



The Control of Hazardous Energy (Lockout/Tagout)

Department of Environmental Health & Safety
Revision 1.0

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Appendix A: Equipment-Specific Lockout/Tagout Procedure Instructions

Appendix B: LO/TO Basics Handout

RECORD OF REVISIONS

Version	By	Date	Description of Revision
1.0	RL	Aug 2020	Implementation of new program

Legend:

RL: Ruth LeBlanc, Director

CG: Christy Gorman, Safety Program Manager

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 or tagout, or whose job requires the employee to work in an area in which activities are being performed under lockout or tagout.

Authorized Employee or Person

A qualified person who locks out or tags out specific machines or equipment in order to perform cleaning, repairing, servicing, setting-up, or adjusting operations on that machine or equipment. An affected employee becomes an authorized employee when that employee's duties include performing cleaning, repairing, servicing, setting-up, or adjusting operations.

Locked Out

The use of devices, positive methods, and procedures, which will result in the effective isolation or securing of prime movers, machinery, and equipment from mechanical, hydraulic, pneumatic, chemical, electrical, thermal, or other hazardous sources.

Normal Production Operations

The use of a machine or equipment to perform its intended production function.

Prime Mover

The source of mechanical power for a machine.

1.0 INTRODUCTION

1.1 Objective

The objective of the Lockout/Tagout Program is to prevent accidents that may cause injuries including (but not limited to) pinching, crushing, cuts, slices, burns, shocks, electrocution, or death that may be caused by unexpected energization or startup of machines or equipment, or the release of stored energy from machines and equipment when maintenance or servicing operations are taking place. Lockout/Tagout procedures are also required to protect employees from using machines or equipment that are unsafe and awaiting service or repair.

1.2 Scope

The scope of these procedures establishes the minimum performance standards required to ensure that machines and equipment are isolated from all hazardous energy sources, either potential or actual, and that they are properly locked. Lockout/Tagout procedures must be in place prior to an affected employee engaging in the servicing or maintenance of any piece of equipment or machinery. This applies in any situation where the unexpected energization of start-up or release of the stored energy to a machine or equipment has the potential to cause injury to an affected and/or authorized employee.

2.0 RESPONSIBILITIES

It is the responsibility of each Department Manager or Supervisor to develop a written lockout/tagout procedure specific to each machine or type of equipment used by affected employees. The procedures shall be in accordance with this document and the requirements of CAL-OSHA. It is the Managers or Supervisors responsibility to ensure that all aspects of the Lockout/Tagout Program are understood and are being followed by affected and authorized employees. Annual inspections and documentation shall be performed as outlined in Section 6.4 of this document.

Affected and authorized employees shall be trained on the safety and the importance of lockout/tagout procedures on all equipment and machines they are required to operate or use. A new affected/authorized employee, or any existing employee that has been transferred, shall be trained on all equipment in the new work area. All affected/authorized employees shall be trained if new machines or equipment are utilized. At no time are affected/authorized employees to perform service or maintenance on any equipment or machine alone, or as a team, if the employees have not received safety training specific to lockout/tagout procedures.

3.0 Procedures

3.1 Preparation for Lockout/Tagout

Read the owner's manual and carefully survey the machine or the equipment to locate and identify all controlling devices to be certain which isolating device(s) (i.e., switches, levers, valves, etc.), apply to the machine or the equipment. It is important to note that more than one energy source may be involved, and that the energy sources may be of a different nature (i.e., electrical, mechanical, hydraulic, pneumatic, chemical, thermal, or other energy).

3.2 Sequence of Lockout/Tagout System Procedure

3.2.1 Notification/Competence

Notify all affected employees that a lockout/tagout system is to be utilized on a machine or equipment and specify the reason the system is being installed. The authorized employee initiating the lockout/tagout shall be aware of and understand the type and magnitude of the energy the machine or equipment utilizes and shall perform the appropriate procedures required to lockout all potential energy sources. The affected and authorized employees are required to know which hazards are present and understand the dangers associated with the particular machine or equipment.

3.2.2 Shut Down

If the equipment or the machine is currently being operated, it shall be stopped following the normal shut-down procedures. All machinery or equipment shall have the power source de-energized or disengaged.

3.2.3 Isolation

Operate the energy isolating device (i.e., switch, valve, lever, etc.) to verify that the equipment has been completely isolated from the energy source. Stored energy (such as that in springs, rotating parts, capacitors, hydraulic pressure, and air, gas, steam, gravity or water pressure) must be dissipated or restrained by methods such as mechanical blocking, bleeding down, repositioning, etc., as required to ensure the energy is no longer a hazard. Other movable parts shall be mechanically blocked out or locked out as necessary to prevent accidental movement, and/or to prevent the release of stored energy during cleaning, servicing, and adjusting operations.

3.2.4 Control/Locks

Locks shall be placed so that the energy isolating devices may not be operated without the removal of the lock. Accident Prevention Tags shall be placed on the lock or as close to the lock as physically possible. These tags must be clearly visible, readable, and of an approved design.

3.2.5 Accident Prevention Tags and Signs

Accident Prevention Tags or Signs shall be approved by your Supervisor. Accident Prevention Tags and Signs shall include, at a minimum, the date the tag is placed on the machine or equipment, the name of the person to whom the lock and tag belong, the department in which that person works, and the telephone number of the department. Accident Prevention Tags and/or Signs shall be placed both on the controls of the machine or equipment and at the power source of the machine or equipment as needed to ensure all affected employees are aware that a lockout/tagout is in place.

Accident Prevention Signs, Tags, Padlocks, and Seals shall have a means by which they can be readily secured to the controls. Tagout device attachment means shall be of a non-reusable type, attachable by hand, self-locking, and non-releasable with a minimum unlocking strength of no less than 50-pounds.

3.2.6 Ensuring Proper Lockout

To verify that the machine or equipment has been isolated, clear the operating area around the machine or equipment. After ensuring that no affected employees are in an area of possible exposure, operate the proper button(s) or operating control(s) to verify that the machine or equipment will not operate. CAUTION: Return all of the proper controls to the “neutral” or the “off” position after the test.

3.2.7 Notification of Lockout/Tagout

Notify all affected or potentially affected personnel that the equipment is now locked and tagged out.

A verbal or an email notification to other workers may be used to supplement the placement of the accident prevention tag. This is recommended if equipment is expected to be locked and tagged out for a significant amount of time.

3.2.8 Exception

An exception applies to the placement of lockout/tagout devices and accident prevention tags or signs when:

- Work on cord and plug-connected electric equipment for which exposure to the hazards of unexpected energization or start-up of the equipment is controlled by the unplugging of the equipment from the energy source and by the plug being under the exclusive control of the employee performing the work.

If the equipment being serviced or repaired is left unattended at any time, both accident prevention tags and an appropriate lockout device shall be placed on the equipment.

4.0 RESTORING TO NORMAL OPERATIONS

4.1 Restoring of Equipment to Use

When all required servicing and/or maintenance is completed, clear the operating area of all affected employees. Check the machine or equipment carefully to ensure that it is ready and is safe to return to normal production operations.

4.2 Removal of Lockout/Tagout

Only after all tools have been removed from the machine, accounted for, and the guards have been reinstalled and properly adjusted (as needed), the authorized employee may remove all accident prevention tags, signs, and lockout/tagout devices.

4.3 Machine Start-Up

Reconnect or re-establish contact with the energy source for the machine or equipment. Operate the energy isolating devices to restore the proper energy level to the machine or equipment. Verify the machine or equipment is operating properly.

5.0 PROCEDURES INVOLVING MORE THAN ONE PERSON

5.1 Procedures

Maintenance and servicing operations which require more than one person will require that each team member follow the preceding steps. Each person who is involved in any part of the operation will be required to post accident prevention tags or signs and lockout/tagout the equipment as if he/she were the only one working on the equipment. No team member will have the capability to remove any other team member's lock. If the actual energy isolating device cannot accept multiple locks, then an approved hasp will be used to facilitate the multiple locks. All hasps shall be approved by your Supervisor.

5.2 Equipment

If it is not physically possible for all of the authorized employees in the operation to have an individual lock, then only one lock will be used. The key to this lock will be placed in a designated lockout/tagout cabinet or lockbox, and all the team members will then apply their locks to a multiple lock hasp that will secure the keys in the cabinet or lockbox.

5.3 Lock Removal Procedures

As each authorized employee involved in the servicing or maintenance operation completes his or her part, they will then remove their lock. Upon removal of any lock the authorized employee removing the lock will inform his or her job Supervisor.

5.4 Shift Change/Hand off

If lockout/tagout is in place and will remain through another work shift or personnel change, communication shall be made to the Supervisor or Manager to ensure that the next shift of affected and/or authorized employees is aware of the lockout/tagout. There shall be an orderly transfer and/or sign over of all lockout/tagout devices, and as necessary actions shall be taken to ensure there is no interruption of lockout/tagout program. The Supervisor or Manager is responsible for notifying the next shift Supervisor or Manager, who shall be responsible for notifying all employees who may be affected by the lockout/tagout.

5.5 Outside Contractors

Contractors shall have their own Lockout/Tagout Program and shall be required to adhere to the Program. The Supervisor, Manager, or Project Manager shall ensure the Contractor performs Lockout/Tagout when necessary. Contractors shall provide their own lockout/tagout devices and tags or signs. In the event both a contractor and Sonoma State University employees are working on the same equipment or machine(s), the employee shall also place his or her lockout/tagout devices and tags/signs to the equipment or machine. Both parties shall, at a minimum, follow all procedures in this Program to ensure there are no accidental or unexpected releases of hazardous energy.

6.0 RULES

6.1 General Rules

Any and all equipment or machines that are subject to maintenance or repair that are not part of the normal production operation of the equipment or machine shall be provided with an accident prevention tag or sign and be locked and tagged out. This is to eliminate the possibility of unexpected or accidental activation resulting in the release of hazardous energy during the service or repair operations. This rule shall apply at all times when an accidental or unexpected activation could cause any injury or death to an affected employee.

6.2 Training

All personnel shall be trained in the recognition of accident prevention tags and signs and lockout/tagout devices. This training will emphasize the rule that employees are to never attempt to activate equipment or machines that are locked out or tagged out. Employees shall be trained to understand to never remove any energy isolating device unless authorized and have performed all safety functions in accordance with Section 4.0 of this document.

6.3 Machine and Equipment Specific Procedures

Lockout/tagout procedures shall be specific to each machine or type of equipment and shall be documented. The procedure shall include the proper steps for shutting down, isolating, blocking and securing machines to control hazardous energy. The procedure shall also include steps for the placement, removal, and as needed, the transfer of lockout and tagout devices. Employees shall be trained to be aware of specific hazards relative to each machine and type of equipment.

6.4 Periodic Inspections and Documentation

Authorized employees or Supervisors shall conduct periodic inspections of energy control procedure(s) applicable to specific machines or equipment at least annually to evaluate the continued effectiveness and determine if it necessary to update the written procedures. The inspection shall be conducted by an authorized employee or person other than the one(s) utilizing the hazardous energy control procedures being reviewed.

Where lockout/tagout procedures are used for hazardous energy control, a periodic review between the Supervisor or authorized employee and the affected employee shall be performed to ensure the employees understand both the requirements and their responsibilities under the Program.

It is required that periodic inspections are performed and are documented. The documentation shall include: the identification of the machine or equipment, the hazardous energy control procedure being utilized, the date of the inspection, all employees included in the inspection and/or review, and the name of the person performing the inspection or review. [Content]

Appendix A:

**Equipment-Specific Lockout/Tagout
Procedure Instructions**

Control of Hazardous Energy

Equipment-Specific Lockout/Tagout Procedure Instructions

Note: Only one Procedure is required for identical equipment set up in an identical configuration.

The template includes the following required sections:

- Signatures – Employee who completes the procedure should sign and date, then take the procedure to his/her supervisor for review and signature. If the supervisor has questions regarding any elements of the procedure, these should be taken to the next level manager and Environmental Health & Safety. The supervisor shall keep a copy of the completed form on file, and the original will be kept by the employee performing the work.
- Section A: Procedure Purpose – No additional information is required in this section.
- Section B: Equipment Description – Enter the building and room where the equipment is located. The equipment description should include enough detail to uniquely identify the specific piece of equipment covered by this procedure. If the equipment has an existing identification tag or number, this should be noted. Examples of equipment identification include, “Motor powering pump P-2”, “Air Handler located in southwest corner of the room”, etc.
- Section C: Hazardous Energy Assessment – Identify hazardous energy to which you may be exposed during your servicing work. Example:

Type of Energy	Type / Magnitude	Danger Zone	Isolation Point(s)
Electrical- low voltage (50-600 V) - list amperage	480VAC 3 phase 100-amp service	Wiring connection points in motor housing junction box	Disconnect adjacent to motor on right hand side.

- Section D: Preparation and Notification
 - Step 1- Preparation: Identify group lockouts, authorized personnel, and shift changes.
 - Step 2- Notifications: Notify and record affected employees (example: department technician who will lose compressed air when compressor is shut down).
 - Step 3- Equipment Shutdown: List equipment shut down procedure (note: this is NOT the lockout procedure, this is just the steps to stop and shut down the machine/equipment).
- Section E: Steps for Controlling Hazardous Energy Identified in Section C. For EACH energy source / isolation point identified in Section C, complete the applicable information. Example:

<p>Energy source description: 480 VAC 3 phase 100-amp service Isolate: Switch disconnect to “off” Control: Apply lock and tag to disconnect Dissipation: N/A Verify zero energy state appropriate to the type of hazardous energy involved: Check voltage at wiring connection point on motor</p>
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- Section G: Steps to Return to Service



**Sonoma State University
Equipment-Specific Lockout/Tagout Procedure**

Author

Employee who completed this form(print name & sign) *date*

This document has been reviewed and approved by

Supervisor (print name & sign) *date*

Section A. Procedure Purpose

The purpose of this procedure is to identify all hazardous energies and hazardous energy isolation points and list all required steps to safely shut equipment down and return it to service after work is completed.

Failure to follow this lockout procedure may result in injury to personnel or damage to equipment and may result in disciplinary action, up to and including termination.

Section B. Equipment Description

Equipment Location: Building: _____ Room Number: _____

Equipment Description:

**Sonoma State University
Equipment-specific Lockout/Tagout Procedure**

Section C: Hazardous Energy Assessment

Evaluate the equipment for all hazardous potential energy sources and check the left hand box if present. For each, describe the type and magnitude, danger zone (the part(s) of the equipment where the energy is found), and isolation points. Note: Describe how to control each identified hazardous energy source in Section F.

	Types of Energy	Type / Magnitude	Danger Zone	Isolation Point(s)
<input type="checkbox"/>	Electrical - low voltage (<50 V) - list amperage			
<input type="checkbox"/>	Electrical - low voltage (50-600 V) - list amperage			
<input type="checkbox"/>	Electrical - high voltage (>600 V) - list amperage			
<input type="checkbox"/>	Pressure - hydraulic, pneumatic > 150 psi in rigid pipe 50 psi in flexible, unsecured lines			
<input type="checkbox"/>	Vacuum			
<input type="checkbox"/>	Mechanical - capable of crushing, pinching, cutting, snagging, striking			
<input type="checkbox"/>	Thermal - high temperature-surface temperature, hot liquids, steam Liquids or gases > 125°F (52°C) Surfaces ≥ 140° F (60°C)			
<input type="checkbox"/>	Thermal, cryogenic - super cold surface or cryogenic liquid < 27°F (-3°C)			
<input type="checkbox"/>	Stored energy - flywheel, springs, differences in elevation, capacitors, batteries, etc.			
<input type="checkbox"/>	Emergency power - does the equipment maintain an emergency power/uninterruptible power supply?			

**Sonoma State University
Equipment-Specific Lockout/Tagout Procedure**

Section D: Preparation and Notification

Step 1. Is this a Group Lockout? Yes No

If "yes" list all authorized employees working under this lockout:

Primary Authorized Employee: _____

Other Authorized Employees: _____

Will this lockout span a shift change? Yes No

If "yes" then supervisor or manager must sign this section confirming that the following shift has been notified of the presence of the lockout and the need to place their locking devices at the energy control point before working on the locked-out equipment:

Name of Supervisor/Manager: _____

Signature of Supervisor/Manager: _____

Step 2. Notify

Prior to starting work, notify affected workers of the lock out activity.

Employees notified: _____

Step 3. Shut equipment down steps:

**Sonoma State University
Equipment-Specific Lockout/Tagout Procedure**

Section E. Steps for Controlling Hazardous Energy Identified in Section C

Energy source description:

Isolate:

Control:

Dissipation:

Verify zero energy state appropriate to the type of hazardous energy involved:

Energy source description:

Isolate:

Control:

Dissipation:

Verify zero energy state appropriate to the type of hazardous energy involved:

Energy source description:

Isolate:

Control:

Dissipation:

Verify zero energy state appropriate to the type of hazardous energy involved:

Energy source description:

Isolate:

Control:

Dissipation:

Verify zero energy state appropriate to the type of hazardous energy involved:

Sonoma State University Equipment-Specific Lockout/Tagout Procedure
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Section G: Steps to Return to Service
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Step 1. Verify equipment and area is clear of tools, workers, equipment, materials, and debris.
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Step 2. Unlock and remove any blocking devices; remove linkages.

Step 3. Reposition any safety devices, guards, interlocks.

Step 4. Warn workers to stay clear of area.
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Step 5. Remove all locks and tags for energy control points.

Step 6. Verify affected areas are clear of personnel.
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Step 7. Re-energize the equipment. Note: be certain to consider effects of re-energization on all systems “downstream” of energy source.

Step 8. Notify supervisor when work is complete.

Step 9. If you find any errors in this procedure, or have suggestions on how to improve it, provide your comments to your supervisor.
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Appendix B:

LO/TO Basics Handout

What is Lockout Tagout?

Employee Awareness

Lockout/Tagout (LOTO) is an OSHA required safety control for all machines (both electrical and mechanical). LOTO consists of engineered control steps that include written procedures, and the use of a system of locks, blocks, and/or tags that prevent the release of unexpected hazardous energy.

Lockout is the physical process that stops, blocks, or isolates the potentially hazardous energy of equipment at its source. A typical scenario is that a power switch, circuit breaker, or valve is turned off, and a locking device is attached to prevent the power from being turned back on.

Tagout is a written warning on a tag that indicates a LOTO situation exists. The tag displays the name of the service person and the duration of time that the machine will be LOTO. Occasionally, if a lock cannot be placed on a machine, a tag may be used in its place. This is permitted in certain circumstances only. Locks and tags must have the same format. They must be easy to read and durable enough to withstand the work environment.

Who can perform LOTO procedures?

Only employees who have completed Lockout Tagout training and have received permission from their supervisor can conduct LOTO procedures. Trained workers must be provided with locks and tags that clearly indicate who has locked out and tagged out the machine or equipment.

Which types of machines require a LOTO program?

All machines that are powered by any form of potentially hazardous energy or have stored potential energy, including kinetic energy must undergo LOTO. Potential energy is often stored, and can be released by electricity, pressurized liquid, pressurized gas, or springs. All equipment and machines are subject to LOTO, as needed to ensure worker safety.

When are LOTO procedures required?

Any machine that is being serviced, maintained or is under repairs must be LOTO. This includes lubricating, cleaning, un-jamming, removing guards, or when the body can become exposed to moving parts. The only person allowed to undo a LOTO procedure is the person that implemented it.

What steps must be taken when implementing Lock out/Tag out?

- Notify all coworkers before beginning LOTO and verify that they are a safe distance from the machine. Identify any potential hazards and the energy source used in the machine.
- Refer to the equipment specific LOTO procedure. Isolate or shut down all energy sources of the machine. Sometimes there may be more than one power source.
- Connect the pre-designated lock and tag to the energy control(s). Each user should have their own lock, tag, and key. Place the locks and/or tags so that they are clearly visible to others.
- Test the machine to ensure that no energy is flowing. Turn "on" the local switch control(s) to make sure that zero energy is reached. Be sure to turn them "off" before moving to the next step.
- When service or maintenance is complete, remove all tools and keep the energy switches in the "off" position.
- Remove the lock and/or tag. The individual who placed the lock or tag is the only person authorized to remove it.
- Make sure coworkers are a safe distance from the machine. Turn on the energy and test the machine for proper operation. Notify other workers that the machine is operational again.

Employees must follow all LOTO procedures and must not take short cuts.

Lock-Out/Tag-Out Checklist

1. Identify all sources of electrical energy for the equipment or circuits in question.
2. Disable backup energy sources such as generators and batteries.
3. Identify all shut-offs for each energysource.
4. Notify all personnel that equipment and circuitry must be shut off, locked out, and tagged out. (Simply turning a switch off is NOT enough.)
5. Shut off energy sources and lock switchgear in the OFF position. Each worker should apply his or her individual lock. Do not give your key to anyone.
6. Test equipment and circuitry to make sure they are de-energized. This must be done by a qualified person *
7. Deplete stored energy by bleeding, blocking, grounding, etc.
8. Apply a tag to alert other workers that an energy source or piece of equipment has been locked out.
9. Make sure everyone is safe and accounted for before equipment and circuits are unlocked and turned back on. Note that only a qualified person may determine when it is safe to reenergize circuits.

*OSHA defines a "qualified person" as someone who has received mandated training on the hazards and on the operation of equipment involved in a job or task.

Employee Responsibilities:

- Notify your supervisor immediately if you notice damaged or malfunctioning equipment.
- Don't leave malfunctioning equipment so that someone else may be injured; if your Supervisor is not available, mark the equipment clearly with a safety tag or clearly written notice stating the hazard or problem. Write the date and your name on the tag or note.
- Never use equipment that is tagged as needing repair and never remove safety tags. Only the person applying the tag and/or lock may remove them.
- Read and follow manufacturer safety instructions and labels for all equipment you use. Request additional training if you are unsure about safe equipment use.
- Ask questions! If you are not sure about any safety program or safety requirement- ask your Supervisor or contact EHS.
- ALWAYS.....SAFETY FIRST!