



UNIVERSITY OF MINNESOTA
University Health and Safety

Energy Control (Lockout/Tagout) Program

Effective Date: June 2015, revision November 2019

I. PURPOSE

This program establishes safe work practices to protect employees from injuries related to the unexpected energization, start up or release of stored energy while performing service or maintenance on machinery and equipment.

II. SCOPE

The provisions of this program apply to all University personnel working in, on or around machines or equipment during servicing or maintenance where there is a possibility of exposure to hazardous energy.

This program does NOT apply to:

- Minor tool changes, adjustments, and other small service activities that take place during normal operations if they are routine, repetitive, and integral to the use of the equipment. (Example: Changing a drill bit on a drill press.)
- Work on cord and plug connected electrical equipment for which exposure to the hazards of unexpected energization or startup of the equipment is controlled by unplugging of the equipment from the energy source and by the plug being under the exclusive control of the employee performing the service or maintenance.
- Hot tap operations involving transmission and distribution systems for substances such as gas, steam, water or petroleum products when they are performed on pressurized pipeline, provided that continuity of service is essential; shutdown of the system is impractical; and demonstrated procedures are followed, and special equipment is used which will provide proven effective protection for employees.

III. DEFINITIONS

Affected employee – An employee whose job requires operation or use of a machine or equipment on which servicing or maintenance is being performed under lockout or tagout, or whose job requires him/her to work in an area in which such servicing or maintenance is being performed.

Authorized employee – A person who locks out or tags out machines or equipment in order to perform servicing or maintenance on that machine or equipment. An affected employee becomes an authorized employee when that employee's duties include servicing or maintenance covered under this program.

Capable of being locked out - An energy isolating device is capable of being locked out if it has a hasp or other means of attachment to which, or through which, a lock can be affixed, or it has a locking mechanism built into it. Other energy isolating devices are 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.

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 the following: a manually operated electrical circuit breaker; a disconnect switch; a line valve; a block; and any similar device used to block or isolate energy. Push buttons, selector switches and other control circuit type devices are not energy isolating devices.

Hazardous Energy – Any source of active or stored electrical, mechanical, hydraulic, pneumatic, chemical, thermal or other energy which could cause harm.

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

Lockout device – A device that utilizes a positive means, such as a lock, to hold an energy isolating device in a safe position and prevent the energizing of a machine or equipment.

Servicing or maintenance - Workplace activities such as constructing, installing, setting up, adjusting, inspecting, modifying, and maintaining and/or servicing machines or equipment. These activities include lubrication, cleaning or unjamming of machines or equipment and making adjustments or tool changes, where the employee may be exposed to the unexpected energization or startup of the equipment or release of hazardous energy.

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 the equipment being controlled may not be operated until the tagout device is removed.

Tagout device – A prominent warning device, such as a tag, which can be securely fastened to an energy isolating device to indicate that the energy isolating device and the equipment being controlled may not be operated until the tagout device is removed.

IV. **RESPONSIBILITIES**

Employee Responsibilities

Authorized Employees

- Attend required training on energy control procedures.
- Adhere to established energy control procedures when servicing or maintaining equipment.
- Assist with the annual inspection/review of energy control procedures.
- Immediately report any hazards or unsafe situations to supervisor.

Affected Employees

- Attend required training on energy control procedures.
- Do not disturb, bypass or remove lockout/tagout devices.
- Do not attempt to restart or reenergize machines or equipment which are locked or tagged out.
- Immediately report any hazards or unsafe situations to supervisor.

Supervisor Responsibilities

- Develop written energy control procedures for machinery and equipment with more than one type of energy that their employees service or maintain.
- Ensure that employees are properly trained on energy control procedures.
- Provide employees with the necessary lockout/tagout devices.
- Ensure that written energy control procedures used by their employees are inspected/reviewed at least annually.

Managers/Directors Responsibilities

- Ensure the Lockout/Tagout program is fully funded and implemented by the supervisors and employees within their department.

University Health & Safety Responsibilities

- Maintain the Lockout/Tagout written program.
- Develop and provide training resources.
- Inform affected departments of program requirements.
- Provide technical assistance to work areas performing Lockout/Tagout.
- Monitor implementation of the written program.

V. LOCKOUT VS. TAGOUT

Lockout is the preferred method of isolating machines or equipment from energy sources. If an energy isolating device is capable of being locked out, authorized employees shall utilize lockout procedures.

Tags are essentially warning devices affixed to energy isolating devices, and do not provide the physical restraint on those devices that is provided by a lock. Tags may evoke a false sense of security.

If an energy isolating device is not capable of being locked out, authorized employees shall utilize tagout procedures. Tags be securely attached at the same location that the lockout device would have been attached.

If tagout procedures are used, additional safety measures such as the removal of an isolating circuit element, blocking of a controlling switch, opening of an extra disconnecting device, or removal of a valve handle should be taken to reduce the likelihood of inadvertent energization.

VI. ENERGY CONTROL PROCEDURES

GENERAL LOCKOUT/TAGOUT PROCEDURES

General lockout/tagout procedures must be followed for all lockout/tagout applications. In some instances, written procedure will also be required (See “Equipment specific lockout/tagout procedures”).

General Lockout/Tagout procedures include the following actions and shall be done in the following sequence:

1. **Notify employees** – Affected employees shall be notified of plans to deenergize machinery or equipment before lockout or tagout devices are applied.
2. **Shut down machine or equipment** – The machine or equipment to be serviced shall be turned off or shut down using normal procedures.
3. **Isolate energy** – Energy isolating devices shall be used to isolate the machine or equipment from all energy sources. Push buttons, selector switches and other control devices are not energy isolating devices.
4. **Attach lockout or tagout device** – Each authorized employee and contractor involved with the servicing or maintenance who have potential exposure to hazardous energy shall apply their personal lockout or tagout device to each energy isolating device. Lockout devices, where used, shall be affixed in a manner that will hold the energy isolating devices in a “safe” or “off” position to prevent accidental reenergization. If the energy isolating device will not accept a lockout device, a tagout device shall be utilized and fastened at the same point. 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.
5. **Release stored and residual energy** – After lockout or tagout devices have been applied to all energy isolating devices, drain, block and/or release all stored and residual energy sources (such as that in capacitors, springs, elevated parts, rotating parts and air, gas, steam or water pressure) for the machine or equipment being serviced to render it safe.
6. **Verify isolation** – Prior to starting work on machines or equipment that have been locked out or tagged out, the authorized employee shall verify that all energy sources have been isolated and deenergized. After ensuring that no employees are exposed, attempt to start the machine or equipment using normal operating controls. Return controls to neutral or off position after the test. When working on electrical equipment, test for voltage.
7. **Release from lockout or tagout** – After servicing or maintenance has been completed and prior to restoring energy to the machine or equipment, the authorized employee(s) shall:
 - a. inspect the work area to ensure that tools, supplies and non-essential items have been removed and that the machine or equipment components are operationally intact (including the reinstallation of guards);
 - b. ensure that all employees have been safely positioned or removed;
 - c. verify that operating controls are in the neutral or off position;
 - d. remove lockout and tagout devices from energy isolating device(s)

8. **Restore energy** – After lockout tagout devices have been removed and before a machine or equipment is started, the authorized employee shall:
 - a. notify affected employees that the lockout or tagout devices have been removed and the equipment is ready to return to service;
 - b. restore energy to the machine or equipment;
 - c. attempt to start the machine or equipment using normal operating controls;
 - d. verify that the service and maintenance was effective;
 - e. ensure restored energy sources are intact, operating properly and guards are in place.

EQUIPMENT SPECIFIC LOCKOUT/TAGOUT PROCEDURES

Departments must develop, document, and utilize written equipment specific lockout/tagout procedures for each piece of equipment or group of similar equipment where:

- there is a potential for stored, residual, or reaccumulation of energy after shut down;
- there is more than one energy source;
- locking out will not completely deenergize and deactivate the equipment;
- more than one lock is required to achieve a locked-out condition;
- servicing the equipment may create hazards for other employees; or
- there have been accidents involving the unexpected activation or reenergization of the equipment.

The written lockout/tagout procedures must specifically outline the scope, purpose, authorization, rules, and techniques to be utilized for the control of hazardous energy and shall include:

- a specific statement of the intended use of the procedure;
- specific procedural details for each step included in the general lock/tagout procedure
- specific procedural details for the placement, removal, and transfer of lockout devices or tagout devices
- specific procedural details for group lockout if applicable.

See: Equipment Specific LOTO template (appendix A)

VII. GROUP LOCKOUT/TAGOUT

When service or maintenance is to be performed by multiple employees and/or contractors, they shall utilize a procedure which affords the employees a level of protection equivalent to that provided by the implementation of a personal lockout or tagout device. A multi-lock lockout device (such as a hasp) should be used where possible, so that each individual can apply their own lock or tag. The multi-lock device cannot be opened until all employees have removed their individual locks or tags.

If a multi-lock device cannot be accommodated at each energy isolation device, group lockbox procedures can be used:

- A lead authorized employee performing service on the equipment will follow the Energy Control Procedure for the specific equipment to be serviced.
- Keys for each lockout device applied will be placed in a group lockbox.

- The lead authorized employee will then place a multi-lock device (hasp) on the outside of the group lockbox and lock it with their personal lock.
- Each authorized employee performing service on the equipment will review the energy control procedure and place their personal lock on the outside of the group lockout box when he/she begins work.
- Lockout will remain in place while any of the authorized personnel are performing service or maintenance on the equipment.
- After service is completed, the equipment will not be released from lockout until all authorized employees have removed their personal locks from the multi-lock device securing the group lockbox.
- The lead authorized employee will then remove their personal lock from the multi-lock device on the lockbox, remove the group locks/tags from each energy isolating device, notify affected employees and reenergize the equipment.

Primary responsibility is vested in the lead authorized employee for a set number of employees working under the protection of a group lockout or tagout device (such as an operations lock). When more than one crew or department is involved, one authorized employee will be designated to coordinate affected workforces and ensure continuity of protection.

VIII. REMOVAL OF LOCKOUT OR TAGOUT DEVICES

Each lockout or tagout device shall be removed from each energy isolating device by the employee who applied the device.

EXCEPTION: When the authorized employee who applied the lockout or tagout device is not available to remove it, that device may be removed under the direction of the employer, provided that the authorized employee's supervisor uses the following documented steps:

1. verify that the authorized employee who applied the device(s) is not at the facility; and
2. make all reasonable efforts to contact the authorized employee to inform him/her that his/her lockout device has been removed; and
3. ensure that the authorized employee knows his/her lockout device has been removed before he/she resumes work at that facility; and
4. document all steps taken on the LOTO Device Removal Request form (appendix A).

IX. SHIFT CHANGES

For shift changes, the lock of at least one authorized employee on the arriving shift should be applied before the last employee from the previous shift removes their lock.

X. LOCKOUT/TAGOUT HARDWARE

Locks, tags, chains, cables, hasps, key boxes, adaptor pins, self-locking fasteners, and other lockout devices shall be provided by the department for authorized employees who are isolating, securing or blocking machines or equipment from energy sources.

Lockout devices and tagout devices must be singularly identified; shall be the only device(s) used for controlling energy; shall not be used for other purposes; and shall meet the following requirements:

- **Durable** – Lockout and tagout devices shall be capable of withstanding the environment to which they are exposed for the maximum period of time that exposure is expected.
- **Standardized** – Lockout and tagout devices shall be standardized within the facility in at least one of the following criteria: color, shape, or size; and in the case of tagout devices, the print and format shall be standardized.
- **Substantial** – Lockout devices shall be substantial enough to prevent removal without the use of excessive force or unusual techniques, such as with the use of bolt cutters or other metal cutting tools. Tagout devices, including their means of attachment, shall be substantial enough to prevent inadvertent or accidental removal. Tagout device attachment means shall be of a non-reusable type, attachable by hand, self-locking, and non-releasable.
- **Identifiable** – Lockout devices and tagout devices shall indicate the identity of the employee applying the device. Tagout devices shall warn against hazardous conditions if the machine or equipment is energized and shall include a legend such as the following: “Do Not Start”, “Do Not Open”, “Do Not Close”, “Do Not Energize”, or “Do Not Operate”.

XI. INSPECTION OF ENERGY CONTROL PROCEDURES

Supervisors shall ensure the written energy control procedures used by their employees are inspected/reviewed at least annually to ensure the procedures and requirements of the LOTO Program are being followed. The periodic inspection shall be performed by an authorized employee other than the one(s) utilizing the energy control procedure being inspected. Any deviations or inadequacies will be corrected.

Where lockout is used for energy control, the periodic inspection will include a review, between the inspector and each authorized employee, of that employee’s responsibilities under the energy control procedure being inspected.

Where tagout is used for energy control, the periodic inspection shall also include a review, between the inspector and each affected employee, of that employee’s responsibilities under the energy control procedure being inspected.

The certification shall identify:

- the machine or equipment that the energy control procedure was being utilized,
- the date of the inspection,
- the employees included in the inspection, and
- the person performing the inspection.

Supervisors shall certify that the periodic inspections have been performed using the LOTO Procedure Inspection Form (appendix A).

XII. TRAINING

Training is intended to ensure the purpose and function of the LOTO Program is understood and personnel with knowledge and skill are available for safe application, usage, and removal of energy control as necessary.

- Authorized employees shall be trained to recognize the applicable hazardous energy sources, the type and magnitude of energy sources, and proper techniques for energy isolation and control.
- Affected employees shall be instructed in the purpose and use of the energy control procedure.
- Other employees whose work may be in areas where energy control is utilized shall be instructed about the procedure and the prohibition against restarting machines which have been locked/tagged out.
- All employees shall be trained prior to participating in or working around lockout/tagout procedures
- Authorized and affected employees shall be retrained when their assignment changes, when equipment changes, or when energy control procedures change.
- Managers and supervisors shall verify required training has been documented.

XIII. REFERENCES

29 CFR 1910.147 The control of hazardous energy (lockout/tagout)

XIV. APPENDICES

Equipment Specific Procedure template
LOTO Device removal form
LOTO Inspection form

**UNIVERSITY HEALTH & SAFETY
ENERGY CONTROL
EQUIPMENT SPECIFIC PROCEDURE TEMPLATE**

Building Name: _____	Building # _____
Room/Location: _____	
Equipment Name: _____	

PURPOSE: This energy control procedure shall be used by authorized employees performing servicing or maintenance on the equipment listed above to prevent unexpected energizing, startup or release of stored energy that could cause injury.

LOCKOUT STEPS

Step 1: Notify affected personnel that the equipment is being shut down for servicing or maintenance and that it must not be restarted or reenergized while locked or tagged out.

Step 2: Shut down/turn off equipment using normal procedures and operating controls.

Step 3: Isolate equipment from hazardous energy sources by shutting off and locking or tagging out the following:

Energy Source #1	Energy Isolation Device and Location	Method of Isolation and Lockout/Tagout
Energy Source #2	Energy Isolation Device and Location	Method of Isolation and Lockout/Tagout
Energy Source #3	Energy Isolation Device and Location	Method of Isolation and Lockout/Tagout
Energy Source #4	Energy Isolation Device and Location	Method of Isolation and Lockout/Tagout
Energy Source #5	Energy Isolation Device and Location	Method of Isolation and Lockout/Tagout

Step 4: Relieve stored energy as follows:

Step 5: Verify isolation by trying to restart the equipment. Return controls to “off” position after verification.

RELEASE FROM LOCKOUT STEPS

Step 1: Inspect work area to ensure that non-essential tools and materials have been removed and that equipment components are operationally intact, including guards and safety devices.

Step 2: Ensure that all employees have been safely positioned or removed from the area.

Step 3: Verify that operating controls are in “Neutral” or “Off” position before removing lockout/tagout devices.
NOTE: If the authorized employee who applied the lockout or tagout devices is not available to remove them, they may only be removed under the direction of the employer. The specific procedures must be documented using the form in Appendix B.

Step 4: Notify affected employees that lockout/tagout devices have been removed and equipment will be restarted.

Step 5: Restart/reenergize equipment.

**UNIVERSITY HEALTH & SAFETY
LOTO DEVICE REMOVAL PROCEDURE**

PURPOSE: Personal lockout/tagout (LOTO) devices shall only be removed by the employee who applied the device. If the authorized employee who applied the LOTO device(s) is not at the facility or readily available, the device(s) may be removed by the employee's supervisor using the following documented steps.

Building Name: _____ **Building #** _____

Room/Location: _____

Equipment Name: _____

Name of employee whose lock(s) must be removed: _____

Name of Supervisor authorizing removal: _____

Reason lock(s) must be removed now: _____

Check the appropriate box below regarding notification.

OPTION 1

The employee whose LOTO device(s) had to be removed was notified prior to removal.

Signature of Person Who Notified Employee *Notification Method* *Date*

OPTION 2*

The employee whose LOTO device(s) had to be removed could not be notified prior to removal.

Signature of Person Who Tried to Notify Employee *Method Attempted* *Date*

*If the employee could not be notified prior to removal of the LOTO device(s), their supervisor must ensure that they are notified prior to returning to work. The employee must verify notification below.

Signature of Lock Owner Verifying Notification *Notification Method* *Date*

**UNIVERSITY HEALTH & SAFETY
LOTO INSPECTION FORM**

Building Name: _____

Building # _____

Room/Location: _____

Equipment Name: _____

PURPOSE: The University's energy control procedure must be inspected annually to ensure that OSHA standards are being followed. This form will be used by authorized employees other than the one(s) utilizing the energy control procedure to document this inspection. The inspector shall note any deviations or inadequacies found and initiate corrective action.

INSPECTION ITEMS	Yes	No
Affected personnel were notified that the equipment was being shut down and that it must not be restarted or reenergized while locked or tagged out.		
The equipment was shut down/turned off using normal procedures and operating controls.		
All energy isolation devices were properly identified and isolated (turned off or closed).		
The appropriate lockout/tagout devices were applied to each energy isolation device.		
Stored energy (if applicable) was properly dissipated.		
Isolation was verified by trying to restart the equipment.		
Controls were returned to the "off" position after verification.		
If group lockout/tagout was being used, were appropriate multi-lock hasps or group lockout boxes employed?		
After the completion of servicing or maintenance work, were affected and other personnel notified that lockout/tagout devices had been removed and equipment was being restarted?		

AUTHORIZED EMPLOYEE(S) OBSERVED

COMMENTS/RECOMMENDATIONS

INSPECTOR'S CERTIFICATION

I certify that I observed the authorized employees listed above while using this energy control procedure and reviewed their responsibilities with them. If tagout procedures were used, I also reviewed responsibilities with affected staff.

Inspector Signature: _____

Date: _____