

Name:			Lockout/Tagout Program		
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1.0 Purpose

Portland State University's (PSU) Lockout/Tagout Program protects employees and contractors who service or maintain machines or equipment which could cause injury by an unexpected start-up or release of a hazardous energy. Service or maintenance includes erecting, installing, constructing, repairing, adjusting, inspecting, unjamming, setting up, trouble-shooting, testing, cleaning, and dismantling machines, equipment or processes.

This Program ensures that machinery or equipment is stopped, isolated from all hazardous energy sources, and properly locked or tagged-out prior to work.

1.1 Regulatory Standards

1. The OR-OSHA Control of Hazardous Energies (Lockout/Tagout) Standard (OR-437 Div. 2/J. 1910.147) requires the employer to develop, implement, and enforce a hazardous energies control program that includes:

- Written energy-control procedures
- Lockout/tagout devices and hardware
- Inspections of energy-control procedures at least annually
- Effective employee training program

2. American National Standards Institute ANSI B11 Standard – Machine Safety Standard

2.0 Scope

This Program applies to all PSU employees and contractors hired who may be exposed to stored hazardous energy during service or maintenance work. Uncontrolled hazardous energies include potential, kinetic, flammable, chemical, electrical, and thermal sources.

Some normal production operations are also covered by this standard under Section [9.0 *Special Lockout/Tagout Situations*](#).

3.0 Definitions

Affected employee: A person who uses equipment or machinery that is being serviced under lockout or tagout procedures as well as working in an area where equipment or machinery is being serviced.

Authorized employee: A person who locks out or tags out equipment/machinery to do service or maintenance work. An affected employee becomes an authorized employee when that employee's duties include service or maintenance work on equipment/machinery.

Capable of being locked out: An energy-isolating device that is designed with 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 will also be considered to be capable of being locked out, if lockout can be achieved without the need to dismantle, rebuild, or replace the energy-isolating device or permanently altering its' energy-control capability.

Contractor/s: Outside companies hired by PSU to do maintenance or service work and who are or may be exposed to hazardous energies.

Disconnect: A switch that disconnects an electrical circuit or load (motor, transformer, or panel) from the conductors that supply power to it. An open circuit does not allow electrical current to flow. Under a lockout procedure, the disconnect must be capable of being locked in the open position.

Energized: Connected to an energy source or containing potential energy.

Energy source: Any source of energy. Examples: potential, electrical, mechanical, hydraulic, pneumatic, chemical, and thermal.

Energy-isolating device: A mechanical device that physically prevents the transmission or release of energy.

Hazardous energy: Any of the types of energy existing at a level or quantity that could be harmful to workers or cause injury through inadvertent release or start-up of equipment.

Lockout device: A device that locks an energy-isolating device in the safe (off) position.

Lockout: Placing a lockout device on an energy-isolating device, under an established procedure, to ensure the energy-isolating device and the equipment/machinery it controls can't be operated until the lockout device is removed. (An energy-isolating device is capable of being locked out if it has a hasp that accepts a lock or if it has a locking mechanism built into it.)

Procedure: A series of steps taken to isolate energy and shut down equipment.

Servicing or maintenance: Workplace activities such as constructing, installing, setting up, adjusting, inspecting, modifying, and maintaining machines or equipment. Also includes lubricating, cleaning, unjamming, and making adjustments or tool changes if a worker may be exposed to the unexpected startup of the equipment during such activities.

Tagout device: A prominent warning sign, such as a tag, that can be securely fastened to an energy-isolating device to indicate that the energy-isolating device and the equipment it controls can't be operated until the tagout device is removed.

Tagout: Placing a Tagout device on an energy-isolating device, under an established procedure, to indicate that the energy-isolating device and the equipment it controls can't be operated until the tagout device is removed.

4.0 Responsibilities

4.1 Environmental Health and Safety (EHS)

- EHS department is responsible for administering, implementing, and enforcing the Lockout /Tagout Program and for providing required training.

4.2 Facilities and Property Management (FPM) Supervisors and Capital Projects and Construction (CPC) Project Managers

- Must enforce the use of Lockout/Tagout devices when employees or contractors service or conduct maintenance work and may be exposed to a hazardous energy.

4.3 All PSU employees and contractors

All PSU employees and contractors who do service or maintenance work and/or work in areas where Lockout/Tagout procedures are used must:

- comply with the Lockout/Tagout Program, at a minimum; or a contractor may provide their own company Lockout/Tagout Program so long as it is consistent with Portland State University's;
- follow the Lockout/Tagout procedures described in this Program;
- understand the purpose of the Program; and
- not attempt to restart machines or equipment that are locked or tagged out

5.0 Lockout and Tagout devices

Lockout and Tagout devices must meet the following criteria to ensure that they are effective and not removed inadvertently when deployed:

- Lockout devices must work under the environmental conditions in which they are used. Tagout device warnings must remain legible even when they are used in wet, damp, or corrosive conditions.
- Lockout and tagout devices must be designated by color, shape, or size. Tagout devices must have a standardized print and warning format that is clear and legible.
- Lockout devices and tagout devices must be strong enough that they can't be removed inadvertently. Tagout devices must be attached with a single-use, self-locking material such as a nylon cable tie.
- Any employee or contractor who sees a lockout or tagout device must be able to recognize who attached it and its purpose.

- Each lock must have a unique key or combination.

Energy-isolating devices are the primary means for protecting PSU employees and their contractors who maintain or service equipment, and machinery must be designed to accept a lockout device.

5.1 Electrical energy sources:

Lockout or Tagout of electrical energy sources must occur at the circuit disconnect switch. Electrical control circuitry does not effectively isolate hazardous energy. See also, section: [10.0 Alternative methods](#).

6.0 Hazardous Energy Survey

The PSU EHS Department will help facilitate, with each department involved, a Hazardous Energy Survey of equipment to determine the type(s) and magnitude of energy, and necessary service and maintenance tasks. Each task will be evaluated to determine if it must be accomplished with lockout or tagout procedures.

Facilities and Property Management staff shall provide updated Lockout/ Tagout Hazardous Energy Surveys with all necessary procedures when equipment is added or changed and will review existing equipment procedures to ensure they are accurate. Procedures should include all information in Section 7.0 Energy Control Procedures. [Appendix A: PSU Lockout Tagout Survey Procedures Form](#).

Capital Projects and Construction staff shall provide new Lockout/ Tagout procedures for equipment that is installed in remodel or new construction projects. Procedures should include all information in [Section 7.0 Energy Control Procedures](#). Reference [Appendix A: PSU Lockout Tagout Survey Procedures Form](#).

7.0 Energy Control Procedures

Authorized employees and contractors who lockout or tagout equipment when doing service or maintenance work, must follow the specific written energy-control procedures for said equipment. The procedures must include the following information:

- The intended use of the procedure
- Steps for shutting down, isolating, blocking, and securing equipment or machinery
- Steps for placing, removing, and transferring lockout devices
- Equipment-testing requirements to verify the effectiveness of the energy-control procedures

7.1 De-energize / Shutdown Equipment

Employees and contractors **must** do the following before beginning service or maintenance work:

1. Depending on the complexity of the proposed work, pre-task planning meeting may be required.
2. Employee or contractor shall complete a Pre-Task Plan for any substantial Lockout /Tagout work that will impact more than an isolated piece of equipment.
3. Inform all *affected employees* of equipment shutdown prior to starting work (utilizing the PSU Impact Notice Program)
4. Shut down equipment following the LOTO Procedures.
5. Isolate or block all hazardous energies.
6. Remove/release any potential (stored) energy.
7. Lockout or tagout all energy sources.
8. Verify the equipment is isolated from all hazardous energies then de-energized.

7.2 Energize / Restore Equipment Power

Employees and contractors **must** do the following before removing lockout or tagout devices then re-energizing equipment:

1. Remove tools and replace machine or equipment components.
2. Inform all coworkers about energy-control device removal.
3. Ensure all workers are clear of the work area.
4. Verify machine or equipment power controls are off or in a neutral position.
5. Remove the lockout or tagout device.
6. Re-energize equipment.

7.3 Testing Energized Equipment

Employees and contractors **must** do the following before performing any energized testing.

When re-energizing equipment is necessary — when power is needed to test or position the equipment, for example — temporary removal of Lockout or Tagout devices is allowed. **This applies only to the time required to perform the task and this procedure below MUST be followed.**

When an energy-isolating device is locked or tagged out and it becomes necessary to test or re-position equipment, the following must be done:

1. Remove unnecessary tools and materials.
2. Ensure that all other employees are out of the machine/equipment area.
3. Remove locks or tags from energy isolating devices.
4. Proceed with the test.
5. De-energize equipment and Lockout/Tagout energy-isolating devices.
6. Operate equipment controls to verify that the equipment is de-energized.

8.0 Specific Energy-Control Procedures

PSU utilizes specific energy-isolation procedures for all machines and equipment that have energy-isolating devices and are required to be maintained or serviced. Manufacturer recommended energy-control procedures or best practices should always be followed.

Energy-control procedures are maintained in the FPM Systems office and/or where feasible procedures will be posted on or next to the equipment itself, or within the mechanical spaces in campus buildings. Additionally, energy-control procedures are available through the EHS department.

9.0 Special Lockout/Tagout Situations

9.1 Contract service and maintenance Pre-task Plans

PSU and its contractors must be aware of their respective lockout/tagout procedures before the contractor does work onsite. Pre-task planning meetings with a contractor may be required prior to the start of a complex project. PSU employees must understand and comply with the contractor's energy-control procedures (if it is deemed more stringent than PSU's); otherwise, the PSU Lockout /Tagout Program will be followed by all involved.

9.2 Group lockout

When servicing and/or performing maintenance by a crew, craft, department, or other groups (including contractors), they shall utilize a procedure that affords all employees involved a level of protection equivalent to that provided by the implementation of a personal Lockout/Tagout procedure.

Group lockout/tagout devices shall be used in accordance with the procedure requiring for single Lockout/Tagout protection, which affords the employees a level of equivalent protection provided by the implementation of a personal lockout or tagout device, mentioned earlier in this program.

Primary responsibility for a set number of employees working under the protection of a group Lockout or Tagout device must be vested in a single authorized employee. The single authorized employee must determine the exposure status of individual group members.

If there will be more than one crew, department, or group involved in the activity, a single authorized employee must be designated to coordinate affected workforces and to ensure continuity of protection.

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

9.3 Shift Changes and Long-term Shutdowns

PSU will utilize specific procedures during a work shift and personnel changes to ensure the continuity of Lockout/Tagout protection, including the orderly transfer of Lockout/Tagout devices protection between the off-going and on-coming employees.

The equipment must remain in Lockout/Tagout condition across shift changes, so that workers arriving at the site are aware that the equipment is out of service. If individual locks or tags are used, the individual responsible for designating the lockout/tagout and the individual responsible for it during the next shift must both be present as the locks or tags are switched.

Procedures to transfer Lock or Tag to next shift or for Long-term shutdowns:

1. Department Supervisor shall notify affected employee(s) of current Lockout/Tagout procedure on selected equipment.
2. Department Supervisor shall review with new employee(s) the detailed procedures for the equipment shutdown and re-energization.
3. Both authorized employees confirm equipment is still de-energized and lock or tag are securely in place and visible to all employees in the area.
4. Original lock or tag from authorized employee working on equipment will be swapped out for new authorized employee at the same time, IF it is safe to do so and does not expose employee to an energy release.
 - a. Multi-padlocks should be utilized where possible for all authorized employees to add or remove their lock based on the work they perform.
5. Repeat process for each work shift or personnel change.
6. For long-term shutdowns that remain under the exclusive control of a single authorized employee for the entire duration of the project, it is not necessary to change out the lock or tag for each work shift.

9.4 EHS and Departmental Supervisors

EHS and Supervisors involved will be responsible for monitoring lockout and tagout devices that control the energy to equipment during long-term shutdowns.

10.0 Alternative Methods

When Lockout/Tagout is **not** used for tasks that are routine, repetitive, and integral to the production process, or prohibits the completion of those tasks, then an alternative method must be used to control hazardous energy.

Selection of an alternative control method must be based on a risk assessment of the machine, equipment, or process. The risk assessment must consider existing safeguards provided with the machine, equipment or process that may need to be removed or modified to perform a given task.

For example: When control circuits are used as part of the safeguarding system, the system must be designed to ensure protection as effective as a mechanical disconnect switch or master shut-off valve. A control-reliable dual channel hardwired circuit of industrially-rated components that satisfies the design features as specified in ANSI B11.19, with a safety relay or safety PLC to ensure integrity and performance of the safeguarding system, must be used.

Under all circumstances, the individual must have exclusive personal control over the means to maintain the state of the control circuit in a protective mode.

NOTE: EHS must review all proposed Alternative Methods prior to beginning work.

11.0 Energized Electrical Work Program

Portland State University's signing Electrical Supervisor must approve any and all energized electrical work (EEW) that is performed by PSU employees or contracted firms. Refer to the PSU Energized Electrical Work Program for detail requirements and restrictions.

12.0 Training

Employees who may be exposed to any hazardous energy as a part of their duties will receive annual training on the PSU Lockout/Tagout program. Refresher training will be held annually or when there is an incident due to non-compliance of the policy or if the policy itself is changed or updated. The training will ensure that all employees understand PSU's energy-control policy and have the appropriate skills to apply, use,

and remove energy controls. The training will include the requirements of 29CFR 1910.147 (OAR 437 Div. 2/J) and the following:

- Affected employees will be trained in the purpose and use of energy-control procedures. Affected employees whose jobs are in areas where energy-control procedures are used will be trained about the procedures and the prohibition against starting machines that are locked or tagged out.
- Authorized employees will be trained to recognize hazardous energy sources, the type and magnitude of these sources in the workplace, the methods and means necessary for isolating and controlling the energy, and the means to verify that the energy is controlled, de-energized.
- Authorized and affected employees will be retrained whenever their job assignments change, the energy-control procedures change, equipment or work processes present new hazards, or when the employee doesn't follow energy-control procedures. Annual training will ensure employees understand the energy-control program and procedures and to comply with OR-OSHA training regulations.

Current training records will be maintained by EHS for each employee that received the training and will include the employee's name, PSU ID# and the training date.

13.0 Inspections of Written Energy-Control Procedures

Portland State University EHS will assist with the performance and documentation of annual inspections of the energy-control procedures to ensure that all employees understand and use them correctly. Documentation will include the following:

- The equipment and building location for which the procedure is used.
- The date of the inspection.
- The employees included in the inspection.
- The inspector's name.

If during an inspection if an employee finds energy control procedures are not followed or that the current procedure is not protecting efficiently, either the employees must be retrained and/or the procedure's deficiencies must be corrected immediately.

Employees inspecting procedures must understand the procedure and must be someone other than those following the procedure at the time of the inspection. Each procedure's accuracy, completeness, and effectiveness must be verified.

If the inspection covers a procedure for equipment with an energy-isolating device that can be *locked out*, the inspector must review the procedure with the employees who use it to service the equipment. The inspector can review the procedure with the employees individually or in a group.

If the inspection covers a procedure for equipment with an energy-isolating device that can only be *tagged out*, the inspector must review the procedure with the authorized employees who service the equipment and with affected employees who may work in the area when the equipment is serviced. The inspector can review the procedure with the employees individually or in a group.

14.0 Program Management

Environmental Health and Safety is the administrator and program manager for the PSU Lockout/Tagout Program. EHS will manage the written program, the training documentation, and inspections, and coordinate with campus departments to ensure the appropriate information is available to all employees. Questions regarding Lockout/Tagout and controlling hazardous energy program can be directed to EHS or to FPM.

Software used for updates to written procedures is the responsibility of EHS.

15.0 Program Review

The PSU Lockout/ Tagout Program was drafted, reviewed, and approved to be the minimum standards that will apply to all persons working at Portland State University. It does not replace any other laws, regulations, statutes, policies, etc. from any other entity that would apply to the type of work described in this policy.

Annual review of the Lockout/ Tagout Program will be initialized by EHS and reviewed with FPM and CPC.

APPENDIX A: PSU Lockout Tagout Survey Procedures Form(Example)

Lockout-Tagout Posted Procedure		
ID#: CTF-1 Created: 4/9/2007 Revised: 10/4/2013	Description: 	Location: SB1 lower roof top

2	Lockout Points
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Lockout Application Process
1. Notify affected personnel. 2. Properly shut down machine. 3. Isolate all energy sources. 4. Apply lockout devices, locks, & tags. 5. Verify total de-energization of all sources.

Cooling tower disconnect



PNL P-5



Energy Source	Location	Method	Device
 Electrical knife switch	Knife switch, E-1, is located next to equipment.	Isolate knife switch, E-1 and lockout.	Lock.
 Electrical PNL P-5	E-2, PNL P-5 is located within room 519.	Isolate E-2, PNL P-5 circuit breaker.	Circuit breaker lockout.

Lockout Removal Process
1. Ensure all tools and items have been removed. 2. Confirm that all employees are safely located. 3. Verify that controls are in neutral. 4. Remove lockout devices and reenergize machine. 5. Notify affected employees that servicing is completed.