



University
of Vermont

Department of Environmental Health and Safety
Occupational Health and Safety Office

321 Ryan Street
Essex, Vermont 05452

**CONTROL OF HAZARDOUS ENERGY SOURCES AND ELECTRICAL
HAZARDS LOCKOUT AND TAGOUT PROGRAM**

In accordance with
OSHA 29 CFR 1910.147
OSHA 29 CFR 1910.269
OSHA 29 CFR 1910.333
OSHA 29 CFR 1926.417

REVISED AND DISTRIBUTED BY:

THE UNIVERSITY OF VERMONT
DEPARTMENT OF ENVIRONMENTAL HEALTH AND SAFETY
OCCUPATIONAL HEALTH AND SAFETY OFFICE

REVIEWED BY:

DEPARTMENT OF ENVIRONMENTAL HEALTH AND SAFETY
OCCUPATIONAL HEALTH AND SAFETY OFFICE

Occupational Health and Safety Manager
Occupational Health Administrative Coordinator

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EMERGENCY AND ASSISTANCE

No work will be performed where an emergency cannot be immediately observed and/or prompt rescue assistance summoned.

FIRE – POLICE – RESCUE – EMERGENCY MEDICAL SERVICE..... 9-1-1

Dial 911 and tell them you are at the University of Vermont. Provide them with your building address, building name, and room number as well as the details of your emergency.

CALL IMMEDIATELY FOR ANY EMERGENCY
INCLUDING CHEMICAL SPILL, FIRE, INJURED,
TRAPPED, OR SICK PERSON.

UVM POLICE SERVICES..... (802) 656-3473
FIRE – POLICE – RESCUE – EMERGENCY MEDICAL SERVICE

[UVM Medical Center - Emergency Department](#) (802) 847-2434
111 Colchester Avenue, Main Campus, West Pavilion, Level 1, Burlington, VT 05401
(Medical emergency and evaluation)

[Champlain Medical Urgent Care](#)..... (802) 448-9370
150 Kennedy Drive, South Burlington, VT 05403
(Medical consultation and evaluation)

UVM and Other Administrative Offices

[Department of Environmental Health and Safety](#)..... (802) 656-7233
Occupational Health and Safety Office ohso@uvm.edu

[Service Operations Support](#)..... (802) 656-2560
(Physical Plant Department, chemical cleanup, disposal, and storage) sos@uvm.edu

[Department of Risk Management](#)..... (802) 656-3242
(Accident investigations, insurance services) risk.management@uvm.edu



PROGRAM STATEMENT

I. Purpose

The University of Vermont, Department of Environmental Health and Safety, Occupational Health and Safety Office is dedicated to providing safe work facilities for UVM employees (faculty/staff), students, and visitors, including contractors and consultants (UVM Personnel) and complying with federal and state occupational health and safety standards.

The purpose of this program is to ensure that before an employee performs services or maintenance on machinery or equipment, where potential unexpected energizing, startup, or release of any type of energy could occur and cause injury, the machinery or equipment will be rendered safe to work on by being locked out/tagged out (LOTO).

All UVM Personnel, including administrators and union representatives, share a responsibility to reduce the hazards associated with fall hazards.

II. Standards

The program is designed in accordance with Vermont Occupational Safety and Health Administration (VOSHA) regulations:

- 29 CFR 1910.147 The control of hazardous energy (lockout/tagout)
- 29 CFR 1910.269 Electric power generation, transmission, and distribution
- 29 CFR 1910.333 Selection and use of work practices
- 29 CFR 1926.417 Lockout and tagging of circuits

III. Scope

The University of Vermont (UVM), Department of Environmental Health and Safety, Occupational Health and Safety Office LOTO Program establishes the minimum requirements for the LOTO of energy isolating devices for all UVM employees, including hired contractors who conduct maintenance and construction activities on or within UVM facilities or campus grounds. Specific procedures for control of hazardous energy sources must be developed for any equipment or machinery before any maintenance or servicing is performed. Equipment shall be evaluated and specific LOTO procedures documented on the LOTO Procedure Sheet (*Appendix A*).

Upon completion of the LOTO Procedure Sheet, a copy shall be forwarded to the Occupational Health and Safety Office. Procedure Sheets can be emailed to ohso@uvm.edu. LOTO procedures will be recorded in a centralized electronic database.

All equipment and machinery energy source(s) (any source of electrical, mechanical, hydraulic, pneumatic, chemical, thermal, or other energy) shall be LOTO to protect against accidental or inadvertent operation during any servicing or maintenance activity. Any unauthorized operation or attempt to operate any switch, valve, or other energy isolating device that is LOTO will be disciplined.



Lockout means the placement of a lock on an energy-isolating device of a machine or on equipment in order to prevent the operation of the machine or equipment until the lock is removed. Energy isolating devices can include circuit breakers, switches, valves, and blocks.

Tagout means the placement of a tag which can be securely fastened to an energy-isolating device to indicate that the machinery or equipment may not be operated until the tagout device is removed.

IV. Roles and Responsibilities

Any employee who could be exposed to hazardous energy sources shall be instructed to the safety significance of the LOTO procedure. Such employees are classified as “Affected” employees. Employees authorized to perform LOTO shall receive training commensurate with their responsibilities (See Section 7.0 Training). Such employees are classified as “Authorized” employees. The following job classifications have been authorized to perform LOTO procedures on UVM equipment that is covered under the OSHA standard:

- | | |
|--|-----------------------------|
| 1. Assistant Director of PPD Maintenance | 7. Cage Operating Engineers |
| 2. Safety Programs Manager | 8. Technician |
| 3. Maintenance Manager | 9. Maintenance Mechanic |
| 4. Supervisor/Sr Mechanic | 10. Electrician |
| 5. Safety Programs Coordinator | 11. Plumber |
| 6. Supervisor | |

Each new and transferred "affected employee" and "other" employees whose work operations are or may be in the area shall be instructed in the purpose and use of the LOTO procedure. Prior to LOTO, the senior authorized individual shall brief all affected employees. In the event of tagout system only, the senior authorized individual will also brief all other personnel potentially exposed to the hazard. The procedures noted in the LOTO Procedure Sheets will be followed.

A. Department Administration

1. Maintain and update Design Guidelines requiring that projects be designed according to current VOSHA standards.
2. Provide administrative and financial support for this program within individual units.
3. Ensure that LOTO Program, training, and devices are provided and maintained within the department.
4. Support disciplinary action in the event that proper procedures are neglected and/or obviously not followed.

B. Occupational Health and Safety Office

1. Designate and empower individuals who will act as competent and/or qualified person(s) who will be responsible for the preparation and implementation of the LOTO Program.
2. Ensure that employees who will act as competent and/or qualified person(s) are adequately trained and/or qualified.
3. Ensure the LOTO Program is implemented and maintained within the departments.



4. Consult with outside entities on LOTO as needed.
5. Prepare a LOTO hazard analysis list and procedure sheet, and annually review and revise the material to meet current OSHA regulations.

C. Managers and Supervisors

1. Ensure that employees are informed and trained, and provided with the appropriate LOTO devices to be protected from identified hazards or potential hazards.
2. Coordinate the corrective actions required of hazards brought to their attention by employees.
3. Complete a “[First Report of Injury](#)” report, “[Incident](#)” report, and produce any additional documentation needed to investigate and work-related injuries and illnesses.

D. UVM Employees

1. Comply with the LOTO Program and any further safety recommendations provided by the supervisor and/or Occupational Health and Safety Office regarding LOTO.
2. Complete required LOTO training and request further instructions if unclear.
3. Conduct assigned tasks in a safe manner.
4. Report any unsafe or unhealth work conditions and job-related injuries and illnesses to the supervisor immediately.



INFORMATION AND TRAINING

For assistance, contact the Occupational Health and Safety Office at (802) 656-7233 or send electronic mail to ohso@uvm.edu. Information and training will be provided by the Occupational Health and Safety Office to any unit or individual requesting guidance or training to satisfy implementation of this program.

Training shall be provided to all authorized, affected, and other personnel. Prior to conducting work involving LOTO, employees must be trained to the know knowledge and skills required for the safe application, usage, and removal of the energy controls, including:

- 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,
- The purpose and use of the energy control procedure,
- 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:
 1. 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.
 2. 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.
 3. 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.
 4. Tags and their means of attachment must be made of materials which will withstand the environmental conditions encountered in the workplace.
 5. Tags may evoke a false sense of security, and their meaning needs to be understood as part of the overall energy control program.
 6. Tags must be securely attached to energy isolating devices so that they cannot be inadvertently or accidentally detached during use.
- What the limitations of the PPE are, and
- Proper care, maintenance, service life, and disposal of PPE.

Upon completion of the training, the employee must be able to demonstrate the above-mentioned information. Any type of training format can be used as long as a hands-on portion is incorporated.

Retraining will be required when there is a change in the job assignments, a change of machines, equipment, or processes present a new hazard. Additionally, retraining shall also be conducted whenever the periodic inspection indicates or whenever there is reason to believe that there are deviations from or inadequate employee's knowledge or use of the energy control procedures.

Training records will be maintained at the Occupational Health and Safety Office. Contact the Occupational Health and Safety Office at (802) 656-7233 or ohso@uvm.edu for more information on training requirements and scheduling.



ENERGY CONTROL PROGRAM

An Energy Control Program shall be established, documented, and consist of energy control procedures, employee training and periodic inspections to ensure that before any employee performs any servicing or maintenance on a machine or equipment where the unexpected energizing, start up or release of stored energy could occur and cause injury, the machine or equipment shall be isolated from the energy source, and rendered inoperative.

Lockout is the preferred method of isolating machines or equipment from energy sources and shall be used whenever possible.

If only tags are used, additional steps shall be taken as they may be necessary to provide the equivalent safety available from the use of a lockout device.

At the point when any equipment is to be obtained or modified by UVM, every effort shall be made to equip the unit with lockout capabilities.

LOTO General Guidelines

I. Preparation for LOTO

The authorized employee shall conduct a survey using the LOTO Procedure Sheet to locate and identify all isolating devices such as switch(es), valve(s), or other energy isolating devices which apply to the equipment to be LOTO. More than one hazardous energy source and/or means of disconnect (electrical, mechanical, pneumatic, or other) may be involved.

If specific procedures have not been developed and documented, they shall be developed and documented before work begins. No work can proceed until a Maintenance Manager or Supervisor verifies and approves the specific procedure written by an authorized employee (See *Appendix A* for LOTO Equipment Procedures Sheet). Locks and tags are to be made available to each authorized employee, with the Maintenance Manager or Supervisor responsible for ensuring that this equipment is available and adequate for the hazards present in the facility.

Visitors and vendors must abide by established safety protocols when entering areas.

II. LOTO System Procedures

Refer to written LOTO procedures specific to the equipment serviced or maintained.

Notify the Service Operations Support (802) 656-2560 of the LOTO by identifying machinery, purpose for shut down and estimated time of the shutdown. The authorized employee shall know the magnitude of energy that the machinery or equipment utilizes, shall understand identified and potential hazards, and shall understand how the shutdown of this piece of equipment affects other associated equipment and other utilizing the space for work, research, etc.

If the machinery or equipment is operating, shut it down by the normal stopping procedure. This is usually done by pressing the stop button, opening the toggle switch, etc. In addition, ensure that all stored energy is dissipated and/or restrained.



Operate the switch, valve, or other energy isolating device(s) so that the work is isolated from its energy source(s).

Lockout/Tagout Device Application:

- A. Locks/tags shall be affixed/installed to each energy isolating device only by an "authorized employee".
- B. Locks shall be affixed in a manner that will hold the energy isolating devices in a safe or off position.
- C. Tags, when used, shall be affixed in a manner that will clearly indicate that the operation or movement of the energy isolating device from the safe or off position is prohibited.
- D. Tags that cannot be affixed directly to the energy isolating device shall be located as close as safely possible to the device and in a position that will be immediately obvious to anyone attempting to operate the device.
- E. All potentially hazardous stored or residual energy shall be relieved, disconnected, restrained, or otherwise rendered safe. If there is a possibility of re-accumulation of stored energy to a hazardous level, verification of isolation shall continue until the possibility of accumulation no longer exists.
- F. After ensuring that no personnel are exposed, as a check of having disconnected the energy sources, operate the push button or other normal operating controls to make certain the equipment **will not** operate.

CAUTION - RETURN OPERATING CONTROL(S) TO NEUTRAL OR OFF POSITION AFTER THE TEST

The equipment is now LOTO

III. Testing or Positioning of Machines, Equipment, or Components

- A. Clear the machine or equipment of tools and materials.
- B. Clear employees from the machine or equipment area.
- C. Remove the LOTO devices.
- D. Energize and proceed with testing or positioning.
- E. De-energize all systems and re-apply energy control measures in accordance with the requirements set forth in this program.

IV. Procedure Involving More Than One (1) Person

In the preceding steps, if more than one (1) individual is required to lockout/tagout equipment, each shall place individual's own assigned LOTO device on the assigned isolating device(s). If an energy isolating device cannot accept multiple locks, a multiple LOTO device (hasp) may be used. If a lockout is used, a single lock may be used to lockout the machine or equipment with the key being placed in a lockout box or cabinet that allows the use of multiple locks to secure it. Each employee will have his/her own assigned lock to secure the box or cabinet. As each person no longer needs to maintain his/her lockout protection, that person will remove individual's lock from the box or cabinet.



Notify the Service Operations Support (802) 656-2560 of the multiple individuals who are required to lockout/tagout this piece of equipment.

V. Removal of Lockout/Tagout Devices by Other Than Authorized Employee

Lockout/Tagout devices shall only be removed from each energy isolating device by the employee who applied it, except Lockout/Tagout devices may be removed:

1. By the Maintenance Manager or Supervisor if the authorized employee who applied it is not available, and
2. It is verified that the authorized employee who applied the device is not at the facility.
3. All reasonable efforts were made to contact the authorized employee to inform him/her that his/her LOTO device has been removed, and
4. Authorized employees have this knowledge before they resume work at the facility.

VI. Restoring Machines or Equipment to Normal Operations

After the servicing and/or maintenance activities are complete and equipment is ready for normal operations, check the area around the machine or equipment to ensure that no one is exposed.

Notify the Service Operations Support (802) 656-2560 of restoration of equipment to normal operations.

After all tools have been removed from the machine or equipment, guards have been reinstalled, and employees are in the clear, remove all LOTO devices and notify the “affected” employees of their removal. Operate energy isolating devices to restore energy to the machine or equipment.

VII. Shift or Personnel Changes

In the case of shift or personnel changes, a changeover period will be established so that the authorized employees may exchange their assigned locks/tags. Authorized personnel assuming control of lockout of equipment shall be fully briefed in the scope and strategy of the work by those who are being relieved.



ELECTRICAL LOTO

Electrical work requires that a lock and a tag be used together. However, a tag can be used by itself only if the electrical disconnecting source does not have lockout capabilities.

Tags can be placed without a lock only under the following conditions:

- A. Only one circuit or piece of equipment is de-energized.
- B. The tagout period does not extend beyond the work shift.
- C. Employees exposed to the hazards associated with re-energizing the circuit equipment are familiar with this procedure.

I. Electrical Test Verification of De-Energized Circuits

The authorized personnel shall use test equipment to test circuit elements and electrical parts of equipment to which employees will be exposed to and shall verify that the circuit, elements, and equipment parts are de-energized. The test shall also determine if any energized condition exists as a result of inadvertently induced voltage or unrelated voltage back feed, even though specific parts of the circuit have been de-energized and presumed to be safe. If the circuit to be tested is over 600 volts, nominal, the test equipment shall be checked for proper operation immediately before and immediately after this test.

II. Work on Energized Circuits

Approval must be obtained from the Maintenance Manager or Supervisor prior to any work on energized circuits. The Maintenance Mechanic or other authorized employee will verify that by de-energizing circuits it will create additional or increased hazards, or it is not feasible due to equipment design or operational limitations.

NOTE: Working on energized parts requires the wearing of appropriate personal protective equipment. The Maintenance Manager or Supervisor will be responsible for specifying the appropriate personal protective equipment to be used.



INFORMING OUTSIDE CONTRACTORS/VENDORS

Whenever outside servicing personnel are to be engaged in activities covered by the scope and application of this program, the designated University hiring manager and/or Maintenance Manager or Supervisor and the outside employer shall inform each other of their respective lockout or tagout procedures. If the outside employer has no documented lockout or tagout procedures, they shall ensure that their personnel understand and comply with the procedures established in this program and abide by applicable state and federal regulations.

PERIODIC INSPECTIONS

Periodically, at least annually, the effectiveness of the entire program will be evaluated by the Occupational Health and Safety Office and/or Facilities Management Safety Programs Manager. Any deviations or inadequacies shall be documented and corrected. The inspection will be documented, and records kept on file at the Occupational Health & Safety Office.

ACCIDENTS CONCERNING LOTO

The managers and supervisors will be responsible for completing a “[First Report of Injury](#)” report and fully investigating the LOTO accident(s) and reporting the cause of such accident(s) to the Occupational Health and Safety Office. If the accident involved the control of hazardous energy of a single lockout source, a specific procedure will be written and included before work is continued. If the accident involved a specific procedure for a piece of equipment the LOTO specific procedure will be evaluated and modified (if necessary) prior to authorizing work to continue.



DEFINITIONS

Affected Employee	An employee 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.
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 performing servicing or maintenance covered under this section.
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 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	Any source of electrical, mechanical, hydraulic, pneumatic, chemical, thermal, or other energy.
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. 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	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 a safe position



	and prevent the energizing of a machine or equipment. Included are blank flanges and bolted slip blinds.
Normal production operations	The utilization of a machine or equipment to perform its intended production function.
Servicing and/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.
Setting up	Any work performed to prepare a machine or equipment to perform its normal production operation.
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.



APPENDIX A

Lockout/Tagout Procedure Sheet



LOCKOUT/TAGOUT PROCEDURE SHEET

1. Include and submit sheet(s) to Supervisor(s) and Occupational Health and Safety Office ohso@uvm.edu.
2. To be completed by authorized personnel.

Project/Work Order Number	Description

Equipment Number	Building	Location

Type of Energy Source					
☐ Electrical	☐ Hydraulic	☐ Pneumatic	☐ Gas	☐ Water	☐ Other (<i>specify</i>)
☐ 120v	☐ Main Source	☐ Main Source	☐ Main Source	☐ Main Source	☐
☐ 208v	☐ Secondary Source	☐ Secondary Source	☐ Secondary Source	☐ Secondary Source	☐
☐ 240v	☐ Supply	☐ Supply	☐ Supply	☐ Supply	☐
☐ 480v	☐ Return	☐ Return	☐ Return	☐ Return	☐
☐	☐	☐	☐	☐	☐

Type of Device (<i>explain</i>)
☐ Lockout ☐ Tagout ☐ Combination

Device Used On
☐ Disconnect ☐ Breaker ☐ Plug ☐ Valve ☐ Other (<i>specify</i>):

Device Location on Equipment
☐ Front ☐ Top ☐ Left ☐ North ☐ East
☐ Back ☐ Bottom ☐ Right ☐ South ☐ West

Hazardous Stored Energy to Avoid (<i>explain</i>)			
Power Down Time	☐ Yes	☐ No	Length of Time:
Power Up Time	☐ Yes	☐ No	Length of Time:

Affected Departments/Areas

Completed By (Signature):	Date:
Print Name Email Phone	