

## **Control of Hazardous Energy Sources**

### **Lockout and Tagout Procedure**

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#### **Appendices**

A – OSHA Standard

B – Wellesley College LO/TO Equipment Inventory

C – Specific Procedures

D – List of Authorized and Affected Employees

E – Example Inspection Form

## I. Purpose

It is the intent of Wellesley College to safeguard and protect its employees against loss of life or personal injury and provide them with working conditions that are healthful and safe. This Plan establishes the minimum requirements for lockout and tagout of energy-isolating devices at Wellesley College in accordance with OSHA regulation 29 CFR 1910.147. See Appendix A. Procedures outlined shall be used to ensure that machines or equipment are isolated from all potentially hazardous energy during maintenance or servicing activities where the unexpected energization, start up, or release of stored energy could cause injury.

## II. Scope

The most common form of energy is electrical, but mechanical, hydraulic, pneumatic, chemical, and thermal energy can also be dangerous. Energy can also mean movement or the possibility of movement.

Whenever any part of the body is exposed to these types of energy while servicing or maintaining equipment, lockout/tagout procedures must be followed.

This program applies to all Wellesley College employees who:

1. Service or maintain machines and equipment in which the unexpected energization or start-up could cause injury.
2. Operate equipment *while* it is being serviced or maintained.
3. Service or maintain equipment during normal operations when:
  - a. An employee is required to remove or bypass a guard or other safety device, *or*
  - b. An employee is required to place any part of his/her body into an area on a machine or piece of equipment where work is actually performed upon the material being processed (point of operation) OR where an associated danger zone exists during a machine operating cycle.

Operations not covered under this standard (however, effective protection must still be provided to avoid injury):

1. Normal production operations (except as noted in item “3” above).
2. Minor tool changes and adjustments, and other minor servicing activities, which take place during normal operations when they are routine, repetitive, and integral to the use of the equipment for production.
3. Work on cord and plug connected electric equipment when it 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.

4. Hot tap operations involving transmission and distribution systems for substances such as gas, steam, water or petroleum products when they are performed on pressurized pipelines, provided that:

- (a) Continuity of service is essential;
- (b) Shutdown of the system is impractical; and
- (c) Documented procedures are followed, and special equipment is used which will provide proven effective protection for employees.

See Appendix B for an inventory of equipment where LO/TO may apply.

### **III. Responsibilities**

Each member of the college community plays an important role in the compliance of this program. Major responsibilities are outlined as follows:

#### **A. Environmental Health & Safety Office**

- Review and update this Plan accordingly.
- Conduct a periodic evaluation of the program.
- Provide general training.

#### **B. Maintenance Services**

- Provide employees with the necessary equipment and support to carry out the requirements of this Plan.
- Identify equipment that will require lockout/tagout during maintenance and servicing operations.
- Identify all isolating devices such as switches, valves, etc. to be locked or tagged out.
- Develop specific energy control procedures for each machine or type of device requiring LO/TO.
- Coordinate general training sessions with EHS and provide job specific training on equipment employee will service/maintain.
- Maintain a copy of this Plan in an accessible location.
- Ensure that issues found during program reviews are remedied in a reasonable time frame. Imminent hazards to be addressed immediately.
- Certify that periodic inspections are being performed.
- Ensure that new or overhauled equipment is capable of being locked out.

#### **C. Project Managers**

- Ensure that new or overhauled equipment is capable of being locked out.
- Provide list of new equipment to Maintenance Services.
- Ensure contractors LO/TO program is made known to applicable college employees.

#### **D. Authorized Employees**

A person who locks out or tags out machines or equipment in order to perform servicing or maintenance on that machine or equipment. Authorized employees will conduct inspections (see Appendix E for example inspection form), at least annually.

#### **E. Affected Employees**

An employee whose job requires them to operate or use a machine or equipment on which servicing or maintenance is being performed under lockout or tagout, or whose job requires work in an area where service or maintenance is being performed.

#### **F. Contractors**

Whenever outside service personnel are engaged in activities covered by this OSHA standard, Wellesley College and the contractor's employer shall inform each other of their respective lockout/tagout procedures.

Wellesley College personnel should be aware of the restrictions and prohibitions of an outside employer's energy control program.

### **IV. LO/TO Devices**

If the equipment has an energy isolating device is capable of being locked out, lockout shall be utilized, *unless* it can demonstrate that the utilization of a tagout system will provide full employee protection. Apply tagout device in the same location as lockout device if the equipment is not capable of being locked out. Additional safety measures should then be used to include:

- removal of an isolating circuit element,
- blocking of a controlling switch,
- opening of an extra disconnecting device, or
- removal of a valve handle to reduce the likelihood of inadvertent energization.

Devices shall meet the following requirements:

- **Durable.** Lockout and tagout devices shall be capable of withstanding the environment to which they are exposed (e.g. can withstand various weather & moisture conditions)
- **Standardized.** Standardized within a facility in at least one of the following criteria: Color; shape; or size; and additionally, in the case of tagout devices, 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. Tagout devices, including their means of attachment, shall be substantial enough to prevent inadvertent or accidental removal.

- **Identifiable.** Devices shall indicate the employee applying the device(s). 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. Do Not Operate."

## V. Energy Control Procedures

When all of the following elements exist, there is no need to *document* the LO/TO procedure:

[1] The machine or equipment has no potential for stored or residual energy or re-accumulation 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 de-energize 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; and

[8] the employer, in utilizing this exception, has had no accidents involving the unexpected activation or re-energization of the machine or equipment during servicing or maintenance.

If all the above criteria are not met, a written procedure shall be developed. Procedures will outline the scope, purpose, authorization, rules, and techniques to be utilized for the control of hazardous energy. It will include:

- Specific steps for shutting down, isolating, blocking and securing machines or equipment to control hazardous energy;
- Specific steps for the placement, removal and transfer of lockout devices or tagout devices and the responsibility for them;
- Specific requirements to verify the effectiveness of lockout devices, tagout devices, and other energy control measures.

Typically if more than one hazardous energy source and/or means of disconnect (electrical, mechanical, pneumatic, hydraulic, etc.) is involved a Specific Procedure should be developed. In the event a machine or piece of equipment is not listed or does

not have a specific procedure, contact your supervisor immediately. No work can proceed until the director/manager or their designee resolves the issue and provides the authorized person with a specific procedure.

### **General LO/TO Procedures**

Lockout or tagout shall be performed only by authorized employee(s) who are performing the servicing or maintenance.

Authorized employees will notify affected employees of the application and removal of lockout devices or tagout devices. Notification shall be given before the controls are applied, **and** after they are removed from the machine or equipment.

Basic energy control procedures:

1. "**Preparation for shutdown.**" Before an authorized or affected employee turns off a machine or equipment, the authorized employee shall have knowledge of the type and magnitude of the energy, the hazards of the energy to be controlled, and the method or means to control the energy.
2. "**Machine or equipment shutdown.**" The machine or equipment shall be turned off or shut down using the procedures established for the machine or equipment. An orderly shutdown must be utilized to avoid any additional or increased hazard(s) to employees as a result of the equipment stoppage.
3. "**Machine or equipment isolation.**" All energy isolating devices that are needed to control the energy to the machine or equipment shall be physically located and operated in such a manner as to isolate the machine or equipment from the energy source(s).
4. "**Lockout or tagout device application.**" Lockout or tagout devices shall be affixed to each energy isolating device by the authorized employee(s). Lockout devices, where used, shall be affixed in a manner to that will hold the energy isolating devices in a "safe" or "off" position. Tagout devices, where used, 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. Where tagout devices are used with energy isolating devices designed with the capability of being locked, the tag attachment shall be fastened at the same point at which the lock would have been attached. 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. "**Stored energy.**" Following the application of lockout or tagout devices to energy isolating devices, all potentially hazardous stored or residual energy shall be relieved, disconnected, restrained, and otherwise rendered safe. If there is a possibility of reaccumulation of stored energy to a hazardous level, verification of isolation shall be continued until the servicing or maintenance is completed, or until the possibility of such accumulation no longer exists.

6. "**Verification of isolation.**" Prior to starting work on machines or equipment that have been locked out or tagged out, the authorized employee shall verify that isolation and deenergization of the machine or equipment have been accomplished.

***Work on machines or equipment can now be accomplished safely.***

### **Re-Energization Procedures**

Authorized employees will follow these essential steps before lockout or tagout devices are removed and energy is restored to the machine or equipment:

1. Ensure that nonessential items have been removed and to ensure that machine or equipment components are operationally intact.
2. Work area checked to ensure that all employees are safely positioned.
3. Remove each lockout or tagout device from the energy isolating device(s). This shall be completed by the employee who applied the device.
4. Notify personnel that the LO/TO devices have been removed.

If the authorized employee who applied the device is not available to remove it, that device may be removed by another authorized employee, with Manager approval, and the following :

1. Verification that the authorized employee who applied the device is not at the facility;
2. Reasonable efforts were made to contact the authorized employee to inform him/her that his/her lockout or tagout device has been removed; and
3. The authorized employee has this knowledge before he/she resumes work at that facility.

### **Testing or Positioning of Machines, Equipment or Components**

In situations where lockout or tagout devices must be temporarily removed to test or position the machine, equipment or component, the following sequence of actions shall be followed:

- Clear the machine or equipment of tools and materials;
- Remove employees from the machine or equipment;
- Remove the lockout or tagout devices;
- Energize and proceed with testing or positioning;
- Deenergize all systems and reapply energy control measures to continue the servicing and/or maintenance.

## **Group Lockout or Tagout**

When servicing and/or maintenance is performed by a crew, craft, department or other group, this is considered a group lockout or tagout and shall include the following specific requirements:

- Primary responsibility is vested in an authorized employee for a set number of employees working under the protection of a group lockout or tagout device;
- The authorized employee shall review the exposure status of individual group members;
- Assignment of overall responsibility to an authorized employee designated to coordinate affected work forces and ensure continuity of protection;
- Each authorized employee shall affix a personal lockout or tagout device to the group lockout device, group lockbox, or comparable mechanism when he or she begins work, and shall remove those devices when he or she stops working on the machine or equipment being serviced or maintained.

## **Shift or Personnel Changes**

Specific procedures shall be utilized during shift or personnel changes. This ensures the continuity of protection, including provisions for the orderly transfer of lockout or tagout device protection between off-going and oncoming employees.

## **VI. Inspections**

Periodic inspection of energy control procedures will occur at least annually to ensure that the procedure and the requirements of this Plan are being followed and to correct any deviations or inadequacies identified.

The periodic inspection shall be performed by an authorized employee other than the one(s) utilizing the energy control procedure being inspected.

Where lockout is used for energy control, the periodic inspection shall include a review between the inspector and each authorized employee.

Where tagout is used for energy control, the periodic inspection shall include a review, between the inspector and each authorized and affected employee, of that employee's responsibilities.

Periodic inspections shall be in writing and identify the machine or equipment on which the energy control procedure was being utilized, the date of the inspection, the employees included in the inspection, and the person performing the inspection.

See Appendix E for an example inspection sheet.

## VII. Training & Communication

All employees will be provided with the following:

- Information on this Plan and the OSHA Standard, and
- Relevant energy control procedures.

Each authorized employee shall receive training in:

- the recognition of applicable hazardous energy sources,
- the type and magnitude of the energy available in the workplace, and
- methods and means necessary for energy isolation and control.

Each affected employee shall be instructed in the purpose and use of the energy control procedure.

Authorized and affected employees are shown in Appendix D.

All other employees whose work operations are or may be in an area where energy control procedures may be utilized, shall be instructed about the procedure, and about the prohibition relating to attempts to restart or reenergize machines or equipment which are locked out or tagged out.

When tagout systems are used, employees shall also be trained in the following limitations of tags:

- 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.
- When a tag is attached to an energy isolating means, it is not to be removed without authorization of the authorized person responsible for it, and it is never to be bypassed, ignored, or otherwise defeated.
- Tags must be legible and understandable by all authorized employees, affected employees, and all other employees whose work operations are or may be in the area, in order to be effective.

Retraining shall occur whenever there is:

- a change in job assignment,
- a change in machines, equipment or processes that present a new hazard,
- when there is a change in the energy control procedures,
- whenever a periodic inspection reveals inadequacies in energy control procedures.

The retraining shall reestablish employee proficiency and introduce new or revised control methods and procedures, as necessary.

### **VIII. Lockout Tagout Accidents**

Managers shall be responsible for fully investigating all lockout/tagout accidents, and reporting the cause of such accidents to EH & S.

If the investigation shows that the accident occurred while utilizing the general procedures as authorized for that particular equipment, but could have been prevented by applying a more specific procedure, a specific procedure will be written and included in Appendix C before work is continued.

If the accident involved a specific procedure for the equipment, the specific procedure will be reviewed and modified (if necessary) prior to authorizing work to continue.

If the accident occurred as a result of employee failure, the employee will be immediately retrained prior to reassignment to a lockout/tagout situation.

### **IX. Contact Information**

For any questions or comments regarding this Plan, contact the Environmental Health and Safety Office at x 3882 or email Suzanne Howard at [showard@wellesley.edu](mailto:showard@wellesley.edu).

To report accidents and injuries contact Campus Police at x 5555 and inform your supervisor immediately.

For specific equipment related questions, contact your supervisor and or the manufacturer.