



LOCKOUT TAGOUT PROGRAM

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I. Applicability

This program is applicable to all Tufts buildings both on and off campus where employees or contractors may be exposed to the unexpected energization, motion or start-up of machines or equipment. This program assists in compliance with 29 CFR1910.147 regulations for the control of hazardous energy.

Note: Cord and plug connected equipment is not included in this program as long as the exposure to the hazards of unexpected energization of the equipment is controlled by unplugging the equipment from the energy source. This provision applies only if the plug is under exclusive control of the employee performing the service or maintenance. If that employee leaves the area before servicing or maintenance is completed that piece of equipment or machine will be formally locked out.

II. Overview

Conformance to this Program will aid Tufts University in preventing injuries from the servicing and/or maintenance of machines and other equipment and processes.

Employees failing to comply with the requirements of the Lockout Tagout (LO/TO) program will be subject to disciplinary actions up to and including terminations. Contractors failing to comply with the requirements of the Lockout Tagout Program will be removed from Tufts campus.

III. Definitions

Authorized Employee	A person who locks-out or tags-out machines or equipment in order to perform servicing or maintenance (set up operators and tools changes).
Affected Employee	A person whose job requires them to work in an area or operate machinery or equipment on which servicing or maintenance is being performed under lock-out or tag-out.
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 energy isolation can be achieved without the need to dismantle, rebuild or replace the isolating device, or permanently alter its capability.
Energized	Connected to an energy source or containing residual or stored energy.

Energy Control Procedure	Procedure that clearly and specifically outlines the scope, purpose, authorization, rules and techniques to be utilized for the control of hazardous energy, and the means to enforce compliance.
Energy Isolating Device	A mechanical device that physically prevents the transmission or release of energy, including, but not limited to the following: manually-operated electrical circuit breaker, a disconnect switch, or a manually operated switch by which the conductors of a circuit can be disconnected from all ungrounded supply conductors and, in addition, where no pole can be operated independently a line valve, a block, 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	Any source of mechanical, hydraulic, pneumatic, chemical, natural, thermal or other energy.
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, 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.
Primary Authorized Employee Servicing and/or Maintenance	Individual designated by the supervisor with the primary responsibility for a set number of employees working under the group LO/TO device(s). 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 <i>unexpected</i> 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 and a means of attachment, which can be securely fastened to 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. Responsibilities

Director of Facilities Operations* shall:

1. Provide necessary resources to ensure compliance which includes equipment and training,
2. Ensure that this guideline is fully implemented and that Tufts specific LO/TO procedures are written and followed.

Supervisors shall:

1. Evaluate the potential hazards of specific equipment,
2. Coordinate the correction of LO/TO issues brought to their attention by employees,
3. Communicate with contractors regarding the company's LO/TO Program,
4. Provide training resources to applicable employee,
5. Implement Emergency Lock Removal procedure,
6. Perform annual and periodic inspections, as required,
7. Account for shift and personnel changes, as needed or required.

Employees shall:

1. Have a full understanding of the energy isolating devices in use at the facility,
2. Not perform servicing or maintenance on energized equipment prior to locking it out in accordance with this program,
3. Not work on equipment that he or she has not personally locked out with his or her own keyed lock,
4. Never remove a lock placed by others.

Contractors shall:

1. Be aware of the requirements outlined in this program,
2. Ensure all personnel are properly trained in lockout tagout,
3. Inform Tufts Representative of their LO/TO procedure.

*Note: While the primary audience using this program is the Facilities Services Department, the program applies to all who may be exposed to the unexpected energization, motion or start-up of machines or equipment. The most senior member of a department assumes the responsibilities of the "Director" while the immediate Supervisor or Manager assumes the responsibilities of the "Supervisor".

V. Procedure

Written Program

This document serves as the written LO/TO program for Tufts University. Before performing service or maintenance on equipment or machinery where sources of energy or stored energy could release and cause injury, the energy sources must be isolated and "locked out".

Energy Control Procedure

Up-to-date written procedures are in place and followed for the isolation of an energy source (including locking, blocking and tagging). Procedures must be written for both routine and non-

routine service and maintenance work. These procedures must include sufficient detail to provide each employee with control over all hazardous energy they may be exposed to (such as electrical, mechanical, gravitational, hydraulic, pneumatic, chemical, thermal, or other hazards). See **Attachment 1.1** for an example of energy control procedure.

The 7 Steps to lockout tagout

1. **Preparation for Shutdown** - The Authorized Employee shutting down the equipment must have a complete understanding of the equipment or system and the energy sources involved. All energy isolating devices shall be identified and the equipment needed to lock out these devices shall be determined and collected.
2. **Shutdown – removing equipment from service** - All Affected Employees shall be made aware of the shutdown. Before lockout begins, equipment or system shall be shut down by Authorized Employee in an orderly manner in accordance with energy control procedure or other documented operating procedure.
3. **Isolation** – Authorized Employee shall locate, isolate or relieve all stored energy such as air pressure, springs, hydraulic systems and similar residual energy sources. Place all valves in a safe position, open drains and vents and perform other tasks necessary to de-energize the equipment or system as noted on energy control procedure.
4. **Lockout and Tagout** - Before beginning work on the equipment or system, the following actions to verify LO/TO shall be taken:
 - a. All energy isolating devices shall be set in the safe position and locked in position by Authorized Employee. Tags reading “DANGER—DO NOT OPERATE” shall be filled out and attached to each locked isolating device with a nylon cable tie with name of person securing equipment, phone number, date and time of application.
 - b. Each Authorized Employee who will work on the equipment must apply their personal lock to each locked out isolating device in accordance energy control procedure.
 - c. Manager of Authorized Employee will place his/her lock to each isolating device in accordance with the energy control procedure.
5. **Verification of Isolation** - The Authorized Employee will verify the isolation and de-energizing of the machine or equipment:
 - a. Trying to activate the machine
 - b. Verify no voltage is present using a volt meter
 - c. Verifying no stored energy is present using available system (pressure, temperature) gauges
6. **Perform maintenance and work task** – maintenance task to be performed.
7. **Removing locks and tags and returning equipment to service** - After the planned work has been completed, the following actions to safely return the equipment to service shall be taken by Authorized Employee:
 - a. Each lockout or tagout device shall be removed from each energy isolating device by the employee who applied the device.
 - b. Inspect the area to ensure that non-essential items and all waste and debris have been removed and the equipment or system components are intact.
 - c. Ensure that all machine safety guards have been replaced.

- d. Ensure that all members of the team have been notified that the work has been completed and the locks have been removed.

It is imperative that each Authorized Employee understands the hazards of the work and how to control the hazards. Furthermore, it is required that authorized employee(s) have knowledge regarding the type and magnitude of the energy, the hazards of the energy to be controlled, and the procedure to be used to control the hazardous energy.

VI. Lockout devices and Tags

Locks color and size will be standardized as follows:

Lock Color	Trade
Green	Locksmith/Carpenters
Blue	HVAC
Red	Electrician
White	Maintenance
Yellow	Plumbers
Brown	Manager

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.

Lockout tagout devices shall only be used for lockout tagout purposes.

Tags will accompany locks at all times, unless the device will not accept a lock or lockout device. In these instances the following applies:

- 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 employee responsible for it, and it is never to be bypassed, ignored, or otherwise defeated.
- Tags require time, date applied, name and phone number for Authorized Employee.
- Tags must be legible and understandable by all Authorized Employees and Affected Employees.
- Tags and their means of attachment must be made of materials which will withstand the environmental conditions encountered in the workplace.
- Tags may evoke a false sense of security, and their meaning needs to be understood as part of the overall energy control program.

- Tags must be securely attached to energy isolating devices so that they cannot be inadvertently or accidentally detached during use. Tagout device attachment means shall be of a non-reusable type, attachable by hand, self-locking, and non-releasable with a minimum unlocking strength of no less than 50 pounds and having the general design and basic characteristics of being at least equivalent to a one-piece, all environment-tolerant nylon cable tie.
- See **Attachment 1.2** for diagram of approved program tags.

VII. Emergency removal of another person's lock

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

When the Authorized Employee who applied the device is not available to remove it, the device may be removed under the direction of a single designated person in the Facilities Department provided this designated person follow specific procedures. At a minimum, these include:

- Verification that the Authorized Employee who applied the device is not on campus
- Efforts are made to contact the Authorized Employee to inform them that their lockout tagout device has been removed
- There are methods followed to ensure the Authorized Employee knows their device was removed BEFORE they resume work

The Director of Facilities Operations will either serve as the responsible person or designate an individual to serve in this capacity.

To assist in the consistent application of the emergency lock removal process, see **Attachment 1.3**.

VIII. Group Lockout

When servicing and/or maintenance is performed by a crew, craft, department or other group, a procedure shall be utilized which affords the employees a level of protection equivalent to that provided by implementation of a personal lockout or tagout device.

Group lockout shall be utilized where complex LO/TO operations involve many employees and numerous energy-isolating devices. In such situations the Facilities department may designate a **primary authorized employee**, with the primary responsibility for a set number of employees working under the group LO/TO device(s). The **primary authorized employee** must implement and coordinate the LO/TO of hazardous energy sources and verify that the steps taken, in accordance with the specific written energy control procedure, have in fact isolated the machine or equipment effectively from the hazardous energy sources. This must be accomplished **before** authorized employees participating in the group LO/TO affix their personal lockout device to the group LO/TO box and **before** performing servicing/maintenance activities.

In addition to the **primary authorized employee**, each authorized employee participating in the group LO/TO must be informed of their right to verify the effectiveness of the lockout measures.

Each authorized employee must be allowed to personally verify that hazardous energy sources have been effectively isolated, if they so choose. An authorized employee, who opts to verify the effectiveness of the isolation measures, must perform this verification **after** affixing his or her personal lockout device to the lock box and **before** performing servicing/maintenance activities.

Each authorized employee shall affix a personal lockout device to the group lockout device, group lockbox, or comparable mechanism **before** he or she begins work, and shall remove those devices when he or she finishes working on the machine or equipment being serviced or maintained.

IX. Shift Changes

If the servicing or maintenance on a piece of equipment needs to extend beyond one shift, then all authorized people leaving the facility must remove their personal locks from the equipment at the end of the shift. To insure that the lockout process remains in-effect, an authorized person's lock(s) from the outgoing shift must remain on the equipment or lockbox until an authorized person's lock(s) from the incoming shift is attached.

X. Contractors

Whenever non Tufts personnel or outside servicing personnel (contractors) are to be engaged in LO/TO activities, Tufts personnel will obtain information from the outside personnel/contractor about their lockout/tagout procedures and advise all affected employees of this information. Tufts Employees and the contractor shall inform each other of their respective lockout or tagout procedures using Attachment 1.5 - Outside Personnel/Contractor Certification.

Contractors will be informed of the use of locks and tags and notified about the prohibition of attempts to restart or re-energize machines or equipment that are locked out or tagged out.

Tufts shall ensure that employees understand and comply with the restrictions and prohibitions of the contractor's energy control program.

XI. Training

Authorized employees will receive formal LO/TO training:

- The training will include procedure or equipment-specific instruction, which includes written procedures and hands-on instruction in LO/TO application.
- The training should enable the recognition of applicable hazardous energy sources, the type and magnitude of the energy available in the workplace and the methods and means necessary for energy isolation and control.

Affected employees will receive training to inform them of the purpose of the program, and their limitations and responsibilities under the program.

Training for Other employees can be verbally or by another method, and will inform employees about the procedure and program, about the prohibition relating to attempts to start machines or

equipment that are locked out or tagged out, and in recognizing LO/TO devices and their purpose.

Refresher training shall be provided when;

- Retraining shall be provided for all authorized and affected employees whenever there is a change in their job assignments, a change in machines, equipment or processes that present a new hazard, or when there is a change in the energy control procedures.
- Additional retraining shall also be conducted whenever a periodic inspection reveals, or whenever the employer has reason to believe that there are deviations from or inadequacies in the employee's knowledge or use of the energy control procedures.

XII. Periodic Inspection

A designated authorized employee (other than the one utilizing the energy control procedure) shall conduct a periodic inspection at least annually to ensure the procedures are being followed using **Attachment 1.4**. The inspection will include:

- Correction of any deviations or inadequacies identified.
- A review between the inspector and each authorized employee listed on the energy control procedure.
- Inspection records shall be kept on file in the Facilities Department for 1 year.

Revision Log

Revision #	Date	Description of Change	Written by

Document Responsibility

Owner			
Approved by			

Attachment 1.1 – Energy Control Procedure



LOCKOUT TAGOUT PROCEDURE 29CFR 1910.147

Tufts University
520 Boston Ave.
Medford, MA 02155

Description: Chiller, Water Cooled 1	Asset: 3589
Location: Pearson Chem Lab Mechanical Room	
Rev.: 0	Rev. Date: N/A
	Origin Date: 9/25/2015

5 LOCKS & TAGS NEEDED



CAUTION

Refrigeration gases are present. Only EPA Certified personnel are to proceed with service to refrigeration system portion of equipment per Section 608 or the Clean Air Act of 1990. Ensure machine has come to a complete stop and piping pressures have bled off before proceeding.

NEXT AUDIT DUE
SEP 2016

NEXT AUDIT DUE
SEP 2017

NEXT AUDIT DUE
SEP 2018

NEXT AUDIT DUE
SEP 2019

South side of unit

Northeast side of unit



ALWAYS PERFORM A MACHINE STOP BEFORE LOCKING OUT DISCONNECTS

ID	Source	Location	Method	Check	Device
E-1	Electrical 480V	Disconnect is located on the south side of the unit.	Move E-1 disconnect to off. Lock out.	Attempt restart at Control Panel. Verify zero pressure.	Lock and Hasp
W-1	Condenser Water Inlet	Valve is located on the northeast side of the unit.	Close W-1 valve. Lock out.	Verify pressure has bled off.	Butterfly Valve Lockout

Attachment 1.2 – Diagram of Approved Tags



Tags to be used by Tufts.

Attachment 1.3 – Emergency Removal Form

EMERGENCY LOCK REMOVAL FORM

Whenever any lock is removed by any method other than by "normal means with a key under normal circumstances by the employee assigned to the lock", this form shall be completed. One copy on file and one copy sent to employee assigned to lock.

ITEM (S) LOCKED OUT: _____

DATE REMOVED: _____ TIME REMOVED: _____

REASON FOR REMOVING LOCK'S: _____

EMPLOYEE'S NAME AND NUMBER WITH REFERENCE TO LOCK BEING REMOVED:

LIST PEOPLE AND PHONE NUMBERS CALLED, BY WHOM, ETC: _____

METHOD USED TO REMOVE LOCK(S): _____

METHOD USED AND BY WHOM TO NOTIFY EMPLOYEE OF REMOVAL OF HIS/HER' LOCK(s)

Director of Facilities Operations or designee must sign form giving approval of emergency removal.

NAME: _____ DATE: _____

SIGNATURE: _____

Attachment 1.4 – Periodic Inspection Form

Periodic Lockout/Tagout Inspection Form

Directions:

- Conduct periodic inspections **at least annually**
- Use one form for each machine or equipment that has a written Lockout/Tagout Procedure
- Keep the original on file

Department:		Date:
Machine/Equipment Inspected:		

Employees included in the inspection:

1.	2.	3.
4.	5.	6.
7.	8.	9.

Review the Lockout/Tagout Procedures and employee responsibilities with the authorized employees and complete the following:

1. Do the employees understand the Lockout/Tagout Procedures and their responsibilities under the Companies Lockout/Tagout Policy?

YES NO If no, indicate corrective action taken:

2. Do the employees follow the Lockout/Tagout Procedures?

YES NO If no, indicate corrective action taken:

3. Are the established Lockout/Tagout Procedures effective to provide full protection?

YES NO If no, indicate corrective action taken:

4. Other discrepancies noted and corrective actions taken:

Person(s) Conducting Inspection:

Name:	Signature:	Department:
Name:	Signature:	Department:

Attachment 1.5 – Outside Personnel/Contractor Certification

Outside Personnel/Contractor Certification Form

I certify that _____ of Tufts University and
_____ (Personnel/Contractor) have informed each other of our
respective lockout/tagout procedures.

AUTHORIZED SIGNATURES:

Name:	Signature:	Tufts University Dept. Name:
Name:	Signature:	Personnel/Contractor Name: