

Electrical Safety

Brief

Title:	Electrical Safety
Publication date:	8/20/2015
Effective date:	7/1/2015

BRIEF

Policy Summary

The *Electrical Safety Program* at Berkeley Lab protects Laboratory employees, visitors, and subcontractors by:

- Managing electrical hazards
- Establishing qualifications for performing electrical work
- Providing electrical safety training
- Requiring an electrically safe work condition before performing electrical work while defining allowed exceptions

Who Should Read This Policy

All Berkeley Lab employees, visitors, affiliates, and subcontractors

To Read the Full Policy, Go To:

The POLICY tab on this wiki page

To Read the ES&H Program Details, Go To:

<http://www.lbl.gov/ehs/pub3000/CH08/CH8.html>

Contact Information

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POLICY

A. Purpose

The purpose of the Lawrence Berkeley National Laboratory (Berkeley Lab) *Electrical Safety Program* is to specify the minimum requirements for identifying and controlling electrical hazards to prevent fatalities and injuries to personnel from working on or around hazardous electrical energy.

B. Persons Affected

All Berkeley Lab employees, visitors, affiliates, and subcontractors

C. Exceptions

Exceptions to this policy must be approved by the Environment/Health/Safety (EHS) Division Director and the Electrical AHJ for Safe Work Practices.

D. Policy Statement

1. The policy of Berkeley Lab is to implement the requirements of NFPA 70E, *Standard for Electrical Safety in the Workplace*, 2012 Edition.
 - a. All electrical facilities and equipment shall be installed, operated, and maintained in a safe manner.
 - b. All work involving electrical energy shall be performed in a safe manner.
 - c. The primary safe work practice is to establish an electrically safe work condition.
2. Qualified Electrical Workers:
 - a. Electrical work shall only be performed by Qualified Electrical Workers, with approved equipment and PPE, using the Electrical Safe Work Practices outlined in the *Electrical Safety Program*.
 - b. Management is accountable for ensuring that only Qualified Electrical Workers perform work on electrical equipment, and for ensuring that Qualified Electrical Workers have the required work planning and authorization, training, equipment, and PPE specified in the *Electrical Safety Program*.
 - c. All personnel asked to perform electrical work have a duty to refuse if they are not qualified or if they feel they have not received the work planning and authorization, training, equipment, and PPE specified to perform the work safely.
 - d. All personnel are asked to stop work in accordance with the *Stop Work Policy* in the event of any real or perceived imminent hazard.
3. Energized Work:
 - a. All electrical repair work shall be performed deenergized and in an electrically safe work condition, unless approved by an Energized Electrical Work Permit.
 - b. Performing energized electrical repair work under an Energized Electrical Work Permit shall require additional justification and shall only be approved in extraordinary circumstances and as a last resort. In addition, no person shall be required, against his or her will, to perform energized repair work that requires an Energized Electrical Work Permit.
4. Violation of these principles shall be reported immediately to line management, the Electrical Authority Having Jurisdiction (AHJ) for Safe Work Practices, or the Electrical Safety Committee.

E. Roles and Responsibilities

Role	Responsibilities
Associate Laboratory Director for Operations / Chief Operating Officer (COO)	<ul style="list-style-type: none">• Chairs the Electrical Safety Advisory Board• Delegates Electrical AHJ to qualified individuals at Berkeley Lab• Chairs the appeals process for AHJ decisions
Electrical Safety Advisory Board (ESAB)	<ul style="list-style-type: none">• Provides executive-level support and advice to the Electrical AHJs• Provides critical review of proposed equivalencies

<p>Electrical Safety Committee (ESC)</p>	<p>The Electrical Safety Committee (ESC) is a subcommittee of the Berkeley Lab Safety Advisory Committee (SAC). The ESC has the responsibility to develop and maintain the Berkeley Lab <i>Electrical Safety Program</i>. The ESC will:</p> <ul style="list-style-type: none"> • Provide the SAC with recommendations for training and requirements to implement the program • Provide the SAC with recommendations for funding of electrical safety initiatives • Develop and review technical material related to the <i>Electrical Safety Program</i> • Collaborate with the Laboratory Electrical Safety Officer to maintain, through review and revision, the <i>Electrical Safety Program</i>, the <i>Electrical Safety Manual</i>, and the technical electrical information in the <i>Lockout/Tagout Program</i> • Assist line management in the interpretation of electrical safety requirements • Assist in employee training and safety awareness for electrical hazards • Assess the performance of the <i>Electrical Safety Program</i>, including assessments, audits, inspections, and reviews of electrical accidents and near misses <p>The ESC may also be requested to review electrical and electronic equipment and their installations at Berkeley Lab.</p>
<p>Environment/Health/Safety (EHS) Division</p>	<ul style="list-style-type: none"> • Designates a Laboratory Electrical Safety Officer to maintain, administer, and revise the <i>Electrical Safety Program</i> as needed. • Designates a suitably qualified individual, normally the Laboratory Electrical Safety Officer, to perform the role of Electrical AHJ for safe work practices, subject to DOE Berkeley Site Office approval and delegation of authority. Manages the Electrical Safety training courses and associated records.
<p>Facilities Division</p>	<ul style="list-style-type: none"> • Designates a suitably qualified individual to perform the role of Electrical AHJ for Safe Installations, subject to DOE Berkeley Site Office approval and delegation of authority. • Maintains Berkeley Lab specifications for installations of distribution and premises wiring. • Maintains the arc flash incident energy analysis database for all Berkeley Lab distribution and equipment. • Maintains up-to-date single-line drawings and panel schedules for all Berkeley Lab distribution and premises wiring. • Maintains capacity to repair deficiencies in premises wiring and workplace conditions reported through the Work Request Center.
<p>Engineering Division</p>	<ul style="list-style-type: none"> • Designates a suitably qualified individual to perform the role of Electrical AHJ for Safe Equipment, subject to DOE Berkeley Site Office approval and delegation of authority • Designates a suitably qualified individual to chair the Electrical Safety Committee (ESC). • Maintains Berkeley Lab specifications for the design and build of research electrical equipment • Maintains capacity to repair research-equipment deficiencies reported through the equipment inspection process
<p>EHS Electrical Safety Group</p>	<ul style="list-style-type: none"> • Administers the Berkeley Lab <i>Electrical Safety Program</i> • Administers the Berkeley Lab <i>Lockout/Tagout Program</i> • Administers the Berkeley Lab <i>Electrical Equipment Safety Program</i> • Maintains the Electrical Safety Database for all records related to the <i>Electrical Safety Program</i>, including Qualified Electrical Worker (QEW) records, equipment inspection records, voltage glove-testing records, electrical permits, and Lockout/Tagout (LOTO) permits and procedures • Ensures full implementation of the <i>Electrical Safety Program</i> through the EHS Assurance Program

<p>Electrical Safety Authority Having Jurisdiction (AHJ) for Safe Work Practices</p>	<ul style="list-style-type: none"> • Enforces the Berkeley Lab requirements for electrical safe work practices and workplace conditions • Administers a Qualified Electrical Worker (QEW) approval and certification program for all individuals performing electrical work at the Laboratory • Reviews and approves all individual applications for status as a QEW • Reviews and approves applications for Energized Electrical Work Permits, and maintains the associated database • Selects and applies the appropriate codes and standards to work processes and workplace conditions • Makes day-to-day interpretations on how to best satisfy the electrical mandatory codes and standards identified in 10 CFR 851 • Where appropriate, ensures that proposed equivalencies establish and maintain effective safety equal to, or exceeding, established codes, regulations, and standards • Notifies the DOE Berkeley Site Office (BSO) in writing of all approved equivalencies within 30 calendar days of such determination • Retains database copies of all approved AHJ equivalencies
<p>Electrical Authority Having Jurisdiction (AHJ) for Safe Installations</p>	<ul style="list-style-type: none"> • Enforces the Berkeley Lab specifications for electrical safe installations • Administers an installation inspection program for all electrical installations of distribution and premises wiring • Selects and applies the appropriate codes and standards to new facilities, or modifications to facilities and/or processes • Makes day-to-day interpretations on how to best satisfy the electrical mandatory codes and standards identified in 10 CFR 851 • Where appropriate, ensures that proposed equivalencies establish and maintain effective safety equal to, or exceeding, established codes, regulations, and standards • Notifies the DOE Berkeley Site Office (BSO) and the Laboratory Electrical Safety Officer in writing of all approved equivalencies within 30 calendar days of such determination
<p>Laboratory Electrical Safety Officer</p>	<ul style="list-style-type: none"> • Performs the role of Electrical Safety Program Manager • Performs the role of Electrical AHJ for Safe Work Practices • Manages the Electrical Safety Group • In collaboration with the Electrical Safety Committee, revises the <i>Electrical Safety Program</i> as needed • Provides subject matter expertise to Berkeley Lab in all areas of electrical safety • Maintains the <i>Electrical Safety Manual</i> • Selects and specifies appropriate safety tools and PPE for electrical work
<p>Deputy Laboratory Electrical Safety Officer</p>	<ul style="list-style-type: none"> • Performs deputy role for the Laboratory Electrical Safety Officer in the management of the <i>Electrical Safety Program</i> • For divisions without a Division Electrical Safety Officer: <ul style="list-style-type: none"> • Reviews and approves Electrical Safe Work Plans for the division • Performs annual work-practice audits of all QEWs within the division • Participates in annual division self-assessments in the areas of Electrical Safety and Lockout/Tagout

<p>Division Electrical Safety Officers</p>	<ul style="list-style-type: none"> • Fulfill the function of "Competent Person" for R&D Facilities as required by NFPA 70E Article 350 • Maintain NFPA 70E certification as Certified Electrical Safety Compliance Professional (CESCP) • In cooperation with the Laboratory Electrical Safety Officer, develop the Division ISM Plan for implementing the requirements of the Electrical Safety Program • Enforce the Berkeley Lab requirements for electrical safe work practices and workplace conditions • Consult with the Electrical AHJ for Safe Work Practices for interpretation requirements as necessary • Review and approve Electrical Safe Work Procedures for the division • Perform annual work-practice audits of all QEWs within the division, and submit written reports to the Laboratory Electrical Safety Officer • Lead division annual self-assessments in the areas of Electrical Safety and Lockout/Tagout • Act as a resource to employees, managers, and Division Safety Coordinators for electrical safety-related concerns • Reinforce good work practices to reduce at-risk behaviors • Perform or assign workplace-condition inspections to look for electrical hazards in office, industrial, and/or laboratory spaces • Perform or assign surveys of electrical equipment, and enter non–Nationally Recognized Testing Laboratory (NRTL) equipment into the Electrical Equipment Database for inspection • Coordinate with the Electrical Safety Group to resolve issues with electrical workplace conditions • Are familiar with relevant resources including the Electrical Safety website, the Electrical Safety Database (QuickBase), and the Electrical Safety Manual
<p>Division Electrical Safety Advocates</p>	<ul style="list-style-type: none"> • Act as a resource to employees, managers, and Division Safety Coordinators for electrical-safety-related concerns • Reinforce good work practices to reduce at-risk behaviors • Perform routine workplace-condition inspections to look for electrical hazards in office, industrial, and/or laboratory spaces • Perform surveys of electrical equipment and enter non–Nationally Recognized Testing Laboratory (NRTL) equipment into the Electrical Equipment Database for inspection • Coordinate with the Electrical Safety Group to resolve issues with electrical workplace conditions • Are familiar with relevant resources, including the Electrical Safety website, the Electrical Safety Database (QuickBase), and the Electrical Safety Manual
<p>Qualified Electrical Workers (QEWs)</p>	<ul style="list-style-type: none"> • Only perform electrical work within the limits of qualification, using the required tools and PPE • Only perform work on electrical equipment that has been placed in an electrically safe work condition, unless proper authorization has been obtained and required controls have been established in accordance with this program • Where necessary, comply with the letter, intent, and prescribed sequence of all the steps and requirements listed in written procedures, such as Lockout/Tagout Procedures, Electrical Safety Work Plans, Switching Plans, and Energized Electrical Work Permits • Stop work and place the equipment in a safe state when questions arise in the implementation of any written procedure. Resolve the issue to everyone's satisfaction prior to restarting work. • Continually apply the ISM process in the performance of daily work activities • Satisfactorily complete all training and certification requirements necessary to maintain certification as a Qualified Electrical Worker • Seek out additional guidance or training for tasks that are performed less than once a year • Notify a supervisor of any condition that poses a potential hazard for which the QEW is not able to adequately analyze the hazard or develop controls • Immediately report any occupational injury or illness, including any electrical shock, regardless of how minor the shock is perceived to be, to their supervisor and to Berkeley Lab Health Services • Assist non-QEWs in the performance of Lockout/Tagout of electrical systems, including the absence of voltage verification • Comply with all program requirements of the Electrical AHJ for Safe Installations and the Electrical AHJ for Safe Equipment

<p>Qualified Electrical Worker (QEW) Supervisors</p>	<ul style="list-style-type: none"> • Ensure that each QEW reporting to the QEW supervisor is complying with the safety-related work practices required by the <i>Electrical Safety Program</i> • Assess the need for establishing, implementing, and maintaining procedures and/or work practices that will ensure the safe conduct of electrical work • Where required due to elevated hazards or increased complexity of the work, develop written electrical safe work plans and/or switching plans with step-by-step instructions • Coordinate with the EHS Electrical Safety Group or the Division Electrical Safety Officer (if assigned) to promote a culture of electrical safety in all facets of electrical work • Maintain a safe work environment and take corrective action on any potentially hazardous operation or condition • Ensure that approved, maintained, and tested PPE and clothing are provided, available, and used properly • Assign only trained and qualified employees to electrical work, and personally ensure that employees understand how to work safely by conducting a pre-job briefing as necessary
<p>Division Safety Coordinators</p>	<ul style="list-style-type: none"> • Administer the division's Environment, Safety & Health (ES&H) program, including electrical safety • Work with supervisors and the EHS Electrical Safety Group to triage employees' electrical safety risk exposures • Perform electrical safety walk-throughs to proactively identify electrical safety problems • Monitor division <i>Electrical Safety Program</i> elements with emphasis on the risk exposures that have the most impact on staff • Collaborate with the Division Electrical Safety Officer or Advocate and the EHS Electrical Safety Group to provide effective coverage of electrical safety issues at multiple locations within each division
<p>Line management (including supervisors, managers, and work leads)</p>	<ul style="list-style-type: none"> • Ensures that all electrical-related incidents and injuries are reported appropriately • Ensures that all personnel who report receiving an electrical shock receive immediate professional medical evaluation • Ensures that only QEWs perform work on electrical equipment • Ensures that QEWs receive the proper training, tools, and PPE necessary to perform their assigned work
<p>Non-Qualified Electrical Workers (Non-QEWs)</p>	<ul style="list-style-type: none"> • Report all electrical shocks and electrical-related incidents and injuries to line management • Report all unsafe electrical conditions, and ensure that they are repaired in a timely manner • Submit a Facilities Work Order Request if new, repair, or maintenance electrical work is needed (including installation of electrical outlets) • Comply with the requirements of Section 5, General Electrical Safety for All Persons, of the <i>Electrical Safety Manual</i>

F. Definitions/Acronyms

Term	Definition
<p>Arc flash hazard</p>	<p>A dangerous condition associated with the possible release of energy caused by an electric arc.</p>
<p>Authority Having Jurisdiction (AHJ)</p>	<p>An organization, office, or individual responsible for enforcing the requirements of a code or standard, or for approving equipment, materials, an installation, or a procedure.</p>

Certified Electrical Safety Compliance Professional (CESCP)	A National Fire Protection Association (NFPA) certification for NFPA 70E, <i>Standard for Electrical Safety in the Workplace</i> .
De-energized	Free from any electrical connection to a source of potential difference and from electrical charge; not having a potential different from that of the earth.
Diagnostics	Taking readings or measurements of electrical equipment with approved test equipment that does not require making any physical change to the equipment. Includes testing and troubleshooting.
Direct field supervision	A designated competent Qualified Electrical Worker (QEW) is present on site and is providing oversight, guidance, and instruction on a specific task or set of tasks to another person.
Division Electrical Safety Officer	A qualified electrical worker that is the division-level representative of the Electrical AHJ for Safe Work Practices. Power User Divisions are required to have a Division Electrical Safety Officer.
Division Electrical Safety Advocate	A Non-QEW assigned by the division to perform tasks to support the <i>Electrical Safety Program</i> within the division.
Deputy Laboratory Electrical Safety Officer	A deputy to the Laboratory Electrical Safety Officer in the EHS Electrical Safety Group.
Electrical equipment	A general term, including fittings, devices, appliances, luminaires, apparatus, machinery, and the like used as a part of, or in connection with, an electrical installation. Electrical equipment can be classified as premises wiring or utilization equipment.
Electrical hazard	A dangerous condition such that contact or equipment failure can result in electric shock, arc flash burn, thermal burn, or blast.
Electrically safe work condition	A state in which an electrical conductor or circuit part has been disconnected from energized parts, locked/tagged in accordance with the Berkeley Lab ES&H Manual Lockout/Tagout Program , tested to ensure the absence of voltage, and grounded if determined necessary.
Electrical safety	Recognizing hazards associated with the use of electrical energy and taking precautions so that hazards do not cause injury or death.
Electrical Safety Committee	A standing subcommittee of the Safety Advisory Committee (SAC) focused on Electrical Safety at Berkeley Lab.
Electrical work	Any job or task requiring a Qualified Electrical Worker. It includes any work that involves a shock or arc flash hazard or creates a potential for shock or arc flash hazards, energized or deenergized. Tasks on equipment below the hazard thresholds of Table D-1 in the ES&H Manual <i>Electrical Safety Program</i> are not considered electrical work and do not require a Qualified Electrical Worker (QEW).

Equivalency	An alternate method for a mandatory requirement that offers the same or greater protection from a hazard. The AHJ may permit alternate methods when it is assured that equivalent objectives can be achieved by establishing and maintaining effective safety equal to, or exceeding, established codes, regulations, and standards.
Exposed	Capable of being inadvertently touched or approached nearer than a safe distance by a person. It is applied to electrical conductors or circuit parts that are not suitably guarded, isolated, or insulated.
Incident energy	The amount of thermal energy impressed on a surface, a certain distance from the source, generated during an electrical arc event. Incident energy is typically expressed in calories per square centimeter (cal/cm ²).
Interpretation	A determination whether a part of the code applies or is satisfied in a particular situation. The Authority Having Jurisdiction (AHJ) shall be permitted to select and apply the appropriate codes and standards to new facilities or modifications to facilities and/or processes; and to make day-to-day interpretations on how to best satisfy the codes, standards, and specifications.
Laboratory Electrical Safety Officer (ESO)	The Laboratory subject matter expert on electrical safety. Assigned to manage the overall <i>Electrical Safety Program</i> and is delegated as Electrical AHJ for Safe Work Practices. Manages the EHS Electrical Safety Group, the <i>Lockout/Tagout Program</i> , and the <i>Electrical Equipment Safety Program</i> .
Nationally Recognized Testing Laboratory (NRTL)	An OSHA-recognized organization that tests for safety; and lists, labels, or accepts equipment or materials. See 29 CFR 1910.7.
Non-Qualified Electrical Worker (Non-QEW)	A person who is not a Qualified Electrical Worker.
Premises wiring (system)	Interior and exterior wiring, including power, lighting, control, and signal circuit wiring together with all their associated hardware, fittings, and wiring devices, both permanently and temporarily installed. This includes: (a) wiring from the service point or power source to the outlets; or (b) wiring from and including the power source to the outlets where there is no service point. Such wiring does not include wiring internal to appliances, luminaires, motors, controllers, motor control centers, and similar equipment. Power sources include, but are not limited to, interconnected or stand-alone batteries, solar photovoltaic systems, other distributed generation systems, or generators.
Power User Division	A division where electrical hazards requiring Qualified Electrical Worker support are a substantial, division-wide risk element in daily work planning. Power User Divisions are designated by the EHS Division Director upon the recommendation of the Laboratory Electrical Safety Officer. These divisions include: <ul style="list-style-type: none"> • Facilities Division • Engineering Division • Advanced Light Source (ALS) • Energy Technologies Area (ETA)

Qualified Electrical Worker (QEW)	One who has demonstrated skills and knowledge related to the construction and operation of electrical equipment and installations, has received safety training to identify and avoid the hazards involved, and who has been approved or accepted by the Electrical AHJ for Safe Work Practices.
QEW supervisor	A work lead or supervisor providing daily supervision to a QEW or group of QEWs. The QEW supervisor must be of the same level or higher than those supervised.
Repair	Any physical alteration of electrical equipment (such as making or tightening connections, removing or replacing components, etc.).
Risk assessment	An overall process that identifies hazards, estimates the potential severity of injury or damage to health, estimates the likelihood of occurrence of injury or damage to health, and determines if protective measures are required. As used in this manual, arc flash risk assessment and shock risk assessment are types of risk assessments.
Safety watch	A hazard control measure that is more stringent than the Standby Person. The Safety Watch must be implemented when there are grave consequences from failing to follow safe work procedures. The Safety Watch is a Qualified Electrical Worker (QEW) whose only duty is to monitor the work of another QEW.
Shock hazard	A dangerous condition associated with the possible release of energy caused by contact or approach to energized electrical conductors or circuit parts.
Skill of the craft	Set of tasks for which a Qualified Electrical Worker is fully competent and can perform without additional planning or supervision. These vary depending on the individual's experience, job position description, and routine daily work assignments.
Standby person	A second person designated to fulfill the requirements of accompanying a Qualified Electrical Worker (QEW) performing certain types of high-hazard electrical work. While the primary purpose of a second person is to initiate the emergency response system, a Standby Person is also expected to know how to de-energize electrical equipment and to safely release a QEW from contact with energized parts.
Switching	The manual operation (opening or closing) of any electrical isolation on energized equipment. Manual operation includes the operation of through-the-door breaker handles or other dead-front switching.
Utilization equipment	Equipment that utilizes electric energy for electronic, electromechanical, chemical, heating, lighting, or similar purposes.
Variance	An exception to compliance with some part of a safety and health standard granted by the Under Secretary of DOE to a contractor. Variances are treated under 10 CFR 851 Subpart D and can only be granted by the DOE Under Secretary after considering the recommendation of the DOE Chief Health, Safety and Security (HSS) Officer. The authority to grant a variance cannot be delegated to Berkeley Lab.
Working on (energized electrical conductors or circuit parts)	Intentionally coming in contact with energized electrical conductors or circuit parts with the hands, feet, or other body parts, with tools, probes, or with test equipment, regardless of the personal protective equipment (PPE) a person is wearing. There are two categories of "working on": diagnostic and repair (see definitions above).

Acronym	Full Term
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A	Ampere
AC	Alternating Current
AED	Automated external defibrillator
AHJ	Authority Having Jurisdiction
ANSI	American National Standards Institute
ARMS	Arc Reduction Maintenance Switch
ASTM	American Society for Testing and Materials
ATPV	Arc Thermal Performance Value
BSO	Berkeley Site Office
CFR	Code of Federal Regulations
COO	Chief Operating Officer
CPR	Cardiopulmonary resuscitation
DC	Direct Current
DOE	Department of Energy
EBT	Breakthrough Energy
EESP	Electrical Equipment Safety Program
EETP	Energized Electrical Testing Permit
EEWP	Energized Electrical Work Permit
EHS	Environment/Health/Safety
EMS	Emergency Medical Services
ESA	Electrical Safety Advocate
ESD	Electrostatic Discharge
ESO	Electrical Safety Officer
ESP	Electrical Safety Program
ESWP	Electrical Safe Work Procedure
HVAC	Heating, Ventilation and Air Conditioning
Hz	Hertz
IEEE	Institute of Electrical and Electronics Engineers
ISM	Integrated Safety Management
J	Joule

kHz	Kilohertz
kV	Kilovolt
LBNL	Lawrence Berkeley National Laboratory
LOTO	Lockout/Tagout
mA	Milliampere
MCC	Motor Control Center
MHz	Megahertz
NEC	National Electrical Code
NFPA	National Fire Protection Association
NRTL	Nationally Recognized Testing Laboratory
OEM	Original Equipment Manufacturer
OSHA	Occupational Safety and Health Administration
PIC	Person In Charge
PPE	Personal Protective Equipment
PVC	Poly Vinyl Chloride
QEW	Qualified Electrical Worker
R&D	Research & Development
RF	Radio Frequency
RPT	Relocatable Power Tap
SAC	Safety Advisory Committee
sJHA	Subcontractor Job Hazards Analysis
SME	Subject Matter Expert
SWD	Switching Duty
UL	Underwriter's Laboratories
UPS	Uninterruptible Power Supply
V	Volt
VAC	Volts Alternating Current
VDC	Volts Direct Current
W	Watt
ZVV	Zero Voltage Verification

G. Recordkeeping Requirements

Energized Electrical Work Permits (EEWPs) are maintained in the EHS EEWP Database for at least three years. The Arc Flash Hazard Analysis is maintained as a building record by the Facilities Division. An up-to-date set of documentation adequate for operation, maintenance, testing, and safety should be available to anyone working on potentially hazardous equipment. Obsolete drawings should be marked as obsolete and, if maintained, kept in a "Dead File." Be certain that active file drawings have the latest corrections. All facilities drawings are to be archived with the Facilities Records Analyst and Control Specialist.

H. Implementing Documents

Document number	Title	Type
07.07.011.001	Electrical Safety	Program
07.07.011.002	Electrical Safety, Work Process A, Electrical Safety Program Structure	Work Process
07.07.011.003	Electrical Safety, Work Process B, Electrical Authority Having Jurisdiction (AHJ)	Work Process
07.07.011.004	Electrical Safety, Work Process C, <i>Application of ISM to Electrical Safety</i>	Work Process
07.07.011.005	Electrical Safety, Work Process D, <i>Electrical Work and Requirement for a Qualified Electrical Worker (QEW)</i>	Work Process
07.07.011.006	Electrical Safety, Work Process E, <i>AHJ Approval of Berkeley Lab QEWs</i>	Work Process
07.07.011.007	Electrical Safety, Work Process F, <i>AHJ Acceptance of Construction Subcontractor QEWs</i>	Work Process
07.07.011.008	Electrical Safety, Work Process G, <i>AHJ Acceptance of Non-Construction Subcontractor QEWs</i>	Work Process
07.07.011.009	Electrical Safety, Work Process H, <i>Performance of Electrical Work by Subcontractor QEWs</i>	Work Process
07.07.011.010	Electrical Safety, Work Process I, <i>Electrical Safety Training for Berkeley Lab QEWs</i>	Work Process
07.07.011.011	Electrical Safety, Work Process J, <i>Electrical Safety Training for Non-QEWs</i>	Work Process
07.07.011.012	Electrical Safety, Work Process K, <i>Electrical Incident Emergency Response</i>	Work Process
07.07.011.013	Electrical Safety, Work Process L, <i>Calculation of Electrical Severity Score</i>	Work Process
	Electrical Safety Manual	Manual
07.07.020.001	Lockout/Tagout Program	Program

07.07.033.001	Electrical Equipment Safety Program	Program
07.12.001.000	Safe Electrical Installations Policy	Policy

I. Contact Information

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J. Revision History

Date	Revision	By whom	Revision Description	Section(s) affected	Change Type
1/2/2012	0	M. Scott	Reformat for wiki (brief)	all	Minor
9/30/2013	1	M. Scott	Reformat for wiki (policy)	all	Minor
8/20/2015	2	M. Scott	Complete Revision	All	Major

Document Information

DOCUMENT INFORMATION

Title:	Electrical Safety
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Revision number	2
Publication date:	8/20/2015
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Policy Area:	Industrial Hygiene and Safety
RPM Section (home)	ESH
RPM Section (cross-reference)	none
Functional Division	EHS
Prior reference information (optional)	PUB-3000, Chapter 8

Source Requirements Documents

- 10 CFR 851.21, *Hazard Identification and Assessment*
- 29 CFR 1910 Subpart S, *Electrical*
- 29 CFR 1926 Subpart K, *Electrical*
- NFPA 70, *National Electrical Code (NEC)*
- NFPA 70E, *Standard for Electrical Safety in the Workplace*

Implementing Documents

Document number	Title	Type
07.07.011.001	Electrical Safety	Program
07.07.011.002	Electrical Safety, Work Process A, Electrical Safety Program Structure	Work Process
07.07.011.003	Electrical Safety, Work Process B, Electrical Authority Having Jurisdiction (AHJ)	Work Process
07.07.011.004	Electrical Safety, Work Process C, <i>Application of ISM to Electrical Safety</i>	Work Process
07.07.011.005	Electrical Safety, Work Process D, <i>Electrical Work and Requirement for a Qualified Electrical Worker (QEW)</i>	Work Process
07.07.011.006	Electrical Safety, Work Process E, <i>AHJ Approval of Berkeley Lab QEWs</i>	Work Process
07.07.011.007	Electrical Safety, Work Process F, <i>AHJ Acceptance of Construction Subcontractor QEWs</i>	Work Process
07.07.011.008	Electrical Safety, Work Process G, <i>AHJ Acceptance of Non-Construction Subcontractor QEWs</i>	Work Process
07.07.011.009	Electrical Safety, Work Process H, <i>Performance of Electrical Work by Subcontractor QEWs</i>	Work Process
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	Electrical Safety Manual	Manual
07.07.020.001	Lockout/Tagout Program	Program
07.07.033.001	Electrical Equipment Safety Program	Program
07.12.001.000	Safe Electrical Installations Policy	Policy