

University of Pittsburgh



Lockout / Tagout Program (Control of Hazardous Energy)

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Revised
February 2002

I. SCOPE

This Program outlines the purpose, authorization, rules, responsibilities and techniques to be followed by University of Pittsburgh employees to guard against the unexpected energizing, start-up, or release of stored energy that could cause injury. Supervisors shall ensure that employees under their supervision receive training in the contents of this Program and ensure compliance with the Program contents.

This Program does not apply to work on cord and plug connected electrical equipment where 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 servicing or maintenance.

II. PURPOSE

The purpose of this Program is to establish procedures for the lockout/tagout of energy isolating devices whenever maintenance or servicing is done on machines or equipment. These procedures shall be used to ensure that the machine or equipment is stopped, isolated from all potentially hazardous energy sources and locked out before employees perform any servicing or maintenance where the unexpected energizing or start-up of the machine or equipment or release of stored energy could cause injury.

III. DEFINITIONS

The following definitions are included in this program to ensure all employees know and understand the meaning and concept of the terms as they apply to this program. All definitions are consistent with *OSHA 29 CFR part 1910.147* and can be used as a reference by all employees.

Affected Employees are persons whose job requires him/her to operate or use 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. The affected employees for the University of Pittsburgh Lockout/Tagout Program are those employees who meet above guidelines.

Authorized Employees are persons who physically lock out or tag out machines or equipment in order for servicing or maintenance to be performed. The authorized employees for the University of Pittsburgh Lockout/Tagout Program are Building Engineers, Tradesmen, and Facilities Management Construction Managers. All authorized employees are responsible for implementing a lockout procedure, which meets the minimum requirements established by the University of Pittsburgh and *OSHA 29 CFR part 1910.147*.

Capable of Being Locked Out means an energy-isolating device that 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.

Energy Isolating Device is a mechanical device that physically prevents the transmission or release of energy, including but not limited to the following: A manually operated switch by which the conductors of a circuit can be disconnected from all ungrounded supply conductors and, in addition, no pole can be operated independently; 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.

Energy Source is any source of electrical, mechanical, hydraulic, pneumatic, chemical, thermal or other energy.

Hot Tap is 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. It is commonly used to replace or add sections of pipeline without the interruption of service for air, gas, water, steam, and petrochemical distribution systems.

Lockout is 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 is a device that utilizes a positive means such as a lock, either key or combination type, to hold an energy-isolating device in the safe position and prevent the energizing of a machine or equipment. Included are blank flanges and bolted slip blinds.

Normal Production Operations is the utilization of a machine or piece of equipment to perform its intended production function.

Servicing and/or Maintenance is 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 start-up of the equipment or release of hazardous energy.

Setting Up is any work performed to prepare a machine or equipment to perform its normal production operation.

Tagout is 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.

IV. AUTHORIZATION

An **authorized employee** is a person who physically locks out or tags out machines or equipment for servicing or and who has been properly trained in lockout/tagout procedures.

The authorized employees for the University of Pittsburgh Lockout/Tagout Program are Building Engineers, Tradesmen, and Facilities Management Construction/Project Managers providing contractor oversight.

An **affected employee** is an individual whose job requires him/her to operate or use 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.

An affected employee becomes an authorized employee when that employee's duties include performing servicing or maintenance.

V. BASIC RULES

Each department utilizing the University of Pittsburgh program for the control of hazardous energy shall establish and document site-specific procedures for energy isolation. Specialized lockout devices shall be obtained and kept within the department for its use.

If an energy-isolating device is capable of being locked out, the authorized employee shall utilize lockout, unless the department head can demonstrate that utilization of a tagout system will provide full employee protection. When a tagout device is used on an energy-isolating device, which is capable of being locked out, the tagout device shall be attached at the same location that the lockout device would have been attached.

Lockout/tagout devices used for the implementation of this program shall be standardized, singularly identified and not used for any other purpose. Tagout device attachment means shall be of a non-reusable type, self-locking with a minimum unlocking strength of no less than 50 pounds.

Locks, tags and any other equipment required for energy control (chains, blocks, pins, hasps, etc.) will be provided by the University of Pittsburgh.

Only University electricians will service electrical circuits and University equipment unless specifically authorized by the Electrical Foreman. Lockouts of such circuits will only be performed in the presence of and with authorization of the Electrical Department.

The Department of Environmental Health and Safety shall conduct periodic inspections of the lockout program at least annually to ensure that the procedures and requirements of this program are being followed. This process will be documented by identifying machines and equipment checked, the employees audited, and the date and the name of the person performing the audit.

VI. COMPLIANCE

All University employees are required to comply with the restrictions and limitations imposed upon them during the use of lockout or tagout. Upon observing a machine or piece of equipment, which is locked out or tagged for servicing or maintenance, employees shall not attempt to start, energize or use that machine or equipment. Failure to comply with the restrictions and limitations of the lockout/tagout Program could result in disciplinary actions up to and including immediate termination of employment from the University of Pittsburgh.

VII. PRE-LOCKOUT EVALUATION

In instances where a documented lockout procedure is not available, a pre-lockout evaluation will be conducted by authorized employees on any machine or piece of equipment, which needs maintenance, service, or repair. Upon completion, the pre-lockout evaluation form (found in Appendix B) will be kept on file by the department safety officers, supervisors or foreman with a copy sent to EH&S.:

The pre-lock out evaluation need not document the required procedure for a particular machine or piece of equipment, when **ALL** of the following elements exist:

1. The machine or equipment has no potential for stored or residual energy or reaccumulation of stored energy after shut down which could endanger employees.
2. The machine or equipment has a single energy source, which can be readily identified and isolated.
3. The isolation and locking out of that energy source will completely deenergize and deactivate the machine or equipment.
4. The machine or equipment is isolated from that energy source and locked out during servicing or maintenance.
5. A single lockout device will achieve a locked out condition.
6. The lockout device is under the exclusive control of the authorized employee performing the servicing or maintenance.
7. The servicing or maintenance does not create hazards for other employees.
8. There have been no accidents involving the unexpected activation or reenergization of the machine or equipment during servicing or maintenance.

VIII. LOCKOUT PROCEDURES

Only authorized employees shall perform implementation of the lockout or tagout program. The application of lockout/tagout shall be done in the following sequence:

1. **Notification:** All affected employees shall be informed that servicing or maintenance is required on a machine or equipment and that the machine or equipment must be shut down and locked out to perform the servicing or maintenance.
2. **Preparation for shutdown:** The authorized employee shall refer to the University procedure (if available) to identify the type and magnitude of the energy that the machine or equipment utilizes, shall understand the hazards of the energy, and shall

- know the methods to control the energy. The procedure is available from the department safety officer, supervisor or foreman
3. **Machine or equipment shutdown:** If the machine or equipment is operating, an orderly shutdown must be utilized to avoid any additional or increased hazard(s) to employees as a result of de-energization.
 4. **Machine or equipment isolation:** Physically locate and de-activate the energy isolating device(s) so that the machine or equipment is isolated from the energy source(s).
 5. **Lockout/tagout device application:** Each authorized employee shall affix lockout or tagout devices to each energy-isolating device. Lockout devices shall be affixed in a manner that will hold the energy in a "safe" or "off" position. Tagout devices shall be affixed in such a manner as will clearly indicate that the operation or movement of energy isolating devices from the "Safe" or "off" position is prohibited.
 6. **Stored Energy:** Stored or residual energy (such as that in capacitors, springs, elevated machine members, rotating flywheels, hydraulic systems, and air, gas, steam or water pressure, etc.) must be dissipated or restrained by methods such as grounding, repositioning, bleeding down, blocking etc.
 7. **Verification of isolation:** Ensure that the equipment is disconnected from the energy source(s) by first checking that no personnel are exposed, and then verify the isolation of the equipment by operating the push button or other normal operating control(s).

//// CAUTION ///

Return operating control(s) to "NEUTRAL" or "OFF" position after verifying the isolation of the equipment.

IX. RELEASE FROM LOCKOUT OR TAGOUT

Before lockout or tagout devices are removed and energy restored to the machine or equipment, procedures shall be followed by the authorized employee(s) to ensure the following:

- 1) The work area shall be inspected to ensure that nonessential items have been removed and that machine or equipment components are operationally intact.
- 2) The work area shall be checked to ensure that all employees have been safely positioned or removed. Before lockout or tagout devices are removed and before machines or equipment are energized, affected employees shall be notified.
- 3) Verify that the controls are in the "OFF" or "NEUTRAL" position.
- 4) Remove the lockout devices and tags.
- 5) Re-start the machine or equipment

X. TESTING OF EQUIPMENT

In situations where energy-neutralizing devices are locked out and there is need to test or position the equipment, these procedures will be followed:

1. Clear all personnel to safety.

2. Clear away tools and materials from equipment.
3. Remove lockout devices and re-energize the controls, following the established safety procedures.
4. Proceed with try out or testing of equipment.
5. Neutralize all energy sources once again; purge all systems and re-lockout prior to continuing work.

XI. GROUP LOCKOUT OR TAGOUT

When servicing and/or maintenance is performed by a crew or department, 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. This shall be accomplished by:

- The application of a multi-lock accepting device by the primary authorized employee to the energy-isolating device.
- Each authorized employee shall affix a personal lockout or tagout device when they begin work, and shall remove those devices when they stop working on the machine or equipment.
- The primary authorized employee will remove his/her lock and the multi-lock accepting device when all service or maintenance has been completed.

XII. NEW MACHINERY AND EQUIPMENT

All new machinery and equipment shall incorporate provisions for lockout. Equipment mounted disconnects are recommended. All valves used to hold equipment out of service or for sectionalizing lines should be designed to enable lockout. Bleeder valves should be installed where dissipation of pressure, draining lines, purging, or similar activities are required. All equipment which is extensively modified or which undergoes major repair shall be fitted with energy isolating devices.

XIII. LOCKOUT CONTINUITY DURING SHIFT CHANGES

To ensure continuity of lockout protection in the event that a problem arises after the standard 7:30 a.m. to 4:00 p.m. shift, the following procedures shall be followed:

1. The person who applied the lockout shall remove locks at the end of each shift after appropriate safety checks.
2. If there is an oncoming authorized employee he/she will immediately apply his/her lock and tag to each point of lockout, and recheck for the effectiveness of the lockout.

XIV. LOCK REMOVAL

Locks or tags must not be removed by anyone other than the authorized employee who installed it, with one exception.

If an emergency takes place which calls for re-energizing a machine or piece of equipment, the authorized employee's supervisor may remove his/her lock or tag under the following conditions:

1. The supervisor or foreman will make every practical attempt to contact the employee whose lock and tag are in question and determine the safety involved in removing his/her lockout device(s).
2. The supervisor or foreman will conduct a lockout removal review with all affected parties. The purpose of the review is to ensure that removal of the lock will not jeopardize the safety or health of any individual.
3. When it has been determined that it is safe to do so, the employee's supervisor or foreman may then remove the lock and tag.
4. In the event the employee was unable to be contacted, his/her supervisor or foreman shall notify him/her that his/her lock and tag have been removed as soon as possible.

XV. CONTRACTORS

Whenever outside contractors are to be engaged in activities covered by the scope and application of this program, the University of Pittsburgh representative and the outside contractor representative shall discuss hazardous energy sources involved in the work and de-energization procedures. The procedures employed by the contractor must meet the requirements established in 29CFR1910.147.

In situations where contractor and University employees will be working on the same equipment or machinery, the responsible University Project Manager will coordinate the de-energization and lockout/tagout of the appropriate devices.

XVI. EXEMPTED EQUIPMENT AND OPERATIONS

1. **Cord and Plug Equipment:** Cord and plug connected electrical equipment is not covered by this program, if the unexpected energizing of the equipment is controlled by the unplugging of the equipment. The plug must be under the exclusive control of the employee performing the work, such that it is within reach at all times.
2. **Hot-Tap Operations:** Hot-tapping is not covered by this program if the following conditions are met:
 - a. Service continuity is essential.
 - b. It is impractical to shut the service down.
 - c. There are documented procedures that ensure effective employee protection and those procedures are followed.
 - d. Special equipment, if necessary, is used.

XVII. EMPLOYEE TRAINING

All **authorized employees** must be knowledgeable and understand the hazards associated with the unexpected release of energy by machines, equipment, pipelines, and electrical circuits.

Training for authorized employees shall include:

1. Recognition of hazardous energy sources.
2. Identification of the types and magnitude of energy sources in the workplace.
3. Explanation of the methods and means for isolation and control of hazardous energy.

Affected employees shall be instructed on the purpose and use of the lockout/tagout procedures.

Other employees working in an energy-control area shall be instructed on the lockout/tagout procedures, but not their use; and shall be informed of prohibitions on tampering with energy isolating devices.

In certain situations it may be impossible for a machine or piece of equipment to be locked out and consequently, tagout will be the only form of energy isolation possible. Employees shall be trained on the following limitations posed by the use of tags only:

1. Tags do not provide a physical restraint.
2. Tags are little more than warning devices and may evoke a false sense of security unless their meaning is clearly understood.
3. Tags must be legible and understandable by all employees.
4. Both tags and their means of attachment must be able to withstand hostile environmental conditions encountered in the workplace and must be securely attached so they cannot be inadvertently or accidentally detached.
5. Tags are not to be removed, bypassed, ignored or otherwise invalidated without proper authorization.

Employee retraining will take place whenever there is a change in job assignments or a change in equipment, machines or processes that presents a new hazard. Retraining will also be conducted when program audits indicate non-compliance or a lack of knowledge about the program.



APPENDIX A:

PRE-LOCKOUT/TAGOUT EVALUATION FORM

Where work on machinery or equipment containing hazardous energy must be completed and no documented lockout procedure is available, this evaluation form must be completed. This form is **NOT** required in instances where a single energy source is readily identified and isolated with no potential for stored or residual energy, **AND** a single lockout device, controlled by the authorized employee, will achieve a lockout condition completely de-energizing and deactivate the machine or equipment.

Equipment/Machine Involved: _____
Building /Location/Room: _____

Circle all hazardous energy sources that are present and identify the number of the energy isolating devices for each:

Electrical ____ Mechanical ____ Hydraulic/Pneumatic ____ Chemical ____ Thermal ____

Specifically identify the locations of all energy isolating devices (if necessary sketches may be included on the back or on a separate sheet.) _____

Can each energy isolating device be locked in the "OFF" or "NEUTRAL" position? Yes / No
If No explain; _____

If the energy isolating devices cannot be locked in the "OFF" or "NEUTRAL" position, can they be altered to accommodate the locks? Yes / No _____

Will tag outs have to be used? Yes / No If Yes, where? _____

Describe procedures to assure that the machine or equipment is in a "Zero Energy State." _____

Completed By: _____ Date: _____

(After completion of work, this form will be kept in the foreman's office and a copy sent to EH&S.
FAX # 4-8524)