Computing Sciences
Integrated Safety Management Plan

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1.0 Purpose

This Computing Sciences (CS) Integrated Safety Management (ISM) Plan provides guidance for the implementation of the integrated environment, safety and health (ES&H) policies within the Computing Sciences Area. CS has integrated each of the five functions and seven guiding principles of Integrated Safety Management (ISM)[1] from the Lawrence Berkeley National Laboratory (LBNL) ISM Plan into its ongoing research and operations. Furthermore, CS conducts all of its operations in a manner that protects the health and safety of employees and the general public, safeguards the environment, and is consistent with applicable LBNL, university, and government agency policies and regulations. The Laboratory's ES&H policies and requirements are contained in:

> PUB-201, Requirements and Policies Manual (RPM);
> PUB-3000, ES&H Manual, and
> PUB-3140, Integrated Environment, Safety, & Health Management Plan.

This ISM Plan describes the mechanisms that are applied in Computing Sciences to ensure proper implementation of these safety policies.

2.0 Description of Computing Sciences

The Computing Sciences mission includes computational research and operation of two national user facilities, the National Energy Research Scientific Computing (NERSC) Center and the Energy Sciences Network (ESnet). Berkeley Lab's Computing Sciences organization was created to advance computational science throughout the Department of Energy's Office of Science research programs. Computing Sciences combines computing and network operations with research and development in computer science, computational science, and applied mathematics.

The Computing Sciences Directorate, led by Associate Laboratory Director Jonathan Carter, was created in 1996 and currently has approximately 500 employees and affiliates. Computing Sciences includes four divisions: the Applied Math and Computational Research Division (AMCR), the Scientific Data Division (SciData), the National Energy Research Scientific Computing (NERSC) Center Division, and the Scientific Networking Division

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[1] The five functions of Integrated Safety Management (ISM) are:
- Define the scope of work
- Analyze the hazards (including environmental impacts)
- Develop and implement hazard (including environmental controls)
- Perform work within controls
- Provide feedback and continuous improvement

These five ISM core functions are sustained by applying the seven guiding principles of ISM:
- Line management responsibility for safety
- Clear roles and responsibilities
- Competence commensurate with responsibilities
- Balanced priorities
- Identification of ES&H standards and requirements
- Hazard controls (including environmental controls) tailored to the work being performed
- Operations authorization

(SND). The latest version of the CS organizational structure can be accessed at https://cs.lbl.gov/about/organizational-charts/.

The Computational Research Division conducts research and development in mathematical modeling and simulation, algorithm design, data storage, management and analysis, computer system architecture and high-performance software implementation.

The NERSC Division mission is to accelerate the pace of scientific discovery in the Department of Energy (DOE) Office of Science community by providing high-performance computing, information, and communications services. NERSC is the principal provider of high performance computing services to DOE Office of Science programs.

The Scientific Networking Division manages and operates the Energy Sciences Network (ESnet), a high-speed network serving thousands of Department of Energy scientists and collaborators worldwide.

Computing Sciences offices and computer rooms are located in the Building 50-complex and in Wang Hall (Building 59) on the main Lab site. All three Divisions have some staff that work remotely, both in offices and in technical areas. Drop-in offices have been established in the Building 50-complex and at Shyh Wang Hall, facilitating flexible work arrangements and matrixing of employees. In addition, CS Area researchers collaborate with faculty and scientists located at other institutions. These collaborators may have LBNL employee or affiliate status.

3.0   Accountability and Responsibility

3.1 Summary of Key Roles & Responsibilities

Division Management is responsible for ensuring implementation of ES&H policy. Safety in Computing Sciences flows from the Directors of the three Divisions to their direct reports, and from them down to first line supervisors. Division Management ensures that roles and responsibilities for ensuring compliance with ES&H requirements within CS are clearly defined in staff position descriptions and performance review documents.

Line Management includes Department Heads, Group Leads, and other supervisors. Line Management is responsible for protection of the public, employees, and the environment. More specifically, Computing Science line managers are responsible for integrating ES&H into work practices and for ensuring active communication up and down the management line and within the workforce. Line management is responsible for reviewing the ES&H hazards and controls for their employees and affiliates, including contractors, visitors, students, and matrixed employees. Line management is responsible for ensuring that the hazard analysis is completed promptly, and that required training is completed and controls are implemented. ES&H hazard analysis may be delegated to Activity Leads and Activity Lead Designees.

Activity Leads and Activity Lead Designees may direct, train, and/or oversee the work and activities of one or more workers. Multiple Activity Leads may oversee aspects of staff work, as determined by the nature of the work performed. Sections 5 and 6 of this ISM Plan provide additional detail on work authorization.

Area Safety Leaders are responsible for overall safety within technical areas, such as computer rooms or mechanical rooms. Area safety leaders ensure that the appropriate personal protective equipment has been determined, and that this is posted with other required information at each entrance to their areas.

Division Management, along with the Division Safety Coordinator,conducts annual safety walkarounds to review the safety of their employees and workspaces, documenting their observations and ensuring that unsafe conditions are corrected promptly. Supervisors participate as necessary in accident investigations to identify accident causes and corrective actions. They ensure that corrective actions identified in walkarounds and accident investigations are entered into the [Corrective Action Tracking System](#) (CATS). Management proactively promotes and encourages safety awareness in the workplace.

A Division Safety Coordinator (DSC) serves as a point of contact for all Division staff regarding the implementation and interpretation of the Lab's ES&H policies. The DSC coordinates and manages required safety programs and documentation. The DSC works with AMCR, SciData, NERSC, and SND safety representatives to promote ES&H awareness, communication, safe work practices, and compliance. The DSC also serves as the point of contact to process hazardous waste requisitions on behalf of the area (primarily for the disposal of lithium ion batteries and coolant waste, but all hazardous chemical waste is within scope).

An Electrical Safety Officer (ESO) for the Computing Sciences Area assists division line management in the enforcement of the Berkeley Lab requirements for electrical safe work practices and workplace conditions. The ESO maintains NFPA 70E certification as Certified Electrical Safety Compliance Professional and fulfills the function of "Competent Person" for R&D Facilities as required by NFPA 70E Article 350. The ESO supports the NERSC Division, acting as their Electrical Safety Advocate, and also supports the Electrical Safety Advocates for the Computational Research and Scientific Networking Divisions. Additionally the ESO represents Computing Sciences on the Lab's Electrical Safety Committee, and participates in the Computing Sciences Division Safety Committee.

An Electrical Safety Advocate is designated by each Division to act as a resource to employees, managers, and Division Safety Coordinators for electrical safety-related concerns.

3.2 Responsibilities for All

All employees, affiliates, and contractors are responsible for knowing and following the ES&H requirements that apply to their work. They are expected to work safely, and to cooperate and contribute to Computing Sciences ES&H activities as appropriate. They must consult with qualified specialists to resolve any questions about ES&H activities.

All employees, affiliates, and contractors are responsible for bringing safety and health concerns promptly to the attention of the appropriate manager, supervisor, or Activity Lead for resolution. Line management is then responsible for investigating the concern and implementing corrective action. If a satisfactory response is not received, the Division Director should be contacted, followed by the Director of the Environment, Health, and Safety (EH&S) Division.

All employees, affiliates, and contractors are responsible for stopping work activities considered to pose an imminent danger. An "imminent danger" is defined as any condition or practice that could reasonably be expected to cause substantial harm to the health and safety of employees or the public, or to the environment. The Laboratory's [Stop Work Policy](#) can be found in the RPM.

3.3 Subcontractors, Matrixed Staff, and Students

Subcontractors are required to comply with ES&H requirements. CS managers are responsible for the safe performance of work conducted on-site by subcontractors. When non-construction subcontractor work is hands-on and is conducted on-site, the work hazards and controls are documented in a [Subcontractor Job Hazards Analysis](#). Construction work hazards and controls are addressed through contractor [Safety Checklists and construction JHAs](#). Subcontractor employees issued LBNL badges must be covered by the Lab's Activity Manager system.

Matrixed employees' supervisors from the home divisions or departments retain all ES&H responsibilities pertaining to the matrixed employees.

Students are afforded the same protections and assume the same obligations as any LBNL employee or affiliate for safe work practices. Before student work begins, supervisors are responsible for assuring that each student possesses a thorough understanding of safe work practices. Supervisors are responsible for ensuring that each student performing work is aware of the hazards of their work, has completed the appropriate safety training, and performs their work safely. Short-term students, including summer students, are added to student specific WPC activity to cover the ergonomic hazards of their work. The hazards and controls associated with the work activities utilized by career and long-term staff are included in this work activity. Students who work onsite are provided a desk, chair, USB hub, monitor, mouse, and keyboard. Additional equipment such as monitor arms can be provided upon request or if particular needs are identified. Students who work remotely are provided a laptop, a standard issue mouse and keyboard set and USB hub, as well as a laptop riser, upon request. Furniture such as chairs and tables are not shipped to remote students. Ergo evaluations for students are optional and available upon request by the student and/or their supervisor.

3.4 Offsite Work

Regular or occasional offsite work is subject to the same safety requirements and review as on-site work, unless the safety oversight of the work is covered by another institution. CS has some employees who work in permanent offices at other locations or institutions; some employees or affiliates may be present onsite only as needed for onsite meetings and training. SND's ESnet employees routinely provide on-site support at computational facilities around the United States.

If CS employees conduct Lab-sponsored work on the UCB campus (exclusive of Donner Laboratory) they must follow the ES&H policies and procedures within the partnership [Agreement Between UCB and LBNL Concerning Environment, Health and Safety Policy and Procedures](#).

Flexible work options, including telecommuting, may be permitted at the discretion of line management, when appropriate. Flexible work options must comply with Lab policy.

4.0   Safety Committee

CS maintains an ES&H (Safety) Committee, consisting of representatives from Directorate Management, from the AMCR and SciData Division Departments, the Safety Advisory Committee (SAC) representative, the CS Electrical Safety Committee Representative, the Division Safety Coordinator, the EH&S Division Liaison, the Computing Sciences Electrical Safety Officer, the NERSC Safety Representative, and the SND Safety Representative. The DOE Berkeley Site Office Representative, the LBNL Associate Lab Director for Computing Sciences, CS Division Directors and Deputies are ex officio members. The Safety Committee is chaired by the Division Safety Coordinator.

The CS Safety Committee's responsibilities include these functions:

- review, maintain and implement the CS ISM Plan
- analyze accident and injury data
- promote ES&H awareness and training
- review the need for specialized training
- participate in planning for ES&H Peer Reviews
- develop metrics and analyze pertinent data
- advise the Associate Laboratory Director for Computing Sciences on ES&H issues.

Members of the Safety Committee participate in the preparation of Self-Assessment Reports for the Associate Laboratory Director. The Safety Committee also assures that Computing Sciences works to improve the effectiveness of the ES&H program through the dissemination of lessons learned and other appropriate mechanisms. Division Directors and Deputies are invited to attend the Safety Committee meetings.

5.0   Scope of Work Authorized

The majority of Computing Sciences employees work in an office environment with intensive computer use. Staff may also perform work in computer rooms and other technical areas, and require training appropriate to their activities in these areas. Computing Sciences uses the Laboratory Work Planning and Control process, along with its software tool Activity Manager, to analyze work hazards, authorize work, and allow workers to demonstrate that they are qualified to perform activities.

Activity Leads will review their activities as specified in Activity Manager, based on the level of risk, and when work changes. Activity Manager will notify Activity Leads of relevant review times. Activity Leads or supervisors will obtain required approvals for potentially hazardous or regulated work as specified in ES&H Manual Chapter 6, "Work Planning and Control".

Permits for lockout/tagout, energized electrical work, and confined space entry are used as necessary in compliance with ES&H requirements to control work hazards of employees, affiliates, and contractors performing work which requires these controls.

The Berkeley Lab [Working Alone Policy](#) restricts work in cases where a plausible failure of hazard controls could result in an injury or exposure that would render an individual unable to take appropriate emergency actions. Work activities where a plausible injury or exposure could render an individual unable to self-rescue are considered too hazardous to permit working alone. Activity Leads determine whether any work under their control requires a work alone prohibition and, if required, include controls in the Activity authorization to implement this prohibition.

5.1 NERSC LOTO Work

NERSC has various complex lockout/tagout (LOTO) procedures which are created by a NERSC QEW 2 in partnership with EHS. LOTO procedures are stored within LBNL's Complex LOTO Procedures Database, housed within QuickBase (access required). When creating LOTO procedures a Reviewer is not required. The QEW 2 who didn't originally create the procedure may serve as the Approver. The QEW 2's are authorized as LOTO approvers and evaluators via EH-0460 in Activity Manager. LOTO procedure inspections are conducted when the procedure is used, but no more than once annually. This is done in conjunction with QEW training renewals. The Inspector may reside within EHS or from within NERSC. The Person-In-Charge Log is completed by hand and stored with the printed copy of the Complex LOTO Procedure. Records are transferred to the QuickBase database for digital storage as needed.

The NERSC QEW 2's are the only individuals within CSA who are authorized to initiate a complex LOTO. They also serve in the role of the Authorized Person, LOTO Person in Charge, and Responsible Individual. All other CSA staff who are authorized to participate in LOTO work are authorized under the role of Limited LOTO for Authorized Persons. These staff members are only allowed to participate in LOTO work in situations where the equipment is already locked out by others and they obtain a briefing by the LOTO Person in Charge of the LOTO, and where qualified persons have established the LOTO and verified a zero-energy state. In practice, this is done on a very infrequent basis and it's not uncommon for staff to go years without joining a LOTO.

Most of the supercomputer Complex LOTO Procedures will not be inspected annually because they are only used every few years when new systems are installed and old systems are decommissioned. The complex LOTO procedures for the supercomputer cabinets for Perlmutter and beyond are posted inside each cabinet door along with a sign-in sheet. These procedures are rarely used outside of the initial install and the decommissioning of each system. In the rare instance where these procedures are used outside of install and decommissioning, the complex LOTO procedure will be used in conjunction with the sign-in sheet, the same as would be done for complex LOTO work not involving a subcontractor. This subcontractor work must also be authorized via SJHA.

Subcontractors are permitted to participate in complex LOTO work under the supervision of a NERSC or LBNL QEW so long as they are authorized via an SJHA and have completed EHS0379: LOTO for Subcontractors within the past year. Note: LBNL policy requires that this course be taken every 3 years, but NERSC requires that it be taken annually. HPE affiliates who participate in this work are required to take the training course EHS0388 via their WPC authorization instead of EHS0379.

NERSC participates in the annual LOTO Certification Process, as initiated by the EHS Division.

6.0   Qualification and Training

The LBNL Activity Manager system and the Berkeley Lab Training database are mechanisms used to implement ISM in CS. Activity Manager documents hazard analysis and the Berkeley Lab Training database records completion of performance and training requirements. CS staff and affiliates must be authorized to work under this process. Until authorized to work in the Activity Manager system, individuals will perform work only under the supervision of a qualified employee.

Within the Activity Manager system, CS Activity Leads document the hazards and controls relevant to a work Activity, such as work in a computer room. Once this analysis is complete, the Activity Leads or Designees may add workers to the formal work Activity. The supervisor, if different from the Activity Lead, is notified of this action and may request further information or even removal of their staff from the work Activity. The Activity Lead or Designee provides oversight, guidance, and supervision of the work performed under the Activity.

Area Safety Leaders are responsible for safety in an area such as a computer room. They document hazards and display the hazards on an entrance placard. They serve as safety contacts for the area where they are designated Area Safety Leaders.

CS may develop additional training mechanisms including on-the-job training (OJT) and facility-specific training for work in CS computer rooms and mechanical areas. Qualifications include skills, work experience, knowledge, training, and certifications required by regulations, by Laboratory policy, or Division management. Contract labor employees, affiliates, and students who will be at LBNL for more than two weeks are subject to the same ES&H requirements for qualification and training as career employees performing similar tasks.

CS staff qualifications and training are reviewed as part of the self-assessment program to ensure that skills are commensurate with technical needs and workplace hazards.

7.0   Employee Rights

CS staff may file an ES&H concern with their immediate supervisor, higher level managers, Director of the EH&S Division, or the local DOE office. Concerns may be submitted by calling the University of California Employee Hotline (800) 403-4744 or using the online UC whistleblower page. The toll free number is available 24 hours every day and is operated by a third-party vendor for confidentiality and anonymity if so desired by the caller. Persons reporting improper activities are fully protected by the law (and Lab policy) against retaliation.

8.0   Resource Allocation

Supervisors will incorporate appropriate resource allocation to address ES&H concerns in all research and operations proposals. The allocation of funds is particularly important in addressing ergonomic issues but may also be required to cover the cost of safety equipment, permits, and training.

To facilitate implementation and execution of this ISM Plan, the following Computing Sciences resources are made available:

Directorate ES&H Coordinator
Administrative Support
Directorate ES&H Committee Member
LBNL Safety Advisory Committee Representative

The following resources are made available by the EH&S Division. They are available to assist supervisors, the ES&H committee, and staff in general with any aspects of the implementation of this program:

EH&S Division Liaison
EH&S Health and Safety Representative
EH&S Subject Matter Experts: Confined Space, Electrical, Ergonomics, Indoor Air Quality, Hearing Protection, Respiratory Protection, Chemical Safety, Laser, Seismic, and others as needed.

REVISION LOG

Date	Major/Minor	Brief Description of Revision
January 2007	Minor	- Organizational Chart updated. - Charts, graphs and supporting documentation updated to reflect RY/FY07. - Added URLs. - Added core function descriptions.
October 2008	Major	- Added ISM core functions and guiding principles. - Added links to additional Policy and Procedure documents. - Added stop work policy. - Updated Scope of Work Authorized, adding Job Hazards Analysis (JHA) and Activity Hazard Document (AHD). - Deleted specific training course requirements. - Added signature page.
March 2009	Major	- Added Revision Log. - Updated Accountability and Responsibility section to incorporate most recent PUB-3000 requirements. - Updated work authorization information. - Added Employee Rights section.
March 2010	Minor	- Sec. 1: Added work locations. - Sec. 3: Modified details on walkarounds, construction contractor safety, and staff work expectations. - Sec. 5: Removed mention of Human Subjects research, updated AHD description. - Sec. 8: Updated Resource Allocation section. - Made minor housekeeping revisions throughout.
March 2012	Major	- Sec. 2: Added third Division. - Sec. 3: Updated Accountability and Responsibility wording. - Sec. 5: Added Working Alone policy, updated AHD descriptions. - Sec. 8: Updated Directorate resources.
March 2013	Minor	- Sec. 2: Updated Directorate Organization Chart. - Made minor housekeeping revisions throughout.
July 2015	Major	- Sec. 1: updated ISM Core Functions and Guiding Principles - Sec. 2: Updated Directorate Organization Chart; added CRT as a work location. - Sec. 3: Changed walkarounds from biannual to annual. - Sec. 4: Updated Safety Committee membership and attendance requirements. - Removed references to JHA and AHD; replaced with WPC/Activity Manager. - Made minor housekeeping revisions throughout.
March 2018	Minor	- Sec. 2: Updated Directorate Organization Chart. - Made minor housekeeping revisions throughout.
August 2019	Minor	Sec. 2: Updated Directorate Organization Chart.

		• Made minor housekeeping revisions throughout. • Updated Accountability and Responsibility to include Electrical Safety Officer/Advocate roles.
May 2021	Minor	• Updated ES&H Coordinator to Sarah McGinn • Made minor housekeeping and formatting revisions throughout • Updated hyperlinks • Added description of work conducted at UCB to Section 3. • Updated role of Activity Lead in Section 6.
May 2022	Minor	• Removed mention of the Computational Research Division (CRD) and replaced with AMCR and SciData Divisions as a result of the division reorg at the start of FY22.
October 2023	Major	• Expanded upon section 3 (Accountability and Responsibility) to include ergo equipment provided to students, both onsite and remote. • Expanded upon section 3 (Accountability and Responsibility to include the processing of hazardous waste requisitions • Expanded upon section 5 (Scope of Work) to encompass the LBNL LOTO program changes outlined in Ch 18 of the ES&H Manual.

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