

Chapter 51: [Control of Hazardous Energy](#)

Group Lockout Procedure

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URL: <https://www-esh.slac.stanford.edu/eshmanual/references/coheProcedLOTOGroup.pdf>

1 Purpose

The purpose of this procedure is to prevent worker exposure to *hazardous energy* (such as from unexpected energization, start-up, or release of stored energy).

It covers locking out a machine, equipment, or system for which any of the following conditions are met:

- Multiple energy sources
- Multiple crews
- Multiple crafts
- Multiple locations
- Multiple employers
- Multiple disconnecting means
- Particular sequences of operation are necessary to establish the locked-out condition safely
- Work involves a shift change

Such lockouts are considered *complex* and may be performed only under this procedure or an *equipment-specific lockout procedure (ELP)* (see [Control of Hazardous Energy: General Requirements](#)).

This procedure applies to workers, supervisors, and equipment custodians.

2 Procedure

Step	Person	Action
Define the Work		
1.	Work scope owner (manager, supervisor, project engineer, or field construction manager)	Designates a <i>lead authorized worker</i> to be responsible for the group lockout Note When a group lockout is established by an operations group, the functions and responsibilities of the lead authorized worker may be transferred to the operations group. Operations group members involved with execution of the group lockout must themselves be <i>authorized workers</i> .

Step	Person	Action
Identify and Analyze Hazards and Develop and Implement Controls		
2.	Work scope owner	Designates a knowledgeable worker familiar with the equipment and work scope to prepare an <i>energy isolation plan (EIP)</i> and a second knowledgeable worker to review it
3.	EIP preparer	Identifies hazardous energy sources following Control of Hazardous Energy: Hazard Analysis Procedure : ▪ Reviews as-built drawings, equipment labels, and other available information ▪ Consults with persons knowledgeable with the system or equipment ▪ Identifies required <i>energy isolation devices</i> ▪ Identifies sources of stored energy ▪ Identifies location(s) to perform verification of non-operation, <i>zero-energy verification</i>, and <i>zero-voltage verification (ZVV)</i>
4.	EIP preparer	Develops the energy isolation plan (see Control of Hazardous Energy: Energy Isolation Plan Template and Control of Hazardous Energy: General Requirements , Section 2.4.4.1)
5.	EIP reviewer	Performs an independent review of the energy isolation plan
6.	EIP preparer	Prepares a <i>complex lockout permit</i> (see Control of Hazardous Energy: Complex Lockout Permit and Control of Hazardous Energy: General Requirements , Section 2.4.2.1)
7.	Lead authorized worker (if not the EIP preparer)	Reviews energy isolation plan with knowledgeable individuals (may include the project manager, project engineer, electrical supervisor, subcontractor supervisor, safety inspectors, electrical safety officer, or other subject matter experts)
Authorization and Release		
8.	Lead authorized worker	Establishes permission and obtains release to remove equipment from service
9.	Lead authorized worker	Notifies <i>affected workers</i> before equipment shutdown ▪ Notifies <i>affected workers</i> that a lockout is about to take place, the reason for it, and the specific affected machinery or equipment ▪ Clears the area of people and any non-essential objects
Perform the Work within Controls		
10.	Lead authorized worker	Locates each energy isolation device listed in the energy isolation plan
11.	Qualified electrical worker	Wears appropriate personal protective equipment (PPE) per the arc flash label for switching and ZVV (see Control of Hazardous Energy: Zero-voltage Verification Procedure)
12.	Qualified electrical worker	Assists the lead authorized worker with switching as needed to establish energy isolation
13.	Authorized worker	Assists the lead authorized worker with equipment operation as needed to establish energy isolation
14.	Lead authorized worker	▪ Places/verifies each energy isolation device in the required LOTO position

Step	Person	Action
		▪ Applies personal red lockout lock and tag (lead authorized worker) or operations lock and tag (operations group) to each isolation device (each tag must call out the unique ID assigned to the group lockout) ▪ Signs off each point on the energy isolation plan as locks are placed ▪ Places the key for each lock in the group lockbox ▪ Performs or witnesses each verification of zero energy or verification of non-operation, and each release of stored energy. For electrical equipment with viewing window, verifies all blades are fully open. Switchgear-type breakers must be open and racked out to the fully disconnected position. Rackable MCC buckets must be fully withdrawn with the breaker open. ▪ Signs off each verification of zero energy or verification of non-operation
15.	Qualified electrical worker	Assists the lead authorized worker in establishing an electrically safe condition by performing ZVV of all circuit elements and electrical parts to which worker(s) may be exposed as listed in the energy isolation plan
16.	Lead authorized worker or qualified electrical worker	Signs off each ZVV step on the energy isolation plan
17.	Lead authorized worker	▪ When all energy isolation plan steps are complete, affixes a personal red lockout lock and orange group lockout master lock tag to the group lockbox. This <i>group lockout master lock</i> is the first lock to be applied on the group lockbox and the lock must stay in place for the duration of all work. Important The lead authorized worker must be the first to lock on, and the last to lock off, the energy isolating devices or group lockbox, with the following exception: authorized workers may lock on to the energy isolating devices or group lockbox to perform activities associated with establishing the lockout, such as zero-voltage verification. No work may be performed under the lockout until the lockout is complete and the group lockout master lock and orange master lock tag are affixed to the group lockbox. ▪ Signs Section 2 of the complex lockout permit indicating that the group lockout is complete and the system is safe to work
18.	Authorized worker	▪ Informs the lead authorized worker of intent to lock on to the group lockout ▪ Reviews the energy isolation plan, including associated drawings and/or sketches ▪ Optional: walks down energy isolation points to verify proper lockout ▪ Verifies all energy isolation plan steps are complete and signed off ▪ Verifies lead authorized worker approval in Section 2 of the complex lockout permit ▪ Verifies lead authorized worker master lock and orange master lock tag are applied to the group lockbox ▪ Subcontractor: verifies is authorized by supervisor to lock on to the lockout

Step	Person	Action
		- Signs on the group lockout permit and affixes a personal lockout lock and tag to the group lockbox. Each worker must apply his or her own personal LOTO lock. Never rely on another worker's lock. - Re-verifies personal lock on lockbox at the beginning of each shift. Important Authorized workers must complete this step each time they lock on.
19.	Lead authorized worker	Coordinates multiple work groups under group lockout For work across multiple shifts a lead authorized worker must be designated for each shift. All authorized workers on shift must be informed of this designation. Oncoming lead authorized workers must apply their own lock(s) to the energy isolating devices or, if used, the group lockbox. The off-going lead authorized worker will communicate with the oncoming lead authorized worker to ensure proper coordination of work scopes and work groups across multiple shifts. Oncoming lead authorized workers must stay locked on the energy isolating devices or, if used, the group lockbox until work on their shift has been discontinued, or until their lead duties have been transferred to another lead authorized worker.
20.	Authorized worker	- Performs work under group lockout - Restricts equipment access in accordance with the arc-flash label(s) whenever there are exposed electrical parts Important The electrical worker in charge must control access to electrical equipment per the boundaries on the arc flash label.
21.	Authorized worker	- Upon completion of work, informs the lead authorized worker of intent to lock off - Signs off the complex lockout permit - Removes personal red lockout lock and tag from the group lockbox Note To lock back on repeats Step 18.
22.	Lead authorized worker	Upon completion of work verifies all authorized workers have signed off the complex lockout permit and all authorized worker locks and tags have been removed
23.	Lead authorized worker	Checks the machine/equipment and surrounding area to ensure that non-essential objects have been removed, guards have been reinstalled, and that the machine/equipment is operationally intact
24.	Lead authorized worker	Verifies machine/equipment controls are in the NEUTRAL or OFF position
25.	Lead authorized worker	Verifies that all affected workers and authorized workers are out of harm's way
26.	Lead authorized worker	Removes group lockout master lock and tag from the group lockbox
		Note At this time, the group lockout is no longer in effect.
27.	Lead authorized worker	Removes personal red lockout locks from each energy isolation device in the reverse sequence from which they were installed
		Important If alternate sequencing is desired then a job-specific restoration plan must be prepared by a knowledgeable worker who is familiar with the equipment and work scope.

Step	Person	Action
28.	Lead authorized worker	Before restarting machinery/equipment, notifies either <i>affected workers</i> that work is complete and that locks and tags have been removed or the equipment custodian, equipment owner, or system owner that the lockout is complete and that normal operations may proceed

3 Forms

The following are recommended templates. Equivalent forms may be used:

- [Control of Hazardous Energy: Energy Isolation Plan Template](#) (SLAC-I-730-0A10J-005). Template for creating group lockout energy isolation plans (EIPs); lists required elements of an energy isolation plan
- [Control of Hazardous Energy: Complex Lockout Permit](#) (SLAC-I-730-0A10J-006). Form for documenting lead authorized worker and sign-on and sign-off of workers for complex LOTO
- [Control of Hazardous Energy: Tag Templates](#) (SLAC-I-730-0A10J-003). Templates for creating tags

The following checklist is provided as guidance:

- [Control of Hazardous Energy: Group Lockout Checklist](#) (SLAC-I-730-0A10J-007). Checklist for completing a group lockout

4 Recordkeeping

The following recordkeeping requirements apply for this procedure:

- The supervisor or manager in charge of the work or operations group leader should retain the group lockout forms (energy isolation plan and complex lockout permit) for at least 12 months.

5 References

[SLAC Environment, Safety, and Health Manual](#) (SLAC-I-720-0A29Z-001)

- [Chapter 51, “Control of Hazardous Energy”](#)
 - [Control of Hazardous Energy: General Requirements](#) (SLAC-I-730-0A10S-004)
 - [Control of Hazardous Energy: Hazard Analysis Procedure](#) (SLAC-I-730-0A10C-002)
 - [Control of Hazardous Energy: Simple Lockout Procedure](#) (SLAC-I-730-0A10C-003)
 - [Control of Hazardous Energy: Zero-voltage Verification Procedure](#) (SLAC-I-730-0A10C-004)