Chapter 51: Control of Hazardous Energy

Group Lockout Procedure

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

<table>
<thead>
<tr>
<th>Step</th>
<th>Person</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Work scope owner (manager, supervisor, project engineer, or field construction manager)</td>
<td>Designates a lead authorized worker 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 authorized workers.</td>
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<tr>
<td>2.</td>
<td>Work scope owner</td>
<td>Designates a knowledgeable worker familiar with the equipment and work scope to prepare an energy isolation plan (EIP) and a second knowledgeable worker to review it.</td>
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<tr>
<td>3.</td>
<td>EIP preparer</td>
<td>Identifies hazardous energy sources following Control of Hazardous Energy:</td>
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</table>
### Hazard Analysis Procedure:
- Reviews as-built drawings, equipment labels, and other available information
- Consults with persons knowledgeable with the system or equipment
- Identifies required energy isolation devices
- Identifies sources of stored energy
- Identifies location(s) to perform verification of non-operation, zero energy verification, and zero voltage verification (ZVV)

4. **EIP preparer**
   Develops the energy isolation plan (see [Control of Hazardous Energy: Group Lockout 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 complex lockout permit (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 affected workers before equipment shutdown
   - Notifies affected workers 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
    - 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
Step | Person | Action
--- | --- | ---
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 group lockout master lock 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 two exceptions: 1) 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; 2) an administrative lock and tag may be applied to the energy isolating devices or group lockbox for the purpose of configuration control. Whenever an administrative lock and tag is used, the lead authorized worker retains responsibility for the integrity of the lockout, including re-verifying proper energy isolation if necessary prior to placing the master lock on the group lockbox. For either exception, 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
  - 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
## Step 18

**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.

### Step 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.*

### Step 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.*

### Step 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

### Step 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

### Step 24

**Lead authorized worker**
- Verifies machine/equipment controls are in the NEUTRAL or OFF position

### Step 25

**Lead authorized worker**
- Verifies that all affected workers and authorized workers are out of harm’s way

### Step 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.*

### Step 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 28

**Lead authorized worker**
- Before restarting machinery/equipment, notifies either affected workers 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 recommend templates. Equivalent forms may be used:

- Control of Hazardous Energy: Group Lockout Energy Isolation Plan Template (SLAC-I-730-0A10J-005). Lists required elements of an energy isolation plan
- Control of Hazardous Energy: Complex Lockout Permit (SLAC-I-730-0A10J-006). Documents required sign on and sign off for complex LOTO
- Control of Hazardous Energy: Tag Templates (SLAC-I-730-0A10J-003). Template 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)