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Purpose
The purpose of this Program is to ensure that lockout/tagout is implemented as a functional process at the Institute for eliminating hazards from the workplace in compliance with Cal/OSHA Title 8, California Code of Regulations (CCR), § 3314. It provides faculty, staff, and students with information and guidelines which will prevent the unexpected energization or startup of machines or equipment, or the release of stored energy that could cause injury to Institute employees or outside contractors.

Scope
This plan applies to all employees of the Institute. Outside contractors are expected to comply with lockout/tagout techniques and methods during the following activities:

Cleaning, Servicing, and Adjusting Operations:
- Machinery or equipment capable of movement shall be stopped and their power source(s) de-energized or disengaged.
- Accident prevention signs, tags, or both shall be placed on the controls of the power source(s) of the machinery or equipment.
- If necessary, the moveable parts must be mechanically blocked in addition to being locked out to prevent inadvertent movement, or release of stored energy.

Repair Work and Setting-Up Operations:
- Machines, equipment, and prime movers shall be locked out in the "off" position if they have lockable controls (or are readily adaptable to lockable controls).
- Machines, equipment, and prime movers shall be de-energized or disconnected from their power source(s) (or other actions taken to effectively prevent inadvertent movement or release of stored energy) if they do not have lockable controls on the power source(s) of the machinery or equipment.
- Accident prevention signs, tags, or both shall be placed on the controls of the power source(s) of the machinery or equipment.

Outside Contractors Working at the Institute
- Whenever outside contractors are engaged in work activities covered by the lockout/tagout program, the Institute's on-site lockout/tagout procedures must be followed.

Definitions
Affected Employee - An employee whose job requires them to operate or use a machine or equipment on which cleaning, repairing, servicing, setting-up, or adjusting operations are being
performed under lockout/tagout, or whose job requires the employee to work in an area in which such activities are being performed under lockout/tagout.

**Authorized Employee** - A qualified employee who locks out and tags out specific machines or equipment in order to perform cleaning, repairing, servicing, setting-up, and adjusting operations on the machine or equipment.

**Assigned Individual Tag** – An individual photo tag assigned and used to identify the employee applying the lockout/tagout device.

**Mechanical Block** – A mechanical device that physically prevents the sliding, falling, or rolling of raised machinery or equipment.

**Energy-Isolating Devices** – A mechanical device that physically prevents the transmission or release of energy. Examples include the following:

- Manually operated circuit breaker lockout/tagout device
- Disconnect switch lockout/tagout device
- Line or pipe valve lockout/tagout device
- Mechanical block

*Important note: Push buttons, selector switches, software controls, interlocks, and other control circuit devices are not considered energy-isolating devices.*

**Energy Source** – Any source of electrical, hydraulic, pneumatic, chemical, thermal, gravitational, stored, or other type of energy.

**Energized** – Connected to an energy source or containing residual or stored energy.

**Hazardous Energy Control** – Using mechanical means to prevent hazardous energy from flowing to a person.

- Isolated – All sources of energy have been controlled by isolating or breaking the energy path
- Dissipated – All stored energy has been release and/or reduced to a non-hazardous level

**Lockout** – The placement of a lockout device on an energy-isolating device to ensure that the machinery or equipment being controlled cannot be operated until the lockout device is removed.

**Lockout Device** – A device, such as a lock, used to secure an energy-isolating device in the safe position and prevent the energizing of a machine or equipment.

**Pressure** – Different types of energy provided to equipment and machinery, such as compressed air, hydraulic systems, gas supplies, and compressed springs, which must be bled off,
disconnected, drained, and/or released prior to working on the equipment and machinery.

**Tagout** – The placement of a tagout device on an energy-isolating device to indicate that the machinery or equipment being controlled cannot be operated until the tagout device is removed.

**Tagout Device** – A warning tag, capable of being securely attached, that provides a warning not to use the machine or equipment. The tag shall include the following:

- Identification of employee and department placing the tag
- Contact information for employee and department placing the tag
- Date the tag was placed
- “Do Not Operate” or “Do Not Energize”

*Note: Examples of these warning tags are provided in Appendix B.*

**Zero Energy State** – A condition where no energy or residual pressure is stored in the machinery or equipment, and that must be verified prior to working on the equipment and machinery.

**Responsibilities**

**Facilities Supervisors**

- Ensure that all Affected Employees are trained in the significance and purpose of this lockout/tagout Program.
- Ensure that all Authorized Employees are trained in the significance, purpose, and use of these lockout/tagout procedures.
- Ensure that all Authorized Employees receive the proper level of training and are provided with the right equipment and Personal Protective Equipment (PPE) to perform the job safely.
- Ensure that only Authorized Employees perform lockout/tagout work.
- Conduct periodic (i.e., annual) inspections of energy control procedures to ensure compliance with the requirements of the Cal/OSHA lockout/tagout standard and this Institute Program.
- Write equipment-specific lockout/tagout procedures.

**Environment, Health, and Safety**

- Assist Facilities Supervisors in writing equipment-specific lockout/tagout procedures.
- Assist Facilities Supervisors in coordinating the appropriate level of training for Authorized Employees performing lockout/tagout work.
- Assist Facilities Supervisors in coordinating the appropriate level of training for Affected Employees.
- Conduct periodic (i.e., annual) reviews of the lockout/tagout program.
Program Procedures

Lockout/Tagout

1. Notify all Affected Employees, if impacted, that lockout/tagout work will be performed in their area. If appropriate, the Authorized Employee will have the Service Center issue a Utility and Service Interruption Notice.

2. If the machine or equipment is operating, shut it down by following the normal operating procedures (e.g., press the stop button, open the switch, close the valve, etc.).

3. Open the energy-isolating device, such as a manually operated circuit breaker, and switch it to the “off” position. Important Note: Push buttons, selector switches, software controls, interlocks, and other control circuit devices are not considered energy-isolating devices.

4. All energy-isolating devices must be locked out. Lock out each of the energy-isolating devices with a lock, hasp, and assigned individual warning tag showing the shutdown date. This may include unplugging the equipment and locking it out using an approved lockable cover on the electrical plug.

5. When placing a lock is not possible, an assigned individual warning tag must be used along with another means of disconnecting the circuit, machine, or equipment.

Verification of Lockout

1. Remove all unnecessary personnel from the immediate work area.

2. Dissipate all forms of stored energy (e.g., compressed air pressure in a line).

3. Verify that all types of energy sources have been isolated or disconnected.

4. Test energy-isolating devices by trying to operate the machine or equipment using the normal operating controls (e.g., press the start button).

5. Verify that the machine or equipment is at a zero energy state.

Steps to Restart

1. Reinstall, adjust, and secure all machine or equipment guards or guarding devices.

2. Remove all tools and parts from the immediate work area.
3. Remove all unnecessary personnel from the immediate work area.

4. Inform all Affected Employees in the immediate work area about the planned startup of the machine or equipment.

5. Remove all locks, hasps, and assigned individual warning tags or other energy-isolating devices.

6. Energize all energy sources.

7. Start machine or equipment following normal operating procedures.

**Group Lockout/Tagout**

1. Department or group lockout/tagout devices shall be used following the procedures required above.

2. An Authorized Employee shall determine potential exposure to group members during the lockout/tagout process.

3. An Authorized Employee shall have primary responsibility for the employees working under the protection of the group lockout/tagout device.

4. When multiple departments or groups are involved in the lockout/tagout process, an Authorized Employee will be assigned responsibility to control all affected work personnel to ensure lockout/tagout procedures are being followed.

5. Each Authorized Employee shall attach a personal lockout/tagout device to a group lockbox or multi-lock hasp when they begin work and shall remove the lockout/tagout device at the end of his/her shift.

**Shift or Personnel Changes**

Departments or groups shall establish specific hazardous energy control procedures (i.e., lockout/tagout) that will be utilized during shift or personnel changes to ensure the continuity of lockout/tagout protection including, but not necessarily limited to, procedures for the orderly transfer of lockout/tagout device protection between outgoing and incoming personnel.

**Removing an Authorized Employee’s Lock**

If an employee is unable to remove his/her lockout device due to not being at work, then his/her supervisor must make an attempt to contact the employee to see if he/she can return to work to unlock and remove his/her lockout/tagout device. If the machine or equipment is ready to be put back into service, and the employee is unavailable to unlock and remove his/her lockout/tagout
device, then his/her supervisor is authorized to cut and remove the lock from the energy-isolating device.

The employee, following his/her return to work, must be notified that his/her lockout/tagout device was removed, and informed about the status of the machine or equipment that was locked/tagged out.

**Testing Energized Equipment during a Lockout/Tagout**

In some instances, a machine or equipment must be energized during lockout/tagout work to tune, adjust, or make measurements before the machine or equipment is returned to service.

In these situations, an Authorized Employee must do the following:

1. Remove all unnecessary tools and equipment from the immediate work area.

2. Clear all affected persons from the immediate work area.

3. Remove the lockout/tagout device(s), and energize the machine or equipment.

4. Make the necessary adjustments or measurements following safe and recommended procedures.

5. Reestablish the lockout/tagout condition on the machine or equipment.

**Periodic Inspections**

Periodic inspections of a department’s lockout/tagout procedures will be performed on an annual basis to evaluate the effectiveness of the procedures, and determine whether the procedures need to be updated.

1. The periodic inspections will be conducted by an Authorized Employee, or a supervisor knowledgeable in lockout/tagout, who is not involved with the machine or equipment being utilized and inspected under the lockout/tagout procedures.

2. The periodic inspections will include a review between the inspector and Authorized Employee(s) of their responsibilities under the lockout/tagout procedures being inspected. The Periodic Lockout/Tagout Inspection Form is provided in Appendix A.

3. The supervisor performing the inspection will certify that the inspection has been performed. The certification will include the following information:
   a. The identification of the machine or equipment on which the lockout/tagout procedures are being utilized.
b. The inspection date.
c. The name(s) of the Authorized Employee(s) performing the lockout/tagout procedures during the inspection.
d. The name of the supervisor performing the inspection.
Appendix A

Periodic Lockout/Tagout Inspection Form

Directions:
• Conduct periodic inspections at least annually
• Keep the original Inspection Form on file, and send a copy to Environment, Health, & Safety

<table>
<thead>
<tr>
<th>Department/Shop:</th>
<th>Unit:</th>
<th>Date:</th>
</tr>
</thead>
</table>

Machine/Equipment Inspected:

Authorized Employee(s) included in the inspection:
1. 
2. 
3. 
4. 
5. 
6. 
7. 
8. 
9.

Review the Lockout/Tagout Procedures and employee responsibilities with the Authorized Employee(s), and complete the following:

1. Do the employees understand the Lockout/Tagout Procedures and their responsibilities under Caltech’s Lockout/Tagout Program?
   - [ ] YES  
   - [ ] NO  
   If no, indicate corrective action(s) taken:

2. Do the employees follow the Lockout/Tagout Procedures?
   - [ ] YES  
   - [ ] NO  
   If no, indicate corrective action(s) taken:

3. Are the established Lockout/Tagout Procedures effective to provide full protection?
   - [ ] YES  
   - [ ] NO  
   If no, indicate corrective action(s) taken:

4. Other discrepancies noted and corrective action(s) taken:

   __________________________________________________________

Person Conducting Inspection:

<table>
<thead>
<tr>
<th>Name:</th>
<th>Signature:</th>
<th>Department:</th>
</tr>
</thead>
</table>

Lockout/Tagout Program – 2016
Appendix B

Facilities Department Assigned Individual Tag

This device has been locked out by Caltech Facilities.

For emergency service call ext. 4717

Expected completion date:

Locked out by: Don Jones
Dept.: HVAC ext. 3007
Device locked out date: 

California Institute of Technology
Central Plant Assigned Individual Tag

This device has been locked out by Caltech Facilities.

For emergency service call ext. 4717

Expected completion date:

Locked out by: Central Utility Plant
Dept.: Central Utility Plant ext. 6571
Device locked out date: ____________