSC is appointed by the Division Director, and is responsible and accountable to the Division Director for advising, documenting, disseminating, and tracking compliance with Division ES&H policies. The DSC serves as a point of contact between ESD staff (including matrixed employees, students and participating guests) and LBNL's EHS Division.

Department Heads—Department Heads are responsible and accountable to the Division Director for understanding Berkeley Lab's and ESD's ES&H policies. They are further responsible for understanding and complying with the provisions of this Plan. Department Heads, as part of Safety Line Management, are further responsible for assuring that this Plan is understood and is being implemented by their line managers (Principal Investigators, and other supervisors).

Principal Investigators (PIs) and other Supervisors—PIs and other Supervisors are accountable to their Department Head for understanding and complying with the provisions of this Plan and for reviewing on-site and off-site research activities under their direction to identify and control work hazards, to consult appropriate subject-matter experts when needed, to prepare/review safety documents and authorizations, and to ensure that all work is carried out in a safe manner and in accordance with all Laboratory and Divisional ES&H requirements as set forth in this Plan.

Workers—Employees, students, participating guests, and contractors are responsible for understanding and complying with the provisions of this Plan and for knowing and following the ES&H requirements that apply to their work. They are expected to identify, understand, and be trained to deal with, the hazards associated with their work, to work safely, to report all unsafe conditions, incidents/near-misses/accidents and onset of physical discomfort to their supervisors and to comply with the Division's ES&H requirements. ESD employees, students, participating guests, and contractors as well as employees matrixed to ESD from other Divisions, are expected to comply with training requirements described in Section 2.5 "Qualifications and Training" of this Plan.

All Berkeley Lab **employees, contractors, students, and participating guests** are responsible for stopping work activities considered to pose imminent danger. If there are concerns about the safety, health effects, and/or environmental impact of an activity, anyone should stop the work and ask their Supervisor, the PI, the Division Safety Coordinator, or the EH&S Division Liaison or other member of the EHS Division staff for assistance to resolve the issue before proceeding. The employee's Supervisor should be regarded as the *primary* point of contact for all safety concerns. The safety reporting structure is further defined in the following section "ES&H Roles and Responsibilities within ESD".

Also note, safety responsibilities for the Division Safety Coordinator, Principal Investigators and other Supervisors are further explained in Section 2.3 "ES&H Roles Responsibilities within ESD" of this Plan.

2.3 ES&H Roles and Responsibilities within ESD

This section defines the specific roles and responsibilities for ISM implementation within ESD.

The Division Director—The Division Director shall lead discussions on relevant safety issues at Division Council meetings (composed of Department Heads and Program Leads) and Division-wide town hall meetings. Safety shall be an agenda item at these meetings. The Division Director shall also maintain visibility and demonstrate line management commitment to ES&H by periodically walking through Division work space, as specified in ESD's Safety Walkthrough Policy (see Section 2.6 "Worker Safety" of this Plan) . The Division Director shall periodically review and approve revisions of this Plan, and shall hold all ESD staff accountable for understanding and complying with its provisions. The Division Director appoints the Division Safety Coordinator, and Safety Committee chair and members.

Department Heads—Department Heads shall lead discussions on relevant safety issues at their respective Department meetings, with safety being one of the primary agenda items and/or initiate other forms of communication within their Departments. Department Heads will lead at least two Safety Walkthroughs per year of ESD on-site spaces where people in their Department work, described in Section 2.6 "Worker Safety" of this Plan. Department Heads designate one Lab-space Lead PI (LLPI) for each laboratory space in their Department. The LLPI is ultimately responsible for resolution of all safety issues within the laboratory space; this role is described later in this section.

Supervisor—Each employee has one administrative Supervisor who looks after the employee's professional development, mentoring, safety, and training. The Supervisor answers, or helps to answer, the employee's ES&H questions, and is responsible for ensuring that the employee (1) is aware of work hazards and controls, (2) receives appropriate training, (3) works safely and within controls.

Specifically,

1. Supervisors are responsible for ensuring that the employees assigned to them (including participating guests, students and matrixed employees) have completed the LBNL's Job Hazards Questionnaire (JHQ), have taken all required ES&H training courses, are properly trained, as described in Section 2.5 "Qualifications and Training" of this Plan, and are aware of ESD-specific ES&H requirements and resources.
2. Supervisors shall understand the job hazards their employees encounter in the course of the employee's work for other Principal Investigators, and ensure that their employees receive the appropriate training.
3. Supervisors account for their supervisee's performance on ES&H issues when determining his/her overall job performance at the mid-year and annual performance reviews. All

ESD staff must annually certify that they read and understood the ES&H section of the Employee Institutional Requirements (ERI) form, and their supervisors should use this document as part of the basis for appraising the safety performance of the supervisees.

4. Supervisors shall visit their supervisee's work areas semi-annually, at a minimum, as indicated in Section 2.6 "Worker Safety" of this Plan.
5. Supervisors are part of the Incident Review Team of any ES&H occurrences involving their supervisees (see Section 2.6 "Worker Safety" of this Plan).
6. Supervisors shall actively encourage their employees to report any ES&H issues/incidents/near-misses, and early onset of physical discomfort.

Supervisors of matrixed employees: When an employee is matrixed from another division to ESD, the host and home Supervisors have complementary responsibility for the employee's safety training and safe work practice, as follows. It is the responsibility of the host Supervisor to see that matrixed employees have the appropriate training and knowledge to perform their work safely. The home Supervisor shall verify that the employee has received appropriate job-specific training from the host division, as well as the training requirements generated by the JHQ process, as described in Section 2.5 "Qualifications and Training" of this Plan.

The roles and responsibilities of the **Division Safety Coordinator** (DSC) are defined in Pub 3000, Section 1.3.2.9 (http://www.lbl.gov/ehs/pub3000/CH01.html#sec1329). Within ESD, the DSC, appointed by the Division Director, shall

1. promote the communication of ES&H issues throughout the Division, and shall update ESD's ES&H website on an ongoing basis.
2. provide periodic Division ES&H Status Reports to the Division Director and provide upon request additional reports to persons and offices of outside organizations with and for whom ESD conducts research.
3. particpate in the Safety Agenda Item discussions of Division Council once a month, or as needed.
4. participate in ES&H assessments, including ESD's safety walkthroughs, Management of Environmental Safety and Health (MESH) reviews, and other additional safety surveillances at the request of the ESD Director.
5. provide an annual Self-Assessment Report to the Office of Contract Assurance, through the ESD Director
6. review this Plan annually and revise as needed
7. support supervisors in performance of team-investigations of ES&H incidents.

The Division Safety Committee— The Safety Committee will monitor the implementation of the Division's ES&H program, identify opportunities for improvement, advise the Division Director on ES&H issues, facilitate communication of ES&H issues throughout the Division, and support self-assessment activities. Should any need for changes arise in the Division's implementation of integrated safety management, the committee will discuss the matter and make rec-

ommendations to the Division Director. The Committee will identify important issues at each meeting for distribution as ESD-level 1 emails. Each meeting will begin with a resolution-oriented discussion of the most critical current divisional safety issues, followed by a report from the Safety Review Committee. The DSC will discuss new work authorizations (Sections 2.4 "Scope of Work Authorized" b. & c. of this Plan) with the committee for input. The Committee will generally meet on a monthly basis, but at least six times per year. A quorum of three committee members is required for a meeting.

The Division Director will appoint members to the Division Safety Committee, consisting of the DSC, at least one representative from each Department to cover all the types of work performed in ESD, ESD's representative to LBNL's Safety Review Committee, and the EHS Division Liaison to ESD. Membership shall be rotated periodically (preferably on a triennial basis). The Division Director will participate on an *ex officio* basis. An ESD staff member, appointed by the Division Director, will chair the Division Safety Committee and will organize meetings, set agendas, and record and publish meeting minutes which will be distributed to the Division Director, Department Heads, Program Heads, Division Council Members, Division Safety Committee Members, and posted on ESD's ES&H website.

Principal Investigator (PI)—Within ESD, employees commonly work within a Project under the direction of a PI who is not the employee's supervisor. In these cases, the PI and the supervisor have complementary responsibility for the employee's safety training and safe work practice, as follows. It is the responsibility of the PI to see that all staff working on the PI's project have the appropriate on-the-job training and knowledge to perform the work safely. The PI shall advise the employee regarding hazards to enable effective completion of the JHQ. The supervisor shall verify that the employee has received appropriate job-specific training by the PI, as well as the training requirements generated by the JHQ process, as described in Section 2.5 "Qualifications and Training" of this Plan.

When an employee conducts part of his/her work away from his/her normal work environment, the appropriate on-site lab/facility manager, PI or the off-site safety manager designated in the particular ESD Off-Site Safety and Environmental Protection Plan (OSSEPP) (described in Section 2.4.c. "Off-site work" of this Plan) assumes ES&H responsibility for that employee in addition to the employee's Supervisor. Work locations away from the normal work environment include: (1) an off-site field location, (2) one of the ESD Centers or Labs listed in Section 2.4, or (3) an on-site facility belonging to another Division.

Lab-space Lead PI (LLPI)—Many of the facilities/laboratories within ESD are shared by multiple Principal Investigators (PIs). Although the work performed by these PIs can be very different in its nature, for integrated safety management, a single PI (or point-of-contact) is designated by the Department Head as the Lab-space Lead (http://www-esd.lbl.gov/ESDEHS/labsafety.html). This includes laboratory spaces shared by several projects in one Program, or by more than one Program.

While all PIs are responsible for ensuring that their projects are conducted in a safe manner, the LLPI is empowered to resolve safety issues for the space and also coordinates shared ES&H laboratory functions. Examples include housekeeping, chemical inventory, waste management,

and updating ES&H databases for all projects using that lab space. The LLPI is ultimately responsible for resolution of all safety issues within the laboratory space, and maintaining a Lab Safety Primer (http://www-esd.lbl.gov/ESDEHS/safety_primer.html) that contains documentation of the hazards of that particular laboratory (see Section 2.6 "Worker Safety" of this Plan). However, when a PI other than the LLPI is the sole user of a piece of apparatus, that PI is responsible for ensuring that hazards associated with it are controlled and documented, in cooperation with the LLPI. Additionally one person (can be a research associate or technician) who typically works in the laboratory full time may be designated as the point of contact for that space; however, the LLPI (or PI soley responsible for a piece of apparatus) is still ultimately responsible.

2.4 Scope of Work Authorized

a. General

ESD employees develop tools and knowledge that enhance understanding of the Earth. They perform three types of research work: (1) theoretical and computational studies in offices, (2) analytical measurements, instrument development, and bench-top physical modeling in wet labs and instrument shops, and (3) experiment installation and geoscience data acquisition at various off-site (also called *field*) locations.

Each Department within ESD performs bench-top research and tool development in laboratories located in on-site Buildings 14, 70, 70A, and 51F. Offices are also located in these buildings, with the majority of office space located in Building 90. Most field-work is staged in Building 64, which includes a machine shop. Some smaller field projects are staged in Buildings 70 and 70A. Links to descriptions of ESD facilities can be found at http://www-esd.lbl.gov.

Off-site work, comprising approximately 2.5 to 5 percent of the total annual ESD labor effort, is conducted at various user-facilities and sites owned and managed by federal, state, and private organizations, including the ALS, UC Berkeley Campus, and the Richmond Field Station. Some research is performed on ocean vessels.

b. Work Requiring Safety Review and Approval

Line Managers, in conjunction with PIs, shall ensure that all work is conducted within appropriate levels of authorizations, will review the authorization documentation at least annually, and update any personnel assignments, work-scope and experimental procedures. To determine the level of safety documentation, worker training, hazards and hazards control for each project, Principal Investigators will review LBNL PUB-3000 Chapter 6, Safe Work Authorizations and complete a Project/Facility Safety Review Questionnaire (SRQ) (http://www-esd.lbl.gov/ESDEHS/safequest.html) at the time of Field Work Proposal (FWP) or proposal submission. Each SRQ is reviewed by the DSC, who may consult with ES&H Subject Matter Experts for advice on whether the project requires additional safety documentation and EHS Division approval such as a: Radioactive Work Authorization (RWA), Sealed Source Authorization (SSA), Activity Hazards Document (AHD) or an Off-Site Safety and Environmental Protection Plan (OSSEPP) (specific to ESD and described in the next sub-section).Whenever a change in work-scope occurs that may require new or additional safety review and approval, PIs are responsible for reporting the change to the LLPI and acquiring the necessary authorizations.

c. Off-site Work

An Offsite Safety and Environmental Protection Plan (OSSEPP) (http://www-esd.lbl.gov/ESDEHS/ossep.html) is required for all off-site research activities, except for observer's visits, work at DOE user-facilities, at UCB and its facilities (Richmond Field Station), and at other Academic Institutions. The OSSEPP is intended to document site-specific and work-specific hazard analysis, to inform workers of the hazards present, to identify the training and protective measures needed to perform work safely, to provide emergency information and to serve as a safety training document. The Principal Investigator of each off-site project is responsible for preparing an OSSEPP in accordance with ESD procedures and the health and safety rules, procedures, training requirements and other guidelines established at each off-site facility. The OSSEPP is approved by the PI and DSC; ES&H Subject Matter Experts will be consulted as needed. The PI shall ensure that all staff assigned to an off-site research project have read and signed the approved OSSEPP before travel. Staff shall inform their supervisors of their off-site work activity, and discuss safety issues as appropriate. OSSEPPs shall be kept on file in the ESD Division Office, and will also be posted or readily available at the work site; electronic copies are kept by the PI and DSC. OSSEPPs will be reviewed before each field trip and updated whenever there is a change in scope of work, staffing or hazards.

d. Work on the UC Berkeley Campus

Work carried out by ESD employees on the UC Berkeley Campus in spaces under the control of UC Berkeley will be carried out in accordance with the *"Partnership Agreement Between UCB and LBNL Concerning Environment, Health and Safety Policy and Procedures"* (http://www.lbl.gov/ehs/ism/ucb_lbl_partnership_3_15_04.pdf) dated March 15, 2004 as provided in the LBNL Institutional ISM Plan:

- LBNL PIs have an obligation to Berkeley Lab management to provide a safe workplace on campus for all Berkeley Lab-sponsored work. At UCB, this is satisfied by complying with the UCB Safety System.

- LBNL PIs are responsible for analyzing work of persons under their direction and for assuring that the proper training for safe conduct of work is identified and obtained. Until an individual has been properly trained, s/he will work under the direct supervision of someone who is already trained. The type and method of training for work performed at UCB is specified by UC Berkeley.
- LBNL PIs conducting Berkeley Lab-sponsored work are free to implement controls and other measures beyond the institutional requirements if they deem it appropriate.
- LBNL PIs working at UCB can request a joint safety assessment (to be conducted by representatives of both the UCB EH&S and LBNL's EHS Division) to further aid them in ensuring a safe workplace.

LBNL PIs conducting Berkeley Lab-sponsored work at UCB will comply with all UCB assurance requirements that they have met UCB standards including properly specifying training requirements (for themselves, workers and students), obtaining and adhering to UCB work authorizations, and meeting UCB self-inspection requirements.

2.5 Qualifications and Training

Guiding Principle: All ESD employees, students, contractors, and participating guests shall have the necessary technical skills, knowledge, training, personal protective equipment, and certifications required by law and by Laboratory policy to perform their duties safely and in a manner protective of the Laboratory's assets and the environment.
Reference in Pub 3000 – Ch. 24

All new employees, participating guests, students, visitors, and contractors must receive basic ES&H orientation information prior to commencing work at LBNL, and follow the guidelines in ESD's Employee Checklist (*http://www-esd.lbl.gov/workplace_resources/new_employee/files/empchecklist.html*). Everyone with a continuous appointment at the Berkeley Lab exceeding 30 days, including participating guests, will complete a Job Hazards Questionnaire (JHQ), (*https://ehswprod.lbl.gov/EHSTraining/Jhq/EHSLogin.asp*) within the first month of employment. It is advisable for a new employee to complete this with the Supervisor, to make sure the employee understands his/her job duties. The employee's Supervisor is responsible for ensuring that the JHQ is completed and that the employee's training status is reviewed as part of the mid-year and annual performance review process. Each employee's safety performance will be measured against the requirements of this Plan during his/her performance review.

The output of the JHQ process is a list of required and recommended safety training courses. Each employee's supervisor will ensure the required LBNL training courses are taken within 90-days of the JHQ completion (exceptions are for courses that are offered less frequently, and EH&S 0010, Introduction to ES&H at LBNL, which must be completed within 30 days of hire). Depending on the job requirements, the supervisor may specify additional training, such as off-site courses and on-the-job training. Employees are responsible for completing required training within the required timeframe, and for updating the JHQ annually or more frequently when a change in job duties occurs and completing additional training. If an employee has not completed required training, s/he must work under the direct supervision (line-of-sight) of a trained individual.

The Principal Investigator is responsible for task/hazard-specific, or on-the-job training that is not covered in JHQ-generated training requirements for anyone working on the PI's project. The Supervisor should ensure that the employee is aware of this, and verify that the employee has received the required specialized training. The task/hazard-specific training shall be documented in "Lab Safety Primers," which are described in Section 2.6 "Worker Safety."

Employees who are assigned to off-site project work may be exposed to additional site-specific, natural and man-made hazards. The Principal Investigator of the field project shall ensure that these employees are informed of any new hazards as well as any additional controls and training required for protection and safety. This shall be documented in the OSSEPP developed for that project, described in Section 2.4 "c. Off-site work" of this Plan. The project Principal Investigator shall also ensure employees take additional training required by the host site as documented in the OSSEPP. The employee shall notify his/her supervisor of participation in off-site work, and discuss the hazards, controls and required training.

For participating guests working at the Berkeley Lab for 30 days or less and engaged in field or laboratory research, the type of safety training will be determined by the host supervisor and/or PI. Until they have received required training, participating guests must work under line-of-sight supervision of a trained individual.

2.6 Worker Safety

Guiding Principle: Supervisors will provide employees with a safe workplace and will ensure that work is performed within the authorized controls.

a. Line Management Responsibility

Line Managers shall ensure that workplace hazards are identified, evaluated, and controlled and that employees are provided with and use the appropriate safety controls including personal protective equipment per Chapter 19 of Pub 3000, and LBNL's Chemical Hygiene and Safety Plan, and ergonomically-appropriate furnishings and equipment. Line managers shall also hold each employee accountable for safety, and shall recognize ES&H contributions via the performance review process. Line managers are encouraged to use SPOT awards to recognize employees that have made significant contributions to ESD's ES&H Program.

b. Safety Walkthroughs

Safety walkthroughs are performed to observe work, inspect the workplace, and talk with workers and support staff about the safe performance of work. The walkthroughs serve the purpose of proactive accident prevention and promotion of ES&H awareness among staff members and demonstrate the importance that Line Management attaches to safety.

Table 1 specifies ESD's safety walkthrough requirements. The Division Director and/or Deputy Director will inspect all ESD space (labs, shops and offices) at least once per year, using the EH&S Safety Checklists for Managers, or similar, (http://www.lbl.gov/ehs/index2.shtml, click on 'references'), which provide guidelines for the different types of spaces they are responsible for (general work area, lab and shop). The walkthrough results are reported to the Department Heads who are responsible for follow-up.

Department Heads shall conduct periodic safety walkthroughs of laboratory and office areas under their jurisdiction (See Table 1. below) to identify and correct ES&H deficiencies. Prior to the Department Head's walkthrough, LLPIs ensure that the Chemical Management System and HEAR databases are current, and each employee completes the ESD Inspection Checklist (http://www-esd.lbl.gov/ESDEHS/index.html) for their work area (only one checklist is needed for each laboratory space). The checklists are reviewed and collected at the time of the walkthrough for necessary follow-up. The Department Heads and DSC will document the results and follow-up as needed.

The LLPIs shall use the ESD Inspection Checklist for their monthly inspections, or may design their own checklists to be approved by the Safety Coordinator, and log the dates of their inspections in the lab safety primer.

Table 1. ESD safety walkthrough requirements

Title	Who	Minimum Frequency	Purpose	Checklist
Division Director's Walkthrough	Division/Deputy Director, Safety Coordinator, EH&S Liason, Business Manager	1x/yr	Promote safety culture, management awareness of safety/space issues, self-inspection of work areas (collect check lists, update CMS and HEAR)	Management checklist (EH&S)
Department Head Walkthrough	Department Head, Safety Coordinator	2x/yr (off-trimester fr DD walkthrough)	Promote safety culture, DH knowledge of workplace ES&H issues, review new projects/equipment/hazards	ESD Inspection Checklist
Labspace Lead PI (LLPI) inspections	LLPI, lab contact	Monthly	Maintain ES&H standards in labs, review new projects/equipment/hazards/OJT records	ESD Inspection Checklist

The Division/Deputy Director, Department Heads and LLPIs shall complete EHS0027 Performing an Effective Safety Walkaround training.

Supervisors will visit their employees' work area(s) at least twice a year to promote Supervisor awareness of employees' work conditions, allow communication of ES&H concerns, with a spe-

cial focus on ergonomics, using the list of ergonomic "prompts" for Supervisors (http://www-esd.lbl.gov/ESDEHS/ergo_info.html).

Areas for improvement identified during walkthroughs that require follow-up and/or tracking must be documented in CATs, either by the PI, or the DSC. "Risk Levels" are assigned to each finding, according to the definitions in the CATS User Manual (accessible from the CATS database, https://cats.lbl.gov/public_html/start.jsp). The Manual also lists the time-requirements for closing and validating findings based on a graded approach as determined by Risk Level. To ensure the implementation of corrective actions, follow-up inspections will be conducted by the responsible Department Head, in a time-frame consistent with the finding. In addition to safety walkthroughs, any safety deficiencies noted at any time by the ESD management or DSC shall be entered into CATs and corrected according to Risk Level.

c. Lab Safety Primer

Each ESD Lab-space Lead PI (defined in Section 2.3 "EH&S Roles and Responsibilities within ESD" will maintain a "Lab Safety Primer" that provides ready access to information needed to work safely in a specific laboratory space. This manual will include copies of all relevant work authorizations and documentation of on-the-job training for the work performed in the space. A separate manual for each laboratory, or group of laboratories, can be prepared at the discretion of the Lab-space Lead PI. Each person working in a laboratory should know the location of the safety manual, read it, and document that they have done so. Once this is done, the Worker notifies the LLPI via email and/or signs a form included in the Primer. The LLPI updates the manual annually or whenever the scope of work changes, or new information is added. The LLPI notifies the Workers of these changes.

d. Incident Investigation:

All accidents and near-misses that occur within the Division shall be thoroughly investigated to prevent recurrence. The DSC will assist the Supervisor to form an incident review team, which includes the affected or injured employee, the employee's supervisor, the DSC, and the EH&S Division Liaison. For OSHA-recordable accidents, root-cause analysis will be performed by a trained professional who will be included in the review team, along with any ES&H subject-matter experts as needed. All ES&H incidents are discussed by the Division Safety Committee. The Department Head is notified of any ES&H incidents, and the Division Director is notified of all OSHA-recordable accidents.

e. Ergonomic Safety

To promote ergonomic awareness and prevent injuries from occurring, Supervisors must ensure that employees take the appropriate EH&S training, and have an ergonomic evaluation of their workstation (lab and office) and other laboratory and/or field activities. Ergonomic evaluations should also be performed when an employee moves to a new location, anticipates a change in work assignments/load and/or experiences the earliest signs of discomfort. In general, employees performing computer-intensive work should have their workstation(s) evaluated annually. Employees who have identified prior ergonomic injuries or discomfort should also have an annual evaluation. All others should have their workstations evaluated every three years. Em-

ployees that telecommute must perform a self-assessment of their home workstation, and reviewed by the DSC, per section 2.23 (D)(3) Misc. of the RPM .

The employee works with their supervisor and/or PI to implement the evaluator's recommendations, including the purchase of recommended equipment, furnishings, or their modifications. It is ESD policy that all staff, including telecommuters shall obtain the necessary ergonomic equipment/furnishings/accessories. These are paid for by project funds; assistance from the Division is available if project funds are lacking.

The division will designate several individuals (likely one per department) to serve as ergo-advocates. The ergo-advocate will receive special training from EHS Division, will perform non-pain-motivated ergo evaluations, will work with the DSC to identify employees at risk for ergonomic injury, and will monitor and facilitate follow-through on ergonomic evaluation recommendations.

2.7 Environmental Protection and Waste Management

Guiding Principle: ESD will conduct activities in a manner that protects the environment while complying with applicable air quality, water quality, and hazardous waste requirements, including appropriate efforts to prevent pollution and to minimize wastes produced.

a. Hazardous Waste Management:

All hazardous waste generated shall be appropriately and accurately labeled, contained, and disposed of in accordance with LBNL and California State regulations. All waste that is ignitable, toxic, corrosive and/or reactive is deemed chemically hazardous and shall be kept in a Satellite Accumulation Area (SAA). Waste that is radioactive or a mixture of chemically hazardous and radioactive waste shall be kept in a Mixed Waste Accumulation Area (MWAA). The DSC will keep a list of all SAAs and MWAAs and their Custodians within ESD, and must be notified before an accumulation area is established or removed. ESD does not maintain any Waste Accumulation Areas (for larger volumes of waste than allowed in an SAA).

The SAA Custodian is responsible for ensuring that all waste added to the SAA or MWAA is accurately labeled, characterized and picked up in a timely fashion (no more than six months following the start of waste accumulation). The Lab-space Lead PI is responsible for knowing about the existence of SAAs in their lab space, and ensuring that the SAA is in compliance with EHS Waste Management requirements.

No ESD employee shall establish, or add wastes to, an SAA or MWAA without having taken the required LBNL/EHS training and without the knowledge and approval of the SAA Custodian. All employees who generate waste shall separate waste streams to minimize the burden of waste disposal (for example, by keeping chlorinated and nonchlorinated solvents separate, and keeping radioactive and chemically-hazardous wastes separate).

Working with the DSC, the EH&S Division Waste Management Generator Assistant is responsible for scheduling, conducting, and disseminating results of quarterly inspections of all SAAs, and for helping ESD staff to improve waste management, to reduce the amount of haz-

ardous and mixed waste generated, and to seek on-site treatment strategies. The findings of SAA inspections will be communicated to the designated custodians, LLPIs, the Division Director and Department Heads. Corrective actions will be implemented according to the hazard level of the finding, but no longer than 60 days, and verified by the DSC at the next quarterly inspection.

b. Waste Minimization

ESD is committed to waste minimization and resource conservation, seeking opportunities to reduce the use of paper, use recycled materials and minimize waste generation. Based upon responses to the Safety Review Questionnaire, the DSC will follow-up with PIs to evaluate opportunities for waste minimization for new projects. Laboratory and business practices are periodically reviewed for new opportunities for waste minimization.

2.8 Balanced Priorities

Guiding Principle: ESD management and ESD Principal Investigators will allocate an appropriate amount of resources to EH&S requirements.

Principal Investigators will factor into their budget plans the costs of safety equipment, employee training, permits, proper chemical storage and inventorying, waste disposal, pollution prevention, environmental protection, ergonomic furniture/accessories, project relocation and decommissioning, and facility modifications, unless the latter are covered by institutional funding sources.

To facilitate implementation and execution of the ESD EH&S Program, the following Divisional resources are made available:

0.30 x FTE,	Division Safety Coordinator
0.10 x FTE,	Division Administrative Support.

In addition, EH&S Division will provide 0.46 x FTE on a matrix basis to assist the ESD Safety Coordinator and ESD staff. Resources to be committed include approximately 0.15 x FTE for the Division Liaison, and the remainder allocated to Industrial Hygiene and Health Services, Occupational Safety, Fire Protection, Emergency Preparedness, Radiation Protection, Environmental Protection, and Waste Management.

3. ACCEPTANCES

Signatures

Submitted by: _____ 9/27/07
Ernest L. Majer
ESD Division Director (acting)
Date

EH&S Resource Commitment: _____ _____
Howard Hatayama
EH&S Division Director
Date

Accepted: _____ _____
Steven Chu
Berkeley Lab Director
Date