

Lockout Tagout Program

1.0 Introduction

- 1.1 In order to prevent death, injuries and property loss, all employees, students, contractors must comply with the requirements of this standard. Contractors are expected to comply with this standard and OSHA 29 CFR 1910.147 and 1910.269.
- 1.2 This policy establishes requirements for the lockout of energy-isolating devices. The intent is to ensure that equipment is de-energized and isolated from all potentially hazardous energy sources and locked out before employees perform service or maintenance tasks where the unexpected energizing, start-up, or release of stored energy could cause injury.
- 1.3 Authorized employees are required to perform Lockout/Tagout (LOTO) in accordance with the policies and procedures established herein. All other, non-authorized employees observing equipment that is locked out shall not attempt to start-up, energize, use the equipment, tamper with or remove the LOTO device. Failure to comply with the provisions of this program may result in disciplinary action.

2.0 Responsibilities

- 2.1 Department Assistant and Associate Directors are responsible for the following:

- 2.1.1 Enforcement of LOTO throughout workforce;
- 2.1.2 Incorporation of LOTO in Personnel Evaluations
- 2.1.3 Ensure periodic inspections take place

- 2.2 Facility Safety Officer is responsible for the following:

- 2.2.1 Updates and revisions to the written Lockout/Tagout Safety Program;
- 2.2.2 Provide program oversight and a resource to implementing departments.
- 2.2.3 Approve training of principal authorized employees and authorized employees
- 2.2.4 Maintain active lists for principal authorized employees and authorized employees.
- 2.2.5 Manage periodic inspections

- 2.3 Supervisors of areas where lockout/tagout is utilized are responsible for the following:

- 2.3.1 Perform periodic evaluations of the LOTO program in place to ensure it meets all applicable requirements. Evaluations include: Upkeep of shop sign in/sign out list, Maintenance of shop locks, Condition of tags
- 2.3.2 Ensure affected employees have been properly trained in all applicable areas of LOTO.
- 2.3.3 Maintain an active list of authorized employees who may perform LOTO procedures.
- 2.3.4 Provide sufficient locks and/or tags for the LOTO procedures being conducted.
- 2.3.5 Develop equipment specific LOTO procedures for each type of equipment.
- 2.3.6 Address reported policy violations.

- 2.4 Affected Employees** - Those employees who may work with equipment on which LOTO devices are used are responsible for the following:
- 2.4.1 Do not attempt to operate or energize any energy-isolating device that is under LOTO.
 - 2.4.2 Do not tamper with any lockout device or tag.
 - 2.4.3 Report any violations of this policy to supervisor.
- 2.5 Authorized Employees** – Those employees who may be responsible for applying LOTO devices and working on de-energized equipment are responsible for the following:
- 2.5.1 Properly identify and perform LOTO on all hazardous energy sources.
 - 2.5.2 Properly sign out lock and tag through documentation.
 - 2.5.3 Notify affected employees that LOTO activities will be conducted.
 - 2.5.4 Follow specific LOTO procedures for equipment and machinery.
 - 2.5.5 Report violations to supervisor and/or principal authorized employee.
- 2.6 Principal Authorized Employee** – An authorized employee who is trained to have oversight of group LOTO occurrences as the primary owner/operator and may conduct investigations into unattended LOTO prior to removal/restoration.
- 2.6.1 Properly identify and perform LOTO on all hazardous energy sources
 - 2.6.2 Properly sign out lock and tag through documentation
 - 2.6.3 Notify affected employees that LOTO activities will be conducted.
 - 2.6.4 Follow specific LOTO procedures for equipment and machinery
 - 2.6.5 Provide oversight as group LOTO primary owner/operator
 - 2.6.6 Conduct investigations prior to unattended LOTO removal and restoration.
 - 2.6.7 Conduct LOTO training for authorized and principal authorized employees
- 2.7 Contractors** –personnel who are working on projects associated with CU LOTO are responsible for the following:
- 2.7.1 Be provided and aware of the CU LOTO Safety Program.
 - 2.7.2 Ensure contracting CU Department is aware of any LOTO being performed as part of contractor work.
 - 2.7.3 Ensure contractor employees comply with all applicable OSHA LOTO requirements.
 - 2.7.4 Ensure all locks and tags are removed when work is completed.

3.0 Definitions

Affected Employee - The employee whose job requires the operation or use of a machine or equipment on which servicing or

maintenance is being performed under LOTO, or whose job requires him/her to work in an area in which such servicing or maintenance is being performed.

Authorized Employee - An employee who has received the proper training and has been “authorized” by their department to apply LOTO devices when necessary to LOTO hazardous energy sources to perform service or maintenance.

Capable of being Locked Out - An energy-isolating device that is designed with a hasp or other means of attachment to which or through which a lock can be affixed, or has a locking mechanism built into it. Other energy-isolating devices also will be considered to be capable of being locked out, if lockout can be achieved without the need to dismantle, rebuild, or replace the energy-isolating device or permanently alter its energy control capability.

Caution Tag - A warning device such as a tag with means of attachment used to warn employees of an existing or potential hazard. Its legend cautions personnel of the hazard(s) and identifies the employee who attached the tag.

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

Energy-Isolating Device - A mechanical device that physically prevents the transmission or release of energy, including but not limited to a manually operated electrical circuit breaker, a disconnect switch; a manually operated switch by which the conductors of a circuit can be disconnected from all ungrounded supply conductors and no pole can be operated independently; a line valve; a block; any similar device used to block or isolate energy. The term does not include push button, selector switch, or other control type devices.

Energy Source – Any source of electrical, mechanical, hydraulic, pneumatic, chemical, thermal or other energy.

Hazard – A source of possible injury or damage to health

Hot Tap – A procedure used in the repair, maintenance and services activities, which involves welding on a piece of equipment (pipelines, vessels or tanks) under pressure, in order to install connections or appurtenances. Commonly used to replace or add sections of pipeline without interruption of service for air, gas, water, steam and petrochemical distribution systems.

Lockout - The placement of a lockout device on an energy-isolating device, in accordance with an established procedure, to ensure that the energy-isolating device and the equipment being controlled cannot be operated until the lockout device is removed.

Lockout Box - A lockable storage box capable of securing keys to lockout devices

Lockout Device - A device that utilizes an affirmative means such as tags, locks, hasps, chains, and other hardware to secure an energy-isolating device in a safe position and prevent the operation or energizing of hazardous energy sources.

Lockout/Tagout – Specific practices and procedures to safeguard employees from the unexpected energizing or start-up of machinery and equipment or the release of hazardous energy during service or maintenance activities.

LOTO – An acronym for Lockout/Tagout.

LOTO, Group – Type of lockout procedure used for multiple workers, work groups, and/or work shifts

LOTO, Individual - Type of lockout procedure used where one individual has total responsibility for the lockout and repair

LOTO Release - Process of removing all locks, tags, and devices for the purpose of testing.

Other Employee - An employee whose job requires them to work in an area where service or maintenance is being performed in conjunction with a hazardous energy source.

Owner/Operator – Responsible person for the operation, shutdown, and start-up of equipment to be locked out. May have responsibility for the equipment maintenance and repair.

PPE – Personal protective equipment

Principal Authorized Employee – An employee who has received the training to make decisions in situations where multiple groups and organizations are engaged in LOTO on the same device and/or system.

Risk – Refers to a combination of both the likelihood of injury occurrence and the severity

Setting up – Any work performed to prepare a machine or equipment to perform its normal production operation.

Servicing/Maintenance - Workplace activities such as constructing, installing, setting up, adjusting, inspecting, modifying, and maintaining machines or equipment. These activities include lubricating, cleaning, or un-jamming machines or equipment and making adjustments to tools where the employee may be exposed to the unexpected energizing or release of hazardous energy.

Sign In/Sign Out Log – The sign in/sign out log must include the name of the employee executing the lock and/or tag, the number of the lock and/or tag.

Tagout - The placement of a tagout device on an energy-isolating device, in accordance with an established procedure, to indicate that the energy-isolating device and equipment being controlled may not be operated until the tagout device is removed. When tagout procedures are utilized, additional safety practices will be required such as removing fuses, etc. A tag is only a warning device

4.0 Lockout/Tagout Devices

4.1 Standardized Devices

- 4.1.1 LOTO devices must be approved by the Facilities Safety Officer for the LOTO program within the department. All other uses of LOTO devices are prohibited. Contractors may use appropriate devices to meet OSHA requirements.
- 4.1.2 Tagout devices shall indicate the identity of the employee, shop, work center, or contractor/company applying the device(s).
- 4.1.3 The lockout devices must be uniquely identified in at least one of the following criteria:
 - 4.1.3.1 Color
 - 4.1.3.2 Shape
 - 4.1.3.3 Size
- 4.1.4 In the case of tagout devices, print and format must be standardized.

4.2 Durable locks and tags

- 4.2.1 LOTO devices shall be capable of withstanding the environment to which they are exposed for the maximum period of time that exposure is expected.
- 4.2.2 Lockout devices must be substantial enough to prevent removal without the use of excessive force or unusual techniques, such as the use of bolt cutters or other metal cutting tools.

- 4.2.3 Tagout devices must be substantial enough to prevent inadvertent or accidental removal.
- 4.2.4 Tagout devices must be non-reusable, attached by hand, self-locking and non-releasable with a minimum unlocking strength of not less than 50 pounds
- 4.2.5 Tagout devices also need to have the general design and basic characteristics of being at least equivalent to a one-piece, all environment-tolerant nylon cable tie.
- 4.2.6 Tagout devices shall be constructed and printed so that exposure to weather conditions or wet and damp locations will not cause the tag to deteriorate or the message on the tag to become illegible.
- 4.2.7 Tags shall not deteriorate when used in corrosive environments such as areas where acid and alkali chemicals are handled and stored.

5.0 LOTO Application and Exemptions

5.1 All authorized employees shall follow LOTO procedures when service and maintenance tasks are performed on equipment and machinery where the unexpected start-up or energizing of the equipment or the unexpected release of stored energy could cause an injury or fatality

5.2 Equipment or tools that have no potential to release stored or residual energy do not need to be locked out. Consider all sources of stored energy, such as springs or capacitors, before performing work.

5.3 This standard does NOT apply to the following:

5.3.1 Energized equipment maintenance:

5.3.1.1 Hot Tapping: When a continuity of a vital service is absolutely essential, hot tap operations involving pressurized lines (steam, natural gas, etc.) may be completed without applying specific LOTO procedures. This exception may only occur when shutdown is not feasible and engineering analysis of the hot tap procedure has been completed. Only qualified personnel, provided with adequate protection, training and equipment may perform hot tapping.

5.3.1.2 Employees will utilize electrical hot work practices for working with energized electrical equipment, i.e., use of arc shields, hot work gloves, intrinsically safe work boots, aprons, etc. Engineering analysis, including shock and arc flash hazard analysis, will determine the injury potential and determine the appropriate PPE. The use of such protective equipment is essential while working on energized equipment. Only qualified personnel may perform hot work.

5.3.2 Cord and plug equipment

5.3.2.1 LOTO procedures are not required in situations where the employee has complete control at all times of the cord and plug on electrical equipment and the accidental start-up or energizing is totally controlled by unplugging the equipment.

5.3.2.2 The plug must be within reach of the employee at all times.

5.4 Lockout versus tagout

5.4.1 When an energy-isolating device (valve, breaker, switch, etc.) is capable of accepting a lock, a lockout shall be applied.

- 5.4.2 Whenever there is replacement, renovation, repair or modification of a machine or equipment or when new machines or equipment are installed, energy-isolating devices for such machines or equipment shall be installed to allow the application of a lockout device.
- 5.4.3 “Danger, Do Not Operate” tags shall only be used for lockout applications and shall be installed at the lockout point. The tags shall be used for no other application.
- 5.4.4 Tagout may be used exclusively in a secure/controlled location as determined by an assistant/associate director or higher. These locations shall adhere to additional training practices with the acceptance of higher risk.
- 5.4.5 When lockout devices are not feasible, tagout devices may be used provided affected employees have been properly trained on their application.

6.0 Individual LOTO Procedures

6.1 These procedures apply when a single person is responsible for the LOTO of equipment.

- 6.1.1 If there are specific LOTO procedures for a specific piece of equipment, obtain a copy and review procedures.
- 6.1.2 If no equipment specific procedures exist, review shop/work center LOTO procedures

6.2 Identify energy sources and isolating devices:

- 6.2.1 Employees performing LOTO shall identify all sources of energy and shall determine which switches, breakers, valves, or devices that isolate the equipment to be locked out as identified in the Equipment Lockout/Tagout Work Plan.

6.3 Notify all affected employees.

- 6.3.1 The authorized employee(s) performing LOTO shall notify all affected personnel that the equipment is being de-energized and locked out.
- 6.3.2 The notification is required to be documented through LOTO sign in/sign out log

6.4 Shut down the machine, equipment.

- 6.4.1 The equipment shall be shutdown per normal operating procedures (depress the stop button, open switch, close valve, etc.).

6.5 Position the energy-isolating devices.

- 6.5.1 The equipment shall be de-energized so that the machine or equipment is isolated from the energy source(s). This is accomplished by operating the appropriate switch, breaker, valve, or other device.
- 6.5.2 Lockout devices, where used, shall be affixed in a manner that will hold the energy isolating devices in a “safe” or “off” position.

6.6 Apply LOTO.

- 6.6.1 All energy-isolating devices (valves, breakers, switches, etc.) shall be locked out and tagged. A “Danger, Do Not Operate” tag shall be securely attached with the lock and shall possess the name, shop name and/or company name of the person that applied the lockout and the date that it was applied.

6.7 Focus on residual or stored energy.

6.7.1 Following isolation and lockout, and before any work begins, all stored or residual energy (such as that stored in capacitors, spring elevated machine members, rotating flywheels, hydraulic systems, air, gas, steam, water pressure, thermal energies, etc.) shall be dissipated and the equipment shall be reduced to a zero energy state. This may involve but is not limited to:

6.7.1.1 Discharging capacitors on electrical equipment

6.7.1.2 Venting and drawing pressurized fluids and gases.

6.7.1.3 Cooling off hot equipment.

6.7.1.4 Blocking of all machinery components, which could move, rotate, or fall.

6.7.1.5 Attaching electrical grounding devices.

6.7.2 If there is a possibility of re-accumulation of stored energy to a hazardous level, verification of isolation shall be continued until the servicing or maintenance is complete, or until the possibility of such accumulation no longer exists.

6.8 Verify isolation.

6.8.1 Prior to verification, ensure that all personnel are clear from the area.

6.8.2 Proceed in checking that the system or piece of equipment has been de-energized. This may be done by utilizing electrical testing instruments, visual inspection of vents and drains, or by attempting to operate the system or equipment from the normal control station.

6.9 Perform the repair or servicing task.

6.10 Restore equipment to service.

6.10.1 When servicing and maintenance have been completed and the machine or equipment is ready to return to normal operating condition, the following steps shall be taken:

6.10.1.1 Inspect the work area to be sure the equipment is fully assembled and operational.

6.10.1.2 Check to ensure that all remote controls are in the off or neutral position.

6.10.1.3 All devices positioned to dissipate stored energy are re-positioned as necessary for normal start-up.

6.10.1.4 Ensure the job site is secure and equipment is ready to be energized.

6.10.1.5 Ensure that all affected personnel are informed that the equipment is to be re-energized and are stationed at a safe location.

6.10.1.6 Remove the lockout devices(s) and tags and energize the equipment using normal operating procedures, after ensuring the equipment can be safely energized and that all personnel are clear.

7.0 Group LOTO Procedures

7.1 Group LOTO is used whenever multiple workers and/or work shifts are involved.

7.2 When maintenance work is performed by contractors or by work groups different than the group that operates the equipment, information exchange must occur to ensure that all parties are aware of the LOTO status of equipment/machines.

7.3 Group LOTO with a principal authorized employee:

7.3.1 A primary owner/operator will be designated. This employee must be an approved principal authorized employee and will exercise primary responsibility for implementation of the LOTO procedure for the equipment and machinery to be serviced. The primary owner/operator will coordinate operations with equipment operators before and after LOTO.

7.3.2 A verification system must be implemented to ensure the continued isolation and de-energizing of hazardous energy sources during maintenance and service operations. This will involve the use of a lock box to store the keys to locks on all energy- isolation devices. Once isolated, all keys are placed in the lock box and the principal authorized employee will place a lock on the lock box containing the LOTO keys.

7.3.3 Each authorized employee working on the equipment shall individually verify that hazardous energy has been isolated and de-energized and place an individual lock on the lock box.

7.3.4 Once servicing work is complete, all workers will remove their individual locks and tags. The servicing supervisor will inspect the work site and equipment and then remove their lock from the lock box and sign off on the LOTO form.

7.3.5 Use LOTO release any time the lockout box needs to be opened during the servicing work, such as testing motor rotation. Clear all workers from the equipment and worker locks off the lock box. When release is complete, restore isolation of energy sources.

7.3.6 Specific written procedures must be developed and implemented for complex isolation systems or repair operations involving many workers over more than one work shift.

7.4 Group LOTO without a principal authorized employee

7.4.1 When more than one crew or trades craft is involved and there is no principal authorized employee an authorized employee will become the primary owner/operator and assume control of all authorized employee lock keys.

7.4.2 The designated authorized employee will place their second lock on the group lock box and store the key in a mutually agreeable location.

7.4.3 Use LOTO release any time the lockout box needs to be opened during the servicing work, such as testing motor rotation. Clear all workers from the equipment and worker locks off the lock box. When release is complete, restore isolation of energy sources

7.4.4 Once servicing work is complete, all workers will remove their individual locks and tags. The designated authorized employee will inspect the work site and equipment and then remove their lock from the lock box and sign off on the LOTO form.

7.4.5 Should the Group LOTO become a complex isolation system, the designated authorized employee is responsible for contacting a principal authorized employee to take over primary owner/operator duties. Specific written procedures must be developed and implemented for complex isolation systems or repair operations involving many workers over more than one work shift.

8.0 Tagout Procedures

- 8.1** Because of design characteristics of certain equipment, a lockout device is not always feasible. In addition, approved areas may use tagout procedures in secure/controlled facilities. Whenever a tagout is independently used for the control of hazardous energy, the following steps shall be taken:
- 8.1.1 Tagout must comply with basic LOTO procedures.
 - 8.1.2 Tags shall be affixed at the same location that a lock would have been attached.
 - 8.1.3 Affected employees will be trained and made aware of the use of tags.
 - 8.1.4 It must be emphasized that tags are only warning devices.
 - 8.1.5 Acceptable methods of isolating equipment being tagged out include:
 - 8.1.5.1 Removal of an isolating circuit breaker.
 - 8.1.5.2 Blocking of a control switch.
 - 8.1.5.3 Opening a second disconnecting device.
 - 8.1.5.4 Removal of a valve handle.
- 8.2** Whenever tagout is used, additional safety precautions should be taken to isolate equipment and to prevent energizing the equipment.
- 8.3** A tagout should only be used when the design of equipment or machinery makes it unfeasible to utilize a lockout device.
- 8.4** Tagout devices, where used, shall be affixed in a manner that will hold the energy isolating devices in a “safe” or “off” position.
- 8.4.1 Where a tag cannot be affixed directly to the energy isolating device, the tag shall be located as close as safely possible to the device, in a position that will be immediately obvious to anyone attempting to operate the device.

9.0 Removal of a LOTO Device in an Employee Absence

- 9.1** Only a Principal Authorized employee may engage in unattended LOTO removal.
- 9.2** If the removal of a lockout device a principal authorized employee must undergo the following actions:
- 9.2.1 Verify the employee is not on the premises.
 - 9.2.2 Attempt to contact the employee to verify job/equipment status.
 - 9.2.3 Verify that the equipment can be safely energized.
 - 9.2.4 Record on the lockout form that the person’s lockout device was removed.
 - 9.2.5 Inform the employee upon return that their lockout device was removed.
- 9.3** Each department/area will be responsible for implementing specific procedures for all special situations approved by the Facilities Safety Officer to include removal of contractor LOTO.
- 9.4** Removal of an unattended contractor LOTO will be carried out by a Principal Authorized employee, Facilities Safety

Officer and associated contracting agency.

10.0 Training and Recordkeeping

10.1 Training on the purpose, content and function of the LOTO policy is required for all employees who participate in or are affected by the LOTO of equipment. Records must be kept showing training dates, attendance, items covered, and name of presenter.

10.2 Authorized Employee and Principal Authorized Employee training must include a demonstration of LOTO significant to the types of sources controlled by the shop or organization.

10.3 Contractors should have OSHA specific training.

10.4 Principal Authorized Employees

10.4.1 Principal Authorized Employees are supervisors or senior technicians who are proficient in LOTO, work order generation, work flow and have received training on supplying third party support to Group LOTO situations. Their training shall include:

10.4.1.1 Broad understanding of LOTO procedures and policies.

10.4.1.2 Experience with both authorized and affected employee training contents.

10.4.1.3 How to deal with special Group LOTO conditions.

10.4.1.4 Procedures for dealing with an unattended LOTO and its subsequent removal

10.5 Authorized Employees

10.5.1 Authorized employees are those who have received proper training and have been “authorized” by their department to apply LOTO devices when necessary. Training for Authorized Employees shall include:

10.5.1.1 The recognition and identification of potential hazardous and stored energy sources in the work area or department.

10.5.1.2 Explanation and proper use of LOTO procedures.

10.5.1.3 Proper use, application and removal of LOTO devices and systems.

10.5.1.4 Specific area equipment LOTO procedures.

10.5.1.5 How to deal with special Individual LOTO conditions.

10.6 Affected Employees

10.6.1 Affected Employees are those whose job requires the operation or use of a machine or equipment on which servicing or maintenance is being performed under LOTO. Training for affected employees shall include:

10.6.1.1 Purpose and use of the LOTO procedures.

10.6.1.2 How to recognize LOTO equipment.

10.6.1.3 Prohibition on tampering with LOTO equipment.

10.6.1.4 Identification of potential hazardous and stored energy sources

10.7 Retraining

10.7.1 Retraining or additional training is required whenever:

10.7.1.1 There is a new or revised energy control procedure.

10.7.1.2 A principal authorized/authorized/affected employee's job duties change regarding LOTO.

10.7.1.3 The LOTO Program changes.

10.7.1.4 Additional unique LOTO hazards arise, such as new equipment, modified processes, or the use of different LOTO devices.

10.7.1.5 Periodic inspections or program evaluations show employee deficiencies in LOTO techniques.

10.7.1.6 Refresher training will be determined by shop/organizational use of LOTO

10.8 Recordkeeping

10.8.1 All records applicable to the LOTO Program shall be maintained on file. Records shall include:

10.8.1.1 Training session outlines.

10.8.1.2 Training attendance sheets.

10.8.1.3 List of Authorized Employees.

10.8.1.4 List of Principal Authorized employees.

10.8.1.5 Annual program evaluations.

11.0 Periodic Evaluations

11.1 A periodic evaluation of the lockout/tagout procedure shall be conducted at least annually to ensure that the LOTO requirements are being followed.

11.2 Annual Program Evaluation:

11.2.1 Program evaluation shall be made periodically and at a minimum once per year.

11.2.2 The evaluation will be made by or on behalf of management personnel of randomly selected Authorized Employees or supervisors to ensure that LOTO procedures are followed

11.2.3 The evaluation will include a field inspection of actual LOTO.

11.2.4 If deficiencies are identified, the program will be reviewed and modified as required

11.3 The periodic inspection shall be used to correct any deviations or inadequacies identified.

11.4 An Assistant Director or manager shall certify that the periodic inspections have been performed, the date of the

inspection, the employees included in the inspection, and the person performing the inspection.