



**BERKELEY LAB**

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U.S. DEPARTMENT OF  
**ENERGY**

Office of Science

# NSD Safety Day Electrical Safety

Scott Small, NSD Electrical Safety Officer

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# Recent Incidents

## January 2024 Physical Sciences Fire at PNNL

In January 2024, the Pacific Northwest National Laboratory's (PNNL's) Security Operations Center received an alarm indicating the water suppression system in the basement of the Physical Sciences Laboratory (PSL) had activated. The Richland Fire Department was promptly dispatched and later confirmed the PSL fire suppression system had extinguished a fire in the PSL basement.

After reviewing the evidence and deconstructing the fire scene, PNNL's Fire Investigation Team determined the source of the fire was a battery box storing six Lithium (Li) metal waste pouch cells. The battery box was located on the floor, immediately adjacent to a glove box and a stack of combustible materials, and the box was missing the liner/insulation designed to suppress ignition and extinguish flames. The Fire Investigation Team further determined the fire was caused by thermal runaway as evidenced by burn marks on the floor indicative of smoke and flames flowing from beneath the lid of the battery box, damage to the battery box itself, and the ignition of nearby combustible materials.



# Recent Incidents

## May 2023 Electrical Shock from Laptop Charger Plug at NREL

In May 2023 an NREL employee experienced a shock while unplugging a laptop charger from a recessed receptacle within a table in a shared space. The contact was a point shock on the worker's thumb as they braced their hand against the metal surrounding the receptacle to help remove the plug. It was determined that the shock likely occurred because the outlets in these type of tables are angled in a tight space and require awkward hand positioning to unplug cords (see Figure 1).

NREL was concerned because, while the shock was minor, it wasn't the first of these to occur. A few months prior, in October 2022, there was a shock that occurred in a similar fashion.



*Figure 1: Original Outlet Access*

# What electrical hazards do you encounter in your work?

## In the laboratory area

- Electrical hazards from the use or maintenance of lab equipment.

These are typically controlled by the use of Qualified Electrical Workers (QEWs) and the application of the Lockout/Tagout (LOTO) program.

## In the office setting

- Electrical hazards from the use of powered devices; such as computers, extension cords, power strips, electric appliances, and space heaters or fans.

These are typically controlled by using these devices in accordance with the Electrical Safety Manual, as promulgated by the Field Guides.

# What resources are available to you to mitigate these hazards?

## Division Electrical Safety Officer

- Scott Small - [smsmall@lbl.gov](mailto:smsmall@lbl.gov), 510.486.4088

## Division Safety Coordinator

- Jeff Bramble - [jrbramble@lbl.gov](mailto:jrbramble@lbl.gov), 510.486.6242

## Lab Electrical Safety Website

- [electricalsafety.lbl.gov](http://electricalsafety.lbl.gov)



Home


## New! 2024 and 2025 Subcontractor QEW Training Dates Posted

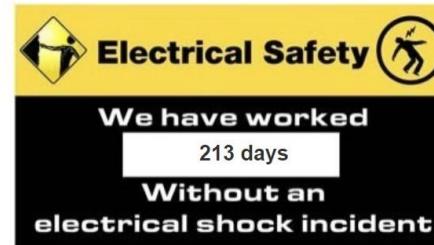
Required training dates for subcontractor QEW 2 have been scheduled through the end of 2023. See the [Subcontractors](#) page for details.

## QEW 2 / 3 Job Safety Plan Google Form

A Job Safety Plan (JSP) is required for all electrical work here at the Laboratory. Use [this](#) electronic JSP form to perform hazard assessments, define controls, and perform a job briefing. Contact any [Electrical Safety Officer](#) with questions or comments.

The screenshot shows a Google Form titled 'QEW 2 / 3 Job Safety Plan'. It includes a description of the JSP requirement, a text field for 'email@lbl.gov (switch account)', a 'Person in Charge' field with a 'Your answer' label, and a 'Lead / Supervisor' dropdown menu.

-  [Emergency Response](#)
-  [QEW Portal](#)
-  [LOTO Requirements](#)
-  [Request QEW Support](#)
-  [Electrical Safety Manual](#)
-  [Field Guides](#)
-  [Forms](#)



# Request QEW Support



The banner features the Berkeley Lab logo on the left, a search bar on the right, and navigation links for CONTACT US, QUICKBASE, and SUBCONTRACTORS. The text 'Electrical Safety' is prominently displayed in the center.

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TEST BEFORE TOUCH

**Electrical Safety**

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QUICKBASE  
SUBCONTRACTORS

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[Home](#) » [Request Help](#)

[Request Repair Assistance](#)

[Request Inspections](#)

[Request Labels \(Surveyors\)](#)

[Electrical Equipment Procurement Guide for Researchers](#)

[ES&H Manual Electrical Equipment Safety Program \(Chapter 14\)](#)

[Flowchart of Processes](#)

[Reputable Manufacturers](#)

[Contact Third-Party Field Evaluation Programs](#)

[Metrics for High-risk Equipment Inspections \(Quickbase\)](#)

[Engineering Electrical Equipment Fabrication Specification](#)

## Request Help

To request the support of a Qualified Electrical Worker for electrical equipment:

### Repair, Modification, and Fabrication of Laboratory Electrical Equipment

- Visit the [Engineering Qualified Electrical Worker \(QEW\) Support](#) web site and submit a Request Form.
- Or, send email to [qewhelp@lbl.gov](mailto:qewhelp@lbl.gov).
- Or call x6222.

### Facilities

- If the electrical work involves a building or infrastructure, submit a work request through the [Facilities Work Request Center](#). Click on the **“General Work Request”** link after logging in with your LDAP.
- Or call x6274.

# Field Guides

The screenshot shows the Berkeley Lab Electrical Safety website. The header includes the Berkeley Lab logo, navigation links (A-Z INDEX, DIRECTORY, SEARCH), and a search bar. The main navigation bar highlights 'RESOURCES'. The breadcrumb trail is 'Home » Resources » Field and Program Guides'. The main heading is 'Field and Program Guides'. A sidebar on the left lists various resources like 'ESO/ESA Training', 'Frequently Asked Questions', and 'QuickBase User Guides'. The main content area features a banner for 'Field Guides' with the subtitle 'Implementing Electrical Safety in the Field'. Below the banner, text explains that guides are provided for LBNL personnel and are available in PDF and PowerPoint formats. A call to action 'Have an idea for a field guide? CONTACT US!' is present. A table lists 'GENERAL FIELD GUIDES AND PROGRAM GUIDES' with columns for ID, title, and format (PDF).

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HOME ELECTRICAL SAFETY LOCKOUT/TAGOUT (LOTO) NON-NRTL EQUIPMENT **RESOURCES**

Home » Resources » Field and Program Guides

## Field and Program Guides

Field Guides  
*Implementing Electrical Safety in the Field*

ESO/ESA Training  
Frequently Asked Questions  
Presentations  
Forms  
QuickBase User Guides

- Lockout/Tagout (LOTO) Procedure Database User Guide
- Lockout/Tagout (LOTO) Permit Database User Guide
- Electrical Equipment Safety Program (EESP) Inspection Database User Guide

Reference Standards

- Hierarchy of Regulatory Drivers
- IHS Access to NFPA and UL Standards
- Berkeley Lab
- Department of Energy
- NFPA Standards
- ASTM Standards
- IEEE Standards
- OSHA Links

Lessons Learned

The following Field Guides are provided to assist LBNL personnel in the application of PUB-3000, Chapter 8 and the Electrical Safety Manual while performing their duties.

They are provided in both PDF handout format, as well as PowerPoint format. You are encouraged to use these guides in the field as well as for Safety and Tailgate sessions.

Have an idea for a field guide? [CONTACT US !](#)

### GENERAL FIELD GUIDES AND PROGRAM GUIDES

FG-00	<a href="#">Electrical Injury Emergency Response</a>	<a href="#">PDF</a>
FG-01	<a href="#">What is "Electrical Work"?</a>	<a href="#">PDF</a>
FG-9A	<a href="#">Non-Hazardous, Non-QEW Switching Requirements</a>	<a href="#">PDF</a>
FG-20	<a href="#">Use, Inspection and Storage of Electrical Extension Cords</a>	<a href="#">PDF</a>
FG-21	<a href="#">Proper Application and Use of Relocatable Power Taps (Power Strips)</a>	<a href="#">PDF</a>
FG-22	<a href="#">Space Heater Safety</a>	<a href="#">PDF</a>
FG-23	<a href="#">Office Inspection for Electrical Safety</a>	<a href="#">PDF</a>



# Field Guides, continued

[What is “Electrical Work”?](#)

[Use, Inspection, and Storage of Electrical Extension Cords](#)

[Proper Application and Use of Relocatable Power Taps \(Power Strips\)](#)

[Space Heater Safety](#)

[Office Inspection for Electrical Safety](#)

# Lithium Ion Batteries

A relatively newer hazard, not especially mentioned in the Field Guides

- There can be a surprising amount of stored energy in these, and they are common in the office setting.
- If used improperly or damaged, they can rapidly release all that energy in the form of a fire.

[Dog Chews Battery and Causes Home Fire](#)

# Summary

Only Qualified Electrical Workers may perform Electrical Work

- Contact the Division Electrical Safety Officer if there is a question about Electrical Work
- Utilize the Field Guide to determine if it is Electrical Work
- Use the “Request QEW Support” link at [electricalsafety.lbl.gov](https://electricalsafety.lbl.gov)

Use of Electrical Devices in the office setting poses risks as well

- Use the Field Guide to inspect your work area
- Use the Field Guides to effectively and correctly utilize extension cords, power strips, and space heaters.

# Questions?

# Thank You

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