

# UC Monthly Safety Spotlight, February 2012

## Shop and Tool Safety, Electrical Safety

### What is “EI-LOTO” and Why is it so Important?

#### EI-LOTO Mini Quiz: Which of the following statements about EI-LOTO is true?

- It is a methodical way of controlling equipment hazards that could cause injury
- It is practiced throughout the UC system
- It is required by CalOSHA to help ensure worker safety
- It identifies hazardous physical conditions and guides you to control them
- It is a reliable way to personally assure your safety and to stay healthy

If you checked all of the boxes above, you have the right idea about EI-LOTO. Energy Isolation - Lock Out/Tag Out or “EI-LOTO” broadly defines a set of methods used to prevent tool or machine parts from moving, or from energy flowing unexpectedly in equipment, and causing worker injuries. EI-LOTO (pronounced “E – I – LOTO where LOTO rhymes with “grotto”) is highly effective, required by regulatory agencies, and an integral part of UC employee safety programs. In the UC system, EI-LOTO safety applies to everything from automated cutting equipment, to scanning electron microscopes, to parked vehicles.



How does EI-LOTO work? What is likely to come to mind is the need to disable electrical equipment during cleaning or servicing. Basic EI-LOTO is simply unplugging equipment with the plug being controlled by the person working on the equipment. More complex EI-LOTO may involve fuses, breakers and alternate electricity sources also being disabled. This is called “de-energizing” and there are points on equipment where locks are installed to assure power cannot be accidentally restored. An “Accident Prevention Tag” is attached to the locked equipment to document the EI-LOTO process ongoing at the equipment. Each lock and tag can only be removed by the person who put it there following a systematic safety review to ensure that it is safe to re-start the equipment. While the lock and tag are in place, no one is permitted to touch or try to activate the equipment.

“Practicing EI-LOTO is vital to prevent injury, and it’s each worker’s personal assurance that they’ll maintain their health and safety on the job,” says Jim Gilson, Senior Safety Engineer at UC Berkeley. “Even a small departure from the EI-LOTO procedure can result in disaster. People have been seriously injured and departments have suffered major disruptions and financial losses to their operations when ‘short-cuts’ around EI-LOTO were taken. By practicing EI-LOTO, equipment hazards are identified and controlled before personnel start working on the equipment, energy-isolation locations are locked and tagged, and safe work processes are documented, before the person sets out to work on the equipment. Job planning becomes easy and straight-forward as safe-work steps are clear and easy to follow, and all equipment energy-hazards are known and locked de-energized by all workers.”

#### Energy Isolation is the Key

Avoiding electrocution is only one of the ways that EI-LOTO procedures protect people. Other forms of energy can be just as hazardous as electricity and must be isolated and controlled.

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Basic physics concepts come into play when any kind of potential energy is involved. For example, an experienced worker was injured while cleaning a large building ventilation fan. Even though the motor was turned off for cleaning, the fan did not stop. Differences in air temperature in the duct caused the blades to continue turning. The worker, who had used a make-shift method to stop the fan's rotation and then continued cleaning, was injured. This is an example of how a proper EI-LOTO procedure is needed for all kinds of energy sources.



Equipment may be powered by or store hydraulic, mechanical, compressed air, pressurized water or other kinds of energy. An EI- LOTO program identifies all energy-hazards on a piece of equipment, and outlines safe-work processes and tools to control the hazards while work is done on the equipment. To de-energize fluids or gasses under pressure, valves can be locked closed, bleed-valves opened or “blinds” installed to block pipes. To prevent movement, equipment can be “blocked” with devices that temporarily prevent suspended or rolling parts from moving. Even placing a wheel-chock on a parked vehicle, or buckling your seat-belt, is practicing EI-LOTO!

**EI-LOTO is a systematic, easy-to-follow safe-work process that is customized for each department's needs. It protects UC personnel as well as infrastructure, research, capital projects, patient care and other critical operations.**

To determine whether an EI-LOTO procedure is needed for a building system or equipment, Project Managers or Principle Investigators (PIs) may assign a “qualified person” in their group to assess the system/equipment. The qualified person details the equipment's potential hazards and determines how to control them, sometimes with the assistance of the local UC EH&S staff and/or the equipment manufacturer. The hazard assessment and control measures are documented for that specific piece of equipment, and followed by all persons work on/with that equipment.

After EI-LOTO processes are established, the qualified person may monitor staff compliance, oversee record-keeping and assure staff training. Everyone who may come in contact with the equipment is trained on an equipment's EI-LOTO procedure BEFORE they start working with/on the equipment, including visiting staff, students, interns and contractors.

In keeping with the UC “Power of Ten” philosophy, a new system-wide Injury and Illness Prevention Team made up of EH&S representatives from all ten UC campuses has been chartered to focus on standardizing safe-work and compliance practices for all of UC. This includes full implementation of EI-LOTO at all levels of UC operations. “Our goal is to help all UC staff to develop and use Lock Out/Tag Out procedures to prevent injuries and support safe cost-effective research,” says Gilson, who chairs the new team. “By distilling the best EI-LOTO processes and resources from all UCs, we can better empower researchers and staff to always choose the safer-way of doing their work.”

For more information on EI-LOTO, go to [ehs.berkeley.edu/hs/88-energy-isolation-lock-outtag-out.html](https://ehs.berkeley.edu/hs/88-energy-isolation-lock-outtag-out.html)

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Energy Isolation Lock out/Tag out procedures are essential to a safe workplace.



When many employees work together on a single project, each one of them has a personal lock on the group task. Can you see the error in this picture that leaves one worker unprotected?

Having a central station for all your EI-LOTO equipment can be a good idea, as long as all employees are trained to conscientiously follow program requirements. Ensure that everyone knows the necessary procedures and how to use the proper devices.



Though it's written in jest, the message is an important one. Even a moment's distraction can lead to injury or fatality. When working around tools and equipment, safety depends on staying focused on the task and consciously following all safe-work practices, including Energy Isolation Lock out/Tag out.



Above left: Even if a machine only has one plug, you may need to secure it. If you are not in full visual control of the power source during the entire time you're working on something, you should ensure that nobody else can change it for you. Even if you just went for a short break, coming back to a machine someone else turned on when you don't expect it to have power can be very dangerous.



Above right: Locks are necessary to prevent unauthorized changes to machine power status. Tags are useful for identifying why something has been de-activated, how long it will be out of service, and who to contact regarding the progress of repairs. Only the worker who applied the lock is allowed to remove it!