

Electrical Safety and Lockout/Tagout

Electrical Safety

All AFRD personnel are responsible for helping to prevent electrical shocks by practicing the following six habits, as applicable to their roles:

If you are not a Qualified Electrical Worker (QEW):

- Do not perform electrical work
- Report unsafe equipment

Qualified Electrical Workers:

- Lockout & Test Before Touch
- Establish and Control Work Space

Management (Program Heads, Supervisors, Work Leads, Project Leads, Activity Leads):

- Plan and control the work
- Correct unsafe behavior and conditions (accountability)

Division Electrical Safety Advocate(s) will be appointed by the Division Director to:

- Act as a resource to employees, managers, and the Division Safety Coordinator for electrical safety-related concerns;
- Reinforce good work practices to reduce at-risk behaviors;
- Perform routine workplace conditions inspections to look for electrical hazards in office, industrial and/or laboratory spaces;
- Perform surveys of electrical equipment and enter non-NRTL equipment into the Electrical Equipment Database for inspection;
- Coordinate with the Electrical Safety Group to resolve issues with electrical workplace conditions; and
- Be familiar with relevant resources including the Electrical Safety website, the Electrical Safety Database (QuickBase), and the Electrical Safety Manual.

During FY15, it is anticipated that new electrical safety requirements (ESH Manual Chapter 8 and Electrical Safety Manual) will be developed and new responsibilities assigned. The Division Electrical Safety Advocate(s) will work with the LBNL Deputy Electrical Safety Officer and the Division Safety Coordinator to develop an Electrical Safety Plan to implement the new requirements.

Lockout/Tagout

Lockout/Tagout (LOTO) is the method of applying a mechanical lockout device and a tag on an energy isolation by a LOTO Authorized Person in accordance with established procedures in order to control hazardous energies and prevent the equipment from being operated until the lockout device is removed.

Personnel who perform LOTO, write/review LOTO procedures, or work on or near equipment where LOTO is performed will have one or more of the following roles as defined by **ES&H Manual Chapter 18**:

Affected Individuals are persons whose job requires them to be near or around the hazard zone (but not within the hazard zone) when equipment or apparatus is being maintained or serviced under a locked-out or tagged-out condition. All visiting scientists, engineers, and affiliates, including participating guests and students, who work in areas in which LOTO is utilized are considered Affected Individuals. Activity Leads must consider the roles of persons assigned to their Activity, and review the information in Activity Manager about hazards co-located with their Activity, to determine who may work in proximity to a hazard zone. Affected Individuals must complete **EHS0010 Introduction to EHS at LBNL** training (and refresher every 3 years), which contains a LOTO awareness module. The responsibilities of Affected Individuals are to:

- Follow all LOTO and safety requirements;
- Recognize when LOTO is being used, the general reasons for LOTO, and the importance of not tampering with or removing a lock and tag.

LOTO Line Managers are WPC Activity Leads responsible for equipment requiring LOTO or personnel performing LOTO. [Note: For activities that have not fully transitioned to an approved WPC Activity, the Supervisor, PI, or Work Lead must maintain the existing work authorization and fulfill the responsibilities of a LOTO Line Manager.] LOTO Line Managers must complete at least EHS0010 Introduction to EHS at LBNL training (and refresher every 3 years), which contains a LOTO awareness module. (Additional training may be required if the Line Manager also performs other LOTO roles.) The responsibilities of LOTO Line Managers are to:

- Ensure written LOTO procedures are generated and maintained where required, and that the procedures are audited at least annually;
- Prohibit employees from working on equipment requiring LOTO until the worker is trained in and authorized to perform LOTO;
- Ensure that employee LOTO authorization is assigned and documented through a work authorization including:
 - Designating specific equipment or categories of equipment to be controlled and ensure that the employee is thoroughly familiar with the equipment (within the context of his or her job function) and with the energy-control procedures;

- Verifying that workers are qualified to perform the necessary LOTO procedures. A practical exercise may be required by the LOTO Line Manager to demonstrate proficiency;
- Determine the appropriate levels of training required for each employee and verify that the required training has been completed.
- Ensure consistent policy implementation and reinforcing LOTO rules;
- Contact the Electrical Safety Officer and follow procedures to remove LOTO devices in case of a person's absence;
- Ensure that necessary LOTO hardware is available.

LOTO Authorized Person is someone who has completed the required training and is authorized by the LOTO Line Manager to perform LOTO on energy isolation points for the designated equipment to perform service or maintenance. LOTO Authorized Persons must complete EHS0358 LOTO for Authorized Persons (and the refresher course, EHS0258, every 3 years) as well as any procedure-specific, on-the-job training determined by the LOTO Line Manager. Only LOTO Authorized Persons shall apply locks and tags to control hazardous energy. The responsibilities of a LOTO Authorized Person are to:

- Recognize the conditions of work that require LOTO, assess all of the hazardous energy sources, use correct procedures and materials to implement LOTO;
- Maintain control over the keys to their personal LOTO locks;
- Apply his or her own personal LOTO lock and tag when performing servicing, maintenance, or modification work; and
- NEVER apply a LOTO lock for anyone else.

Subcontractor Authorized Person performs LOTO authorized under a Subcontractor Job Hazards Analysis and LOTO permit. Subcontractors performing LOTO at LBNL are required to submit their company's LOTO Program (or equivalent) to the EHS Electrical Safety Group and obtain a Subcontractor LOTO Permit. The Subcontractor LOTO Permit constitutes authorization to perform LOTO. The Subcontractor LOTO Authorized Person must have been trained by the and designated as a LOTO Authorized Person under the Subcontractor Company's LOTO Program, and must also complete LBNL EHS Subcontractor LOTO Orientation training (refresher every year). (See **ES&H Manual Chapter 18, Work Process I**).

The **Requester** who authorizes the Subcontractor JHA for the Subcontractor Authorized Person's work ensures that all outside contractors operating under the SJHA are informed of Berkeley Lab LOTO policy by verifying they have completed the LBNL EHS Subcontractor LOTO Orientation training and ensures work observations are performed to verify adherence to the Berkeley Lab LOTO policy.

Qualified Person A person designated by a LOTO Line Manager, who by reason of experience and instruction has demonstrated familiarity with the construction, installation, maintenance, and operation of the equipment, installations and the hazards involved. This employee also is required to be current with all required qualification training for his/her role in the LOTO.

Qualified Electrical Worker is a Qualified Person specifically authorized to work on Electrical systems. (For specific requirements see **ES&H Manual Chapter 8, Electrical Safety**). Qualified Electrical Workers are responsible for wearing all required PPE and following all required safe work practices while performing the necessary operations and zero-energy verification on equipment to support the LOTO process.

Person in Charge is the designated person accountable for the safe execution of the lockout. The Person in Charge must also be a Qualified Person and LOTO Authorized Person for the LOTO procedure. The people authorized to act as a Person in Charge of a LOTO procedure will be assigned through the WPC Activity or equivalent work authorization.

LOTO Responsible Individual is the designated Person in Charge of a Complex or Group LOTO procedure and is accountable for the safe execution of the procedure. The people authorized to act as a LOTO Responsible Individual for an Activity will be assigned through the WPC Activity or equivalent work authorization. LOTO Responsible Individual(s) must complete EHS070 LOTO for Authorized Persons and the additional EHS373 LOTO for Responsible Individuals training (and annual refresher). The responsibilities of the LOTO Responsible Individual are to:

- Conduct the LOTO Briefing;
- Supervise the Qualified Person(s) in the execution of the LOTO Procedure;
- Manage all changes to the scope of work; and
- Ensure all personnel performing work under the LOTO are LOTO Authorized Persons and are personally locked out for their tasks.

LOTO Coordinator is a LOTO Approver and LOTO Responsible Individual that has been assigned by the Division Director, Program Head, Project Manager, or WPC Project Lead to oversee and coordinate multiple LOTOs with a large project, such as a maintenance outage or building energization. For facility construction and maintenance projects at ATAP, Facilities Division will assign a LOTO Coordinator as needed. The responsibilities of the LOTO Coordinator are to:

- Maintain overall control of a set of LOTOs established during a large project;
- Provide overall coordination with the project schedule;
- Resolve scheduling conflicts between different LOTOs and other scheduled work; and
- Ensure the various Responsible Individuals (RIs) are properly informed of any changes that will impact their respective LOTO Procedures.

The **LOTO Evaluator and LOTO Approver** roles at ATAP are not assigned to a specific person. When the **LOTO Line Manager** informs the **ATAP Division Safety Coordinator** of a proposed new LOTO procedure, a proposed modification to an existing LOTO procedure, or a pending annual review of a LOTO procedure, the **ATAP Division Safety Coordinator** will assist the **LOTO Line Manager** in identifying an appropriate qualified person who is independent of the work activity (not anticipated to be one of the people who will be performing the procedure) who is willing to act as the **LOTO Evaluator and Approver**.

LOTO Evaluator is a person trained as a LOTO Responsible Individual, selected by the division to inspect a LOTO Procedure (see **ES&H Manual Chapter 18, Work Process P**). The responsibilities of the LOTO Evaluator are to:

- Observe the performance of the LOTO Procedure for the purpose of initial or periodic inspection;
- Verify that the LOTO Procedure is adequate, understood, and being followed by persons participating in the LOTO; and
- Document the completion of the LOTO Procedure inspection by completing a LOTO inspection report or entering the evaluation in the EHS LOTO database.

LOTO Approver is a person designated by the division to approve LOTO Procedures. They must be authorized as a LOTO Responsible Individual and have technical competence and familiarity with the equipment or systems for which the LOTO Procedure is written. They may obtain additional technical assistance as needed from Qualified Persons more familiar with the systems involved. At ATAP, the LOTO Evaluator also functions as the LOTO Approver for each procedure evaluated. The responsibilities of the LOTO Approver are to:

- Review the submitted LOTO Procedure for completeness and accuracy;
- Verify that the scope of work is clearly defined, described on the LOTO Procedure, and that the LOTO Safe Zone established in the LOTO Procedure fully encompasses the scope of work; and
- Approve the LOTO Procedure if and when it meets all requirements in **ES&H Manual Chapter 18, Work Process N**.