

ENVIRONMENTAL HEALTH & SAFETY

UNIVERSITY *of* WASHINGTON

# UW HAZARDOUS ENERGY CONTROL LOTO PROGRAM MANUAL

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JUNE 2022



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## PURPOSE

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This document represents the University of Washington (UW) Hazardous Energy Control Lockout/Tagout (LOTO) Program. The purpose of this program manual is to establish requirements to ensure employee safety and prevent personal injury or illness that could result during the servicing and maintenance of machines and equipment. This document is in accordance with the requirements of [UW Administrative Policy Statement \(APS\) 12.6](#) and the [Washington Administrative Code \(WAC\) 296-803](#).

The intent of this document is to fulfill the following requirements:

- Establish a written energy control program to protect UW employees who service or maintain machinery or equipment from injury caused by the unexpected energization or startup of the machine or equipment or release of stored or residual energy
- Outline requirements for the development and documentation of equipment-specific hazardous energy control lockout/tagout procedures including:
  - Scope, purpose, employee authorization, requirements, and procedures to control hazardous energy and how employees are to follow the procedures
  - Ensuring equipment-specific lockout/tagout procedures identify at least:
    - When the procedure must be used
    - Specific procedural steps like shutting down, isolating hazardous energy, securing the machine, placing, transferring, and removing of lockout and/or tagout devices and who is responsible for them
    - How to verify the effectiveness of energy isolation devices, lockout devices, tagout devices, and other energy control measures
- Identify training for [Authorized Persons](#) and [Affected Persons](#) (refer to [Appendix A](#) Definitions) involved with lockout/tagout work and their duties
- Provide guidance for managing contractors working with UW employees and/or UW machines and equipment on energy control and lockout/tagout procedures
- Conduct and document periodic reviews, at least annually, to ensure:
  - Employees know and can apply equipment-specific lockout/tagout procedures and correct any deficiencies identified
  - Lockout/tagout procedures for all machines and equipment are adequate and any deficiencies corrected

## SCOPE

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The UW Hazardous Energy Control LOTO Program applies to all University employees, researchers, students, vendors and contractors who may be required to service or maintain UW owned or leased machinery or equipment. This includes all locations that serve as assigned workplaces and educational settings for University faculty and staff, including the Seattle, Bothell and Tacoma campuses, the University of Washington Medical Center, Harborview Medical Center, as well as all other University owned properties, University leased spaces, temporary field locations, and research vessels owned or leased by the UW. This Program also applies to UW employees who may be required to service or maintain machinery or equipment owned and/or managed by another employer or organization.

### Notes:

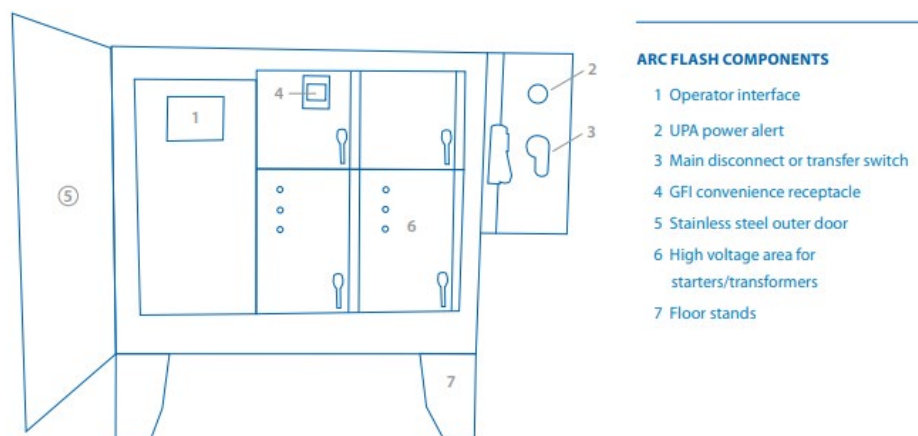
- *UW departments, units, and organizations can use the UW Hazardous Energy Control LOTO Program Manual to meet compliance requirements. Departments/units/organizations may develop and require specific procedures, equipment, and documentation for managing their own lockout/tagout program. This department/unit/organization-specific information with details may be added as an addendum to this program manual if the requirements are equal to or more stringent and do not conflict with the information provided in this document.*
- *For the purposes of this document, “employees” refers to University personnel (as defined in Administrative Policy Statement [40.1](#)), faculty, staff, paid student workers, contractors, and vendors.*

## EQUIPMENT DESIGN AND HAZARDOUS ENERGY CONTROL

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To avoid exposing employees and others to hazardous energy during equipment maintenance and servicing, machines and equipment should be initially designed and built to control hazardous energy. While it is acceptable to control and prevent access to any hazardous energy, the most effective approach is to eliminate or design out the hazard, if possible. This is especially important for researchers who may design and fabricate equipment in their work. Consider the following in the purchase and design of new equipment and machinery:

- Locate controls for the machinery or equipment outside of hazardous areas where a person could be exposed to hazardous energy. Ensure machinery and equipment have safeguards. An example of this would be to provide separate compartments in industrial control panels, one compartment for low voltage (less than 50 volts) used for control wiring, and a second compartment for higher voltage power sources.



Design of industrial control panels

[https://www.usemco.com/wp-content/uploads/ArcFlash\\_Final-Brochure.pdf](https://www.usemco.com/wp-content/uploads/ArcFlash_Final-Brochure.pdf)

- Design, build, purchase and install new machines or equipment with [energy-isolating devices \(see Appendix A Definitions\)](#). Allow for isolation, control or dissipation of any potential hazardous energy. Accessible energy-isolating devices are critical in lockout/tagout procedures. Do not locate energy-isolating devices where one cannot safely access (e.g., elevated surfaces, confined spaces, in the hazard zone, etc.) Label energy-isolating devices to indicate their function, energy type and magnitude.
- For machines and equipment that undergo major replacement, repair, renovation, or modification the unit responsible for the work or design must ensure that the energy-isolating devices accept a lockout device.



Exhaust fans and motors with accessible local disconnects



Sanitary clamp with LOTO feature (used in piping in food, beverage and pharmaceutical industries)

<https://ljar.com/product/safety-sanitary-clamp-series-lockout/>

## ROLES AND RESPONSIBILITIES

Role	Responsibilities
Departments/Units/ Organizations	<p>Departments/units/organizations that own machines and equipment that require service and maintenance and have the potential to release uncontrolled hazardous energy and injure employees and others</p> <ul style="list-style-type: none"> <li>• Provide necessary resources to implement, maintain, and document a department-specific <a href="#">Supplemental Hazardous Energy Control LOTO Program</a> (refer to template in <a href="#">Appendix E</a>).</li> <li>• Identify machines, equipment, and projects at UW owned and leased facilities where LOTO is necessary and develop, document and utilize equipment-specific LOTO procedures.</li> <li>• Appoint a Department LOTO Program Administrator, who is a <a href="#">Qualified Person</a> to oversee the application of the LOTO program, including maintaining a key management policy and use of equipment-specific LOTO procedures that are in accordance with the requirements in this program document.</li> <li>• Appoint <a href="#">Authorized Person(s)</a> to assess LOTO hazards, and develop, perform, and evaluate written equipment-specific LOTO procedures.</li> <li>• Determine <a href="#">Affected Persons</a> who may be affected by LOTO procedures in their work area.</li> <li>• Ensure employees are trained to identify and control hazardous energy on machines or equipment requiring LOTO.</li> <li>• Ensure purchased, acquired or built equipment is compliant with LOTO and the requirements in this document.</li> <li>• Complete periodic reviews of: <ul style="list-style-type: none"> <li>○ All equipment-specific LOTO procedures annually or before use, if used less frequently than once per year; and</li> <li>○ All Authorized Persons' LOTO procedure knowledge annually.</li> </ul> </li> <li>• Train Authorized Persons how to conduct periodic reviews.</li> <li>• Ensure contractors adhere to LOTO requirements.</li> <li>• Report incidents to EH&amp;S within 24 hours via the <a href="#">UW Online Accident Reporting System (OARS)</a>.</li> </ul>



Role	Responsibilities
Environmental Health & Safety (EH&S)	<ul style="list-style-type: none"> <li>• Develop, coordinate, and maintain the UW Hazardous Energy Control LOTO Program in accordance with WAC-296-803 regulations.</li> <li>• Assign a UW Hazardous Energy Control LOTO Program Administrator to maintain the overall program.</li> <li>• Provide consultation and assistance to departments to comply with the requirements of this program.</li> <li>• Provide or coordinate LOTO training to Authorized and Affected Person(s).</li> <li>• Perform an annual review of the LOTO program for accuracy and ensuring compliance with regulatory requirements and current industry best practices.</li> <li>• Audit a representative sample of department/unit/organization procedures to ensure completion and accuracy.</li> </ul>
Project Managers (hiring managers)	<ul style="list-style-type: none"> <li>• Project Managers (hiring managers) must coordinate with the contractor when employees and employers from different companies are working on or near UW machines or equipment under LOTO.</li> <li>• Ensure the following communications occur: <ul style="list-style-type: none"> <li>○ Inform the contractor of UW equipment-specific lockout/tagout procedures.</li> <li>○ Have the contractor inform you of their lockout/tagout procedures.</li> <li>○ Ensure all UW employees involved understand any requirements of the contractor's hazardous energy control program.</li> </ul> </li> <li>• Ensure that contractors performing lockout/tagout: <ul style="list-style-type: none"> <li>○ Adhere to all applicable regulations regarding hazardous energy control; inform their sub-contractors or other entities of machines or equipment requiring lockout/tagout and ensure they are trained on lockout/tagout.</li> <li>○ Provide the Project Manager with the company's hazardous energy control program for review.</li> <li>○ Provide energy control lockout devices, such as locks, tags, lockboxes and hasps.</li> </ul> </li> <li>• Discuss with contractors, after the lockout/tagout is completed, any issues or problems with the equipment-specific energy control procedures during the LOTO.</li> <li>• Ensure any accidents or incidents related to LOTO are reported to the <a href="#">UW Online Accident Reporting System (OARS)</a>.</li> </ul>

Role	Responsibilities
Authorized Person(s)	<p data-bbox="548 331 1414 447">Qualified by proper training and given the authority and responsibility to perform specific lockout/tagout-related tasks by their supervisor</p> <ul data-bbox="548 447 1414 1117" style="list-style-type: none"> <li>• Perform lockout and/or tagout on machines or equipment to service or maintain the machine or equipment</li> <li>• Recognize hazardous energy sources that require LOTO</li> <li>• Communicate and coordinate with Affected Person(s) before LOTO devices are applied</li> <li>• Understand methods and means to isolate and control energy</li> <li>• Be aware of the type and magnitude of energy present in the workplace</li> <li>• Verify the machine or equipment locked out is safe before starting any service or maintenance work</li> <li>• Create and follow equipment-specific LOTO procedures in their entirety</li> <li>• If trained, conduct and document periodic reviews of: <ul data-bbox="646 1003 1414 1117" style="list-style-type: none"> <li>○ Other Authorized Person's knowledge of LOTO procedures</li> <li>○ Adequacy of equipment-specific LOTO procedures</li> </ul> </li> </ul>
<a href="#">Primary Authorized Person</a>	<p data-bbox="548 1125 1414 1241">An Authorized Person who has overall responsibility for meeting the requirements of the equipment-specific LOTO procedures during <a href="#">Group LOTO</a></p> <ul data-bbox="548 1241 1414 1398" style="list-style-type: none"> <li>• Complete information required on equipment-specific LOTO procedures during Group LOTO</li> <li>• Sign equipment-specific procedure before work confirming zero energy state of Group LOTO</li> </ul>
Affected Person(s)	<p data-bbox="548 1407 1414 1522">Person(s) who uses a machine or equipment under service or maintenance or is in the area where service and maintenance is being performed using LOTO procedures</p> <ul data-bbox="548 1522 1414 1715" style="list-style-type: none"> <li>• Be aware of the energy sources, machines, and equipment under lockout/tagout and service and maintenance</li> <li>• Understand and follow instructions from Authorized Person(s)</li> <li>• Receive training as required</li> </ul>

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# HAZARDOUS ENERGY CONTROL REQUIREMENTS

## HAZARDOUS ENERGY SOURCES

Hazardous energy sources that must be controlled with lockout/tagout procedures include the following types of energy with some examples:

- **Electrical** – Alternating (AC) and direct (DC) currents; includes equipment and conductors at both household and industrial voltages, photovoltaic systems, circuit breakers, transformers, capacitors, inverters, motors, and electric/hybrid vehicles.



Electrical switch gear room



Battery rack

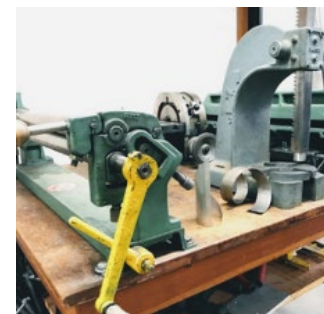
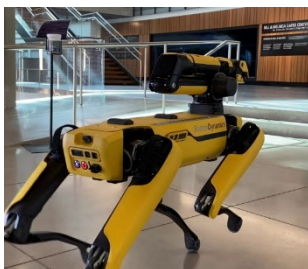
- **Mechanical** – Refrigeration and HVAC equipment, robotic systems, rotating wind turbine, moving paddle wheel, belts, pistons, vehicle/mobile equipment movement, compressed springs, counterbalances; extreme sound is also hazardous mechanical energy.



UW Robotic Learning Lab



UW Machine shops



- **Hydraulic** – Pressurized hydraulic systems, including hoses, pumps, valves, actuators, and reservoirs such as those on a forklift, in an automotive vehicle hoist, power press equipment, or injection molding machine
- **Pneumatic** – Pressurized air or gas systems, including pipes, pumps, valves, actuators, and pressure vessels such as those found in coating or pesticide sprayers, air compressors, and tank and pipe purging systems
- **Chemical** – Liquids, such as gasoline, diesel, benzene, acids, and caustics; gases, such as propane, natural gas, and methane; solids, such as fertilizer, wet and dry cell batteries, and combustible dust



Chemical – flammable solvent dispensing system



Pneumatic – compressed air with filter



Pneumatic – compressed air tanks



Thermal - Boiler

- **Thermal** – Boilers, hot water, heated oil, steam, and equipment need time to cool, while liquefied gases, such as nitrogen, need time to warm to safe thermal levels.
- **Radiation** – Lasers, radio frequency, infrared, microwave, ultraviolet, and X-rays
- **Gravitational** – Elevators, hoists, objects such as a hoisted vehicle, raised dumpster lid, objects supported by a crane, and elevated dump truck beds



Equipment can have more than one type of hazardous energy associated with it. For example, it may have an electric motor (electrical), pressurized steam lines (pneumatic and thermal), and pistons (mechanical). All types of hazardous energy must be controlled.



Clay mixer (moving parts and electrical)



Sump pumps (electrical and hydraulic)

## Residual or stored energy

Residual or stored energy must also be considered. Equipment can store energy even after the power source is isolated (turned off with a circuit breaker, switch, valve, flange, or other energy-isolating device). Some examples include:

- Electrical equipment can store energy in capacitors.
- Machines running on hydraulic or pneumatic energy can keep pressure in areas between the energy-isolating device and the moving parts.
- Equipment running on chemical energy can have fuel in the lines.
- Springs and tension belts can contain stored mechanical energy.
- Pistons suspended in mid-motion can store energy from gravity.

All stored energy in machinery must be controlled by de-energizing, locking, or blocking moving parts to prevent movement during any service or maintenance work.

## CONSEQUENCES OF NOT CONTROLLING HAZARDOUS ENERGY

Not controlling hazardous energy can cause serious and sometimes fatal consequences for workers who are working on equipment and machines and those in the area where work is being done. Some examples are given in the table below for the different types of hazardous energy and the potential injuries and types of exposures if hazardous energy is not controlled.

## Potential consequences:

### From failure to control energy sources with LOTO procedures

Energy Type	Possible Energy Source	Potential Consequences
<b>Electrical</b>	Electrical work	Burns, shock, electrocution
<b>Mechanical</b>	Rotating machinery	Bone fractures, cuts, amputations, injuries from moving parts
<b>Hydraulic</b>	Lines, pumps, cylinders	Bone fractures, cuts, concussions, exposure to released fluids
<b>Pneumatic</b>	Compressed air system	Bone fractures, cuts, concussions, exposure to steam/gases/fluids under pressure
<b>Chemical</b>	Chemical dispensing	Toxic chemical exposure, fire/explosion
<b>Thermal</b>	Refrigeration unit/heating unit	Heat or cold burns, fire
<b>Gravity</b>	Elevators, hoists, shifting or falling objects	Bone fractures, cuts, amputations
<b>Radiation</b>	Lasers, X-rays, UV, infrared, microwave	Burns, hazardous acute/chronic health effects

## SERVICING AND MAINTENANCE ACTIVITIES

Hazardous energy sources must be controlled during servicing and maintenance activities. Examples of servicing and maintenance work are constructing, installing, setting up, adjusting, inspecting, modifying, lubricating, cleaning or unjamming machines or equipment, and making tool changes.

Employees or contractors who perform servicing and maintenance work activities on machinery or equipment must use energy isolation and lockout/tagout procedures and devices when the following situations exist:

- When the machine or equipment has the potential for unexpected energization or start-up and/or when the release of stored or residual energy could cause injury
- When employees are required to remove or bypass a guard or other safety device
- When employees are required to place any part of the body into an area of a machine or equipment where a danger zone exists during a machine operating cycle
- When renovation work requires connection to existing energized equipment or utilities
- Functional testing and commissioning of utility systems and equipment when new construction is connected to utility systems, such as water, gas, steam, or electrical systems, and capable of containing hazardous energy

## CONTROLLING HAZARDOUS ENERGY

The basic steps in the process to prepare equipment for safe servicing and maintenance work are given below. Detailed procedures that must be followed are given in the section [Hazardous Energy Control Procedures](#).

1. **Prepare:** Identify energy sources and energy-isolating devices.
2. **Shut down:** De-energize equipment.
3. **Isolate:** Secure energy-isolating devices on the equipment in a safe position. Dissipate or restrain potential energy that can't be isolated.
4. **Lock and tag:** Use lockout devices, locks, and tags to secure and identify energy-isolating devices on energy sources.
5. **Check for stored energy:** Check electrical grounding, repositioning, bleeding, venting, blocking, or depressurizing lines.
6. **Verify isolation:** Test or confirm equipment is not connected to energy source.

## LOCKOUT/TAGOUT FOR HAZARDOUS ENERGY CONTROL

### Lockout versus tagout

Lockout is always the preferred, more protective means of ensuring de-energization of machinery or equipment. If lockout is not an option, use tagout to protect employees. Tagout must be used and applied to an energy-isolating device (EID) if it cannot be locked out. The [Hazardous Energy Control Devices](#) section contains specific requirements for using both lockout and tagout devices on machine and equipment EIDs.

A tagout system can be used alone (instead of a lockout system) *if all the following requirements must be met:*

1. The tagout device is attached where you would have put the lockout device; and
2. The tagout system provides the same level of employee protection as a lockout system; and
3. The tagout system meets all tagout hazardous energy control requirements.

To meet requirement number two above, *at least one additional safe practice must be used.*

Examples of an additional tagout safe practice that would provide equal protection include:

- Closure of a second in-line valve
- Removal of a valve handle
- Removal of an additional isolating circuit element
- Opening of an extra disconnecting device
- Opening and then racking out a circuit breaker
- Locking, blocking, or barricading a controlling switch



Circuit breaker lockout device locked and tagged out [Brady.com](https://www.brady.com)



Forklift tagged out for service

### Written equipment-specific hazard energy control (lockout/tagout) procedures

Departments must identify all energy sources requiring energy isolation. Authorized Persons must develop, document, and utilize written equipment-specific lockout/tagout procedures for the control of hazardous energy during repair, servicing, and maintenance of equipment. Refer to the [Hazardous Energy Control Procedures](#) section for detailed information to include in an equipment-specific lockout/tagout procedure.



## LOCKOUT/TAGOUT PROGRAM EXEMPTIONS

### Exempt operations and equipment

#### Cord and plug equipment

Lockout/tagout is not required for service and maintenance of electrical equipment receiving power only through a cord and plug *if **all** the following apply*:

- Unplugging the equipment eliminates the possibility of unexpected energization, unexpected start up, or the release of stored energy; and
- The plug is kept under the exclusive control of the Authorized Person servicing or maintaining the equipment.

#### Hot tap

A hot tap operation includes welding on pressurized pipelines without shutting down the system. Lockout/tagout does not apply to hot tap operations under certain conditions. Service or maintenance on pressurized pipelines used to transmit and distribute substances such as gas, steam, water, or petroleum products is only permitted *if **all** the following apply*:

- Continuity of service is essential; and
- Shutdown of the system is impractical; and
- Proven effective employee protection is provided by following documented procedures and using special equipment.

#### Energized electrical

Exempt energized electrical operations may include electrical work on, near, or with conductors or equipment that is covered by [Chapter 296-24 WAC, General Safety and Health Standards, Part L, Electrical](#). Examples include measuring voltage and amperage, troubleshooting, under certain conditions.

#### Fire/life safety systems

Service and maintenance of fire alarm and extinguishing systems and their components are exempt from lockout/tagout requirements if:

- Other employees depend on these systems for fire safety; and
- Employees working on fire extinguishing systems are protected from the unexpected release of hazardous energy by appropriate alternative measures.

#### Normal production operations

Minor tool changes, adjustments, and other minor service during normal production are exempt from lockout/tagout requirements if:

- They are routine, repetitive, and integral to the use of the equipment for production; and

- The work is done using measures which provide effective protection from hazards.

### Out of service

Do not use lockout/tagout devices, locks or tags for taking equipment or systems out of service. Departments/units must develop an out of service procedure and utilize a different system to identify and manage equipment and/or systems that are out of service. The signage below shows a proper notice for equipment out of service.



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## HAZARDOUS ENERGY CONTROL DEVICES

### ENERGY-ISOLATING DEVICES

#### **What is an energy-isolating device (EID)?**

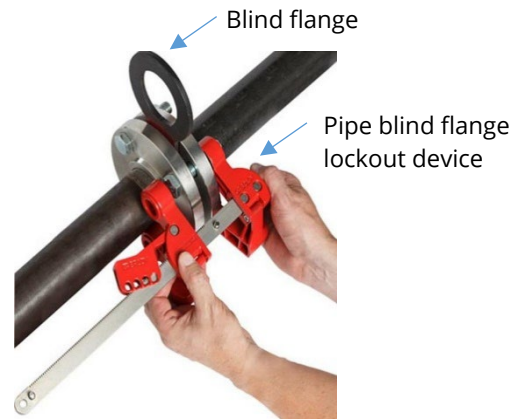
An EID is a mechanical device that physically prevents the transmission or release of hazardous energy.

Energy control depends on the ability to disable and isolate machines or equipment from hazardous energy. The primary tool that protects employees during lockout/tagout is an energy-isolating device or EID.

When machines and equipment can be locked out with an energy-isolating device, lockout devices are used to hold the energy-isolating device in a safe position.

Examples of energy-isolating devices include:

- Manually operated electrical circuit breakers and fuses
- Disconnect switches
- 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
- Bolted blank and blind flanges
- Slide gates
- Bolted slip blinds
- Pipeline gate and ball valves
- Safety blocks or pins
- Similar devices used to block or isolate energy
- Equipment EIDs designed with a hasp or other part to which a lock can be attached
- A locking mechanism built into the machine or equipment to isolate energy



Pipe blind flange EID and lockout device [Brady.com](https://www.brady.com)

**Note that the following devices are *not* energy-isolating devices:** Push-buttons, e-stops, selector switches\*, light switches\*, safety interlocks, control-circuit-type devices, and programmable logic controllers (PLCs). They cannot be used to isolate hazardous energy.

\*Locked out power switches may only be acceptable as an EID if it physically prevents the transmission of electrical energy (per [OSHA 2003 letter of interpretation](https://www.osha-slc.gov/2003-letter-of-interpretation)). Additionally, the mechanical isolating device must also simultaneously open all ungrounded conductors of the supply circuit and no pole can be operated independently.

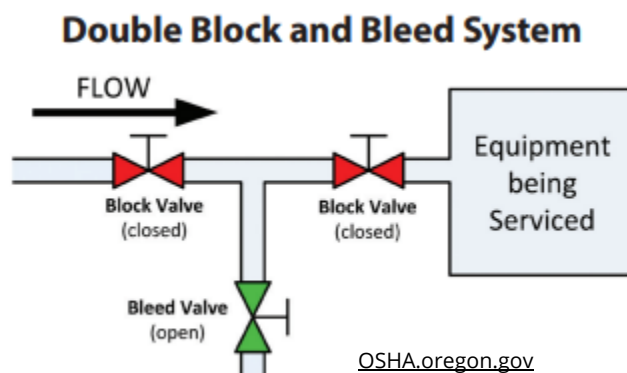
If equipment or machinery does not have an energy-isolating device capable of being locked out, tagout only or other hazardous energy control procedures must be used.

### **Dissipate or restrain potential energy that cannot be locked out**

Dissipate or restrain potential energy that cannot be isolated. Stored energy must be released or restrained after equipment has been de-energized. Capacitors, coiled springs, elevated machine parts, rotating flywheels, and air, gas, steam, chemical, and hydraulic systems are sources of stored energy. If the energy could return to a hazardous level, make sure that it remains isolated from the equipment until all service work is finished.

Safe practices for dissipating potential energy include:

- Drain pressurized fluids or gases until internal pressure levels reach atmospheric levels.
- Discharge electrical capacitors.
- Use double block and bleed process piping. (Refer to the [Confined space hazardous energy control](#) section for a description).
- Release or block tensioned springs.
- Ensure that all moving parts, such as flywheels and saw blades, have come to a complete stop.
- Allow equipment components to cool (or warm) to safe thermal levels.

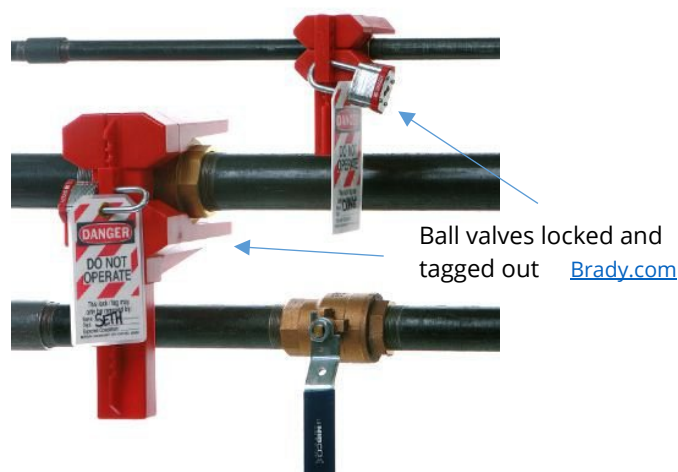


Just shutting off the air supply to an automatically operated air valve or turning off a hydraulic power unit without bleeding off the pressure does *not* constitute energy isolation. Energy isolation is achieved when there is no energy left or it cannot reaccumulate to a hazardous level.

## LOCKOUT/TAGOUT DEVICES

Departments/units must provide energy control devices including lockout devices, tagout devices, and any other equipment necessary for complying with the UW LOTO Program. All devices used in LOTO must meet the stated device requirements. Departments must identify, define, and train Authorized Persons on devices used in a department-specific program. Refer to [Appendix B](#) for examples and images of lockout/tagout devices. Examples of common lockout/tagout devices include:

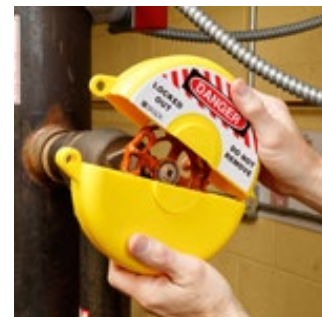
- Locks (key and combination types)
- Tags
- Chains
- Wedges
- Key blocks
- Adapter pins
- Self-locking fasteners
- Blank flanges
- Blocking or cribbing
- Wall switch lockout



- Electrical plug lockout
- Lockout box
- Adjustable cable
- Gate, ball, push, and butterfly valve lockout
- Pipe flange lockout
- Clamp-on breaker lockout



Electrical plug lockout device [Brady.com](https://www.brady.com)



Gate valve lockout device [Brady.com](https://www.brady.com)

## Lockout/tagout device requirements

Lockout/tagout devices may only be used by Authorized Persons and only for hazardous energy control lockout/tagout during service, repair, or maintenance.

All lockout and tagout devices must meet the following requirements:

### 1. Durability

- All lockout/tagout devices must be capable of withstanding the environment for the expected duration of the LOTO procedure and must not create additional hazards to employees.
- Locks must be strong enough to only be removed by excessive force or unusual techniques such as metal cutting tools.
- Tags must be constructed and printed so that exposure to weather conditions or wet and damp locations will not cause the tag to deteriorate or the message on the tag to become illegible.
- Tags must not deteriorate when used in corrosive environments.
- Tags, including their means of attachment, must be substantial enough to prevent inadvertent or accidental removal.
- Tag attachments must 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.



### 2. Standardized

- All locks and tags must have a distinctive design or appearance.

- Locks and tags must be standardized within a facility in at least one of the following criteria: color, shape, or size.
- Tags must use the same print and format within a facility.

### 3. Identifiable

- Tags must indicate the identity of the Authorized Person applying the lockout/tagout device(s), date(s) of proposed LOTO work, and when expected to be done.
- Tags must warn against the specific hazards if the machine or equipment is energized and shall include a hazard statement such as the following:



### Types of locks

Some of the various types of locks used in LOTO procedures are described below. Details of their use are described in the section Hazardous Energy Control Procedures and in [Appendix B](#)-Examples of Lockout/Tagout Devices and [Appendix G](#)-Examples of Group Lockout/Tagout Methods.

Departments/units need to determine how they manage and identify their locks and keys.

*Continued on next page.*



## Types of locks used in LOTO procedures

LOCK TYPE	DEFINITION/DESCRIPTION
Personal locks and tags	<b>Locks and tags that belong exclusively to an Authorized Person</b>
	<ul style="list-style-type: none"> <li>Are uniquely identified and keyed</li> <li>Multiple locks assigned to an Authorized Person may use a single, common key</li> </ul>
Transfer lock	<b>A lock temporarily placed on an equipment EID to ensure continuous LOTO protection for employee changes of Authorized Persons or changes between outgoing and incoming shifts</b>
	<ul style="list-style-type: none"> <li>Does not replace a personal lock</li> <li>Lock can only be used during LOTO shift and employee changes when there cannot be an in-person transfer of the Primary Authorized Person's personal lock.</li> <li>Can be used to maintain continuous LOTO protection between employees and contractors</li> <li>Is uniquely identified and the key(s) are held by management; there is a key management policy developed to ensure continuous protection.</li> <li>Verification of zero energy is required upon placement of a personal lock and removal of a transfer lock.</li> </ul>
Equipment lock	<b>Lock solely used to secure equipment EIDs during a Group LOTO using a lockbox</b>
	<ul style="list-style-type: none"> <li>Does not replace a personal lock</li> <li>Are uniquely identified</li> <li>Multiple locks may use a single, common key</li> <li>Secure equipment; lock keys in lockbox during Group LOTO.</li> </ul>
Job lock	<b>A lock used to ensure continuous energy isolation during a multi-shift operation for large Group LOTO procedures or multiple groups and multiple EIDs</b>
	<ul style="list-style-type: none"> <li>Does not replace a personal lock</li> <li>Placed on a lockbox for the duration of a job</li> <li>Keys are controlled by each assigned Primary Authorized Person from each shift.</li> <li>May have multiple keys if they are in the sole possession of the various Primary Authorized Persons (one on each shift)</li> </ul>
Lockbox	<b>Box that contains Equipment lock keys from the LOTO devices securing EIDs on machines or equipment</b>
	<ul style="list-style-type: none"> <li>Authorized Persons place their personal locks with tags on the lockbox, securing the Equipment lock keys inside.</li> </ul>
Lockout hasp	Multiple locks can be applied to lockout hasp, allowing EID to be locked out by more than one Authorized Person. The energy source is completely locked out and cannot be operated until each worker unlocks their lock from the hasp.

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# HAZARDOUS ENERGY CONTROL PROCEDURES

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Specific written energy control procedures must be created to protect employees servicing or maintaining machines and equipment from potentially hazardous energy. Energy control procedures include written equipment-specific lockout/tagout procedures and other necessary safe work practices departments establish within their organization specific to lockout/tagout.

## **Similar machines and equipment-specific lockout/tagout procedures**

Similar machines and equipment may be covered by a single written procedure *if **all** the following apply:*

- Equipment/machines use the same type and magnitude of energy; and
- Equipment/machines have the same or similar types of energy-isolating devices and controls; and
- Specific equipment/machines are identified in the procedure by the type, ID, and location.

## **Exemptions to written equipment-specific lockout/tagout procedures**

Written equipment-specific lockout/tagout procedures are *not* required *if **all** the following apply:*

- The machine or equipment has a single, easily identifiable energy source that can be isolated; and
- Isolating and locking out the energy source completely de-energizes and deactivates the machine or equipment; and
- The machine or equipment does not have stored or residual energy nor will the energy re-accumulate during service or maintenance; and
- A single lockout device applied to the energy source maintains hazardous energy control; and
- The machine or equipment is isolated from the energy source and locked out during service or maintenance; and
- The Authorized Person(s) completing the service or maintenance have exclusive control of the lockout device; and
- The service or maintenance does not create a hazard for other employees; and
- The machine or equipment has never been unexpectedly energized or activated during service or maintenance.



## WRITTEN EQUIPMENT-SPECIFIC LOCKOUT/TAGOUT PROCEDURES

Written equipment-specific LOTO procedures that are required can be documented using one of the two UW template forms, the UW LOTO Procedure form, or the UW LOTO Field Procedure form.

**LOTO Procedure:** Use this form for equipment that is routinely maintained and serviced, requires a full shutdown for servicing, and has good change management practices in place.

**LOTO Field Procedure:** Use this form for equipment and systems that are not routinely repaired or serviced, or require partial shutdowns, and where change management practices are not robust.

The following numbered requirements listed and described below must be included on both equipment-specific lockout/tagout procedures. The full UW LOTO Procedure form is shown below with instructions and an example completed form is given in [Appendix D](#).

For shift changes and Group LOTO using the full UW LOTO Procedure, an additional log recording all Primary Authorized Persons and Authorized Persons will need to be documented.

Note that each template allows for multiple entries of energy sources, EIDs, and their lockout procedures.

Best practice is to laminate the completed written procedure and attach it to the equipment or location. Also, consider maintaining electronic copies of procedures to use on a tablet in the field.

The shorter UW LOTO Field Procedure template version is also shown below with instructions and given in [Appendix D](#).

## UW LOTO procedure

### 1. Scope

Describe the equipment ID, location and equipment system on the equipment-specific LOTO Procedure form. Include a description of the scope of work and the work order. During work, a scope change could result in a change to the energy isolation boundary and require additional lockout devices and verification of lockout/tagout. If there is a scope change, a new procedure must be developed.

### 2. Notification of Affected Persons

Notify all Affected Persons before equipment shut down. Affected Persons may include the equipment operator, project supervisor, or building coordinator. Ensure Affected Persons are not operating the machine during shutdown.

### 3. Equipment shut down

Identify the specific procedural steps for safely shutting down the machine or equipment. Use normal, orderly stopping procedures to shut down the equipment. Machine operators or Affected Persons may assist, if needed. Record the steps sequentially if important to the shutdown operation, for energy-isolating device, shutdown action, and location.

<b>W ENVIRONMENTAL HEALTH &amp; SAFETY</b> UNIVERSITY of WASHINGTON	
<b>UNIVERSITY OF WASHINGTON LOCKOUT TAGOUT (LOTO) PROCEDURE</b> (WAC 296-803)	
<b>DESCRIPTION:</b>	
University of Washington Department/Division: <i>Department completing the LOTO procedure.</i>	Building/Address: <i>Identify the building name or address.</i>
Equipment ID: <i>Equipment assigned identification number.</i>	Equipment/System Description: <i>Type of Equipment.</i>
Location: <i>Location in building.</i>	Procedure last updated: <i>Enter a Date.</i>
<b>PURPOSE:</b> (WAC 296-803-20005) This procedure establishes the minimum requirements necessary to protect employees from injury caused by the unexpected energization, start up, or release of stored energy during service or maintenance. Use this procedure to make sure the machine or equipment is stopped, isolated from all potentially hazardous energy sources, and locked out before any employee begins work	
<b>AUTHORIZATION:</b> (WAC 296-803-20005) List any authorized persons authorized to lock and tag out the machine or equipment using this procedure:	
<b>SCOPE:</b> (WAC 296-803-20005) Provide a description of the scope of work for this service or maintenance work (include the work order #): <span style="float: right;">Work order #: <span style="border: 1px solid black; padding: 2px 10px;"></span></span>	
<b>NOTIFY:</b> (WAC 296-803-20010) Notify all affected employees that the machine or equipment is to be shut down and locked out for service or maintenance:	
Name/Job Title:	Notification Method:
<i>List the names or job titles of those being impacted.</i>	<i>(i.e. phone, email, meeting, etc.)</i>
<b>NORMAL SHUTDOWN:</b> (WAC 296-803-20010) Shut down the machine or equipment by normal stopping procedures (such as depressing a stop button, opening switches, or closing valves). List the types and locations of machine or equipment operating controls:	
Shutdown Method:	Location:

#### 4. Identify the type and magnitude of energy.

Understand the type of energy and the magnitude of energy controlled. Record all hazardous energy types including electrical, mechanical, hydraulic, thermal, pneumatic, etc. Record the magnitude of each energy type in volts, temperature, pounds per square inch, etc.

#### 5. Locate energy-isolating devices.

Describe the method to control the energy by identifying the energy-isolating devices (EIDs). Provide the equipment tag number and/or describe the location of EIDs on equipment-specific lockout/tagout procedure. Record the "safe" or "off" position needed for energy control. Isolate and/or block all sources of hazardous energy. Insert photos of EIDs into the procedure.

#### 6. Release stored or residual energy.

Describe the equipment tag number and/or location of the stored energy and method of release such as:

- Steam, air, and hydraulic piping or tanks that must be bled, drained and brought to atmospheric pressure and valves left "open" to ensure no pressure or vacuum exists in piping or reservoir tanks

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**ISOLATE AND LOCKOUT: (WAC 296-803-20001)**  
Isolate energy sources using appropriate isolating devices. Lock and tag out the energy isolating devices with assigned individual locks and tags:

**WARNING: The following are the known lockout steps. If additional steps are discovered, inform your supervisor, lock them out, and modify this procedure accordingly.**

1	<p>Click to insert picture (portrait photo only)</p>	<p>Energy source and magnitude:</p> <p>Type of energy source: <input type="text"/></p> <p>Magnitude: <input type="text"/> volts, amps, psi, temp, lbs., etc.</p> <p>Energy Isolating Device Location:</p> <p>EID location (building/room), EID identification #.</p> <p>Isolation device/procedure:</p> <p>Describe the device the lock/tag is applied to (e.g. circuit breaker, line valve, block, etc.) and the method of the de-energization of equipment.</p> <p>Control Method: Lock/Tag Info (Initial and Date)</p> <p>Provide lock description or specific lock #, if applicable, if tagout only provide description of additional safeguard. Initial/Date of person applying lock/tag.</p> <p>Method to relieve residual/stored energy:</p> <p>If applicable, describe the process for relieving any additional energy sources (i.e. bleeding a valve).</p> <p>Verification Method:</p> <p>Explain how zero energy is confirmed</p> <p>Restored by: (Initial and Date): <input type="text"/> Person removing lock</p>
2	<p>Click to insert picture (portrait photo only)</p>	<p>Energy source and magnitude:</p> <p>Type of energy source: <input type="text"/></p> <p>Magnitude: <input type="text"/> volts, amps, psi, temp, lbs., etc.</p> <p>Energy Isolating Device Location:</p> <p>EID location (building/room), EID identification #.</p> <p>Isolation procedure:</p> <p>Describe the device the lock/tag is applied to (e.g. circuit breaker, line valve, block, etc.) and the method of the de-energization of equipment.</p> <p>Control Method: Lock/Tag Info (Initial and Date)</p> <p>Provide lock description or specific lock # if applicable, if tagout only provide description of additional safeguard. Initial/Date of person applying lock/tag.</p> <p>Method to relieve residual/stored energy:</p> <p>If applicable, describe the process for relieving any additional energy sources (i.e. bleeding a valve).</p>

- Ensure fan blades completely stop rotating before applying a block.
- Gas cylinders valves must be locked “closed” and disconnected from distribution piping, if possible.
- Releasing pressurized steam or water lines by opening the proper relief valves; if re-accumulation of stored energy is possible, continue to verify the isolation of energy in machines or equipment until service or maintenance is complete.

7. Apply lockout and/or tagout devices to all energy sources.

Lockout devices are required if an energy-isolating device can be locked out. Ensure the lockout devices hold the EID in a safe or off position.

Apply tag-only methods *only if an energy-isolating device does not accept locks*. Requirements for tag-only methods include:

- Tagout device attached in place of lock as close as safely possible to EID and immediately obvious to anyone attempting to operate the EID
- Tagout system provides the same level of employee protection (i.e., removal of isolation circuit, block control switch, open an extra disconnect, or removal of a valve handle)
- Tagout system meets all safety measures to provide the same level of safety as locks

8. Verify zero energy state.

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<div>Click to insert picture (portrait photo only)</div>	<b>Verification Method:</b> <input type="text" value="Explain how zero energy is confirmed"/>
	<b>Restored by: (Initial and Date):</b> <input type="text" value="Person removing lock"/>
	<b>Energy source and magnitude:</b> <b>Type of energy source:</b> <input type="text"/>
	<b>Magnitude:</b> <input type="text" value="volts, amps, psi, temp, lbs., etc."/>
	<b>Energy Isolating Device Location:</b> <input type="text" value="EID location (building/room), EID identification #."/>
	<b>Isolation device/procedure:</b> <input type="text" value="Describe the device the lock/tag is applied to (e.g. circuit breaker, line valve, block, etc.) and the method of the de-energization of equipment."/>
	<b>Control Method: Lock/Tag Info (Initial and Date)</b> <input type="text" value="Provide lock description or specific lock # if applicable, if tagout only provide description of additional safeguard. Initial/Date of person applying lock/tag."/>
	<b>Method to relieve residual/stored energy:</b> <input type="text" value="If applicable, describe the process for relieving any additional energy sources (i.e. bleeding a valve)."/>
	<b>Verification Method:</b> <input type="text" value="Explain how zero energy is confirmed"/>
	<b>Restored by: (Initial and Date):</b> <input type="text" value="Person removing lock"/>
<b>GROUP LOTO: (WAC 296-803-50050)</b> Determine which procedures to use if more than one person will be involved in the LOTO procedure:	
<b>Will more than one person will be involved in this procedure?</b> If you select NO, group LOTO <u>will not</u> be used, skip to next section If you select YES, a group LOTO <u>will</u> be used, and describe your group LOTO method below	
<input type="checkbox"/> YES <input type="checkbox"/> NO	
<b>Choose a group LOTO method:</b> <input type="checkbox"/> A hasp will be used for this procedure <input type="checkbox"/> A lock box will be used for this procedure Lock Box Identification #: <input type="text"/> <input type="checkbox"/> A Primary Authorized Person Name: <input type="text"/> Name: <input type="text"/>	
During shift or personnel changes, make sure there is continuous LOTO protection and record the new PAP and date each time there is a change.	
<b>THE MACHINE OR EQUIPMENT IS NOW LOCKED OUT AND SERVICE OR MAINTENANCE CAN BE DONE</b>	

Verify the equipment or system is isolated after application of LOTO devices and equipment is clear of employees. Attempt to start the machine by physical means (e.g. push button starts, open secondary valve and inspect gauges for zero energy), observe draining of stored energy, or check status with a voltmeter (if qualified). Do not attempt to start with a SCADA/PLC-type computer system, as they are not as reliable as a physical means. After the test start, return requirement to the “off” position. If the hazardous energy is not controlled, return to Step 6. [Release stored or residual energy](#) and repeat the previous steps.

Document the verification step for each hazardous energy source.

9. Proceed with equipment or machine service and maintenance.

Perform the task(s) in the zero-energy state. Follow normal safe work practices including using work planning documents and appropriate personal protective equipment for the job.

10. Remove lockout/tagout devices and re-energize machine or equipment.

Return machine or equipment under service or maintenance to working order. Authorized Persons should confirm at least the following:

- Inspect area to remove all tools and debris.
- Replace all guards.
- Ensure all employees are clear of the work area.
- Inform Affected Persons that the equipment will be returned to service.
- Verify machine or equipment power controls are in “off” or “neutral” position.
- Remove the lockout/tagout devices.
- Re-energize equipment with proper start up procedures.

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**RESTORE:** (WAC 296-803-50035)  
Restore the machine or equipment to service after the service or maintenance is completed.

**Step 1:** Check the machine or equipment and the immediate area around it to make sure all non essential items have been removed and that the machine or equipment is in operating condition and ready to energize.

**Step 2:** Make sure all employees are safely positioned for starting or energizing the machine or equipment.

**Step 3:** Verify that the controls are in neutral.

**Step 4:** Remove the lockout devices and reenergize the machine or equipment.

**Note:** Some forms of blocking may require re-energization of the machine before they can be safely removed.

**Step 5:** Notify affected employees that the servicing or maintenance is completed and the machine or equipment is ready to use.

Revised January 2018

Questions? Contact [ehsdept@uw.edu](mailto:ehsdept@uw.edu)





Identify Authorized Persons, Primary Authorized Person, date(s), time(s)

If applicable:

- Group LOTO
  - Check box

Record all Authorized Persons, date/time lock applied/removed

- Transfer of employee or shift change
  - Record all Primary Authorized Persons', date/time, initials
  - Verification check

Completion of LOTO procedure and signoff

- LOTO Reviewer signs after reviewing LOTO information.

<b>STEP 9: PRIMARY AUTHORIZED PERSON (WAC 296-803-50010):</b> The PAP assures the LOTO is effective in creating a zero-energy state, all Affected Persons are notified and this procedure is complete.									
PAP Signature						Date		Time	
<input type="checkbox"/> Check here if Group LOTO is not applicable to this LOTO and <b>skip STEP 10.</b>									
<b>STEP 10: GROUP LOTO-AUTHORIZED PERSON(S) (WAC 296-803-20050, 296-803-50055):</b> All authorized persons, including contractors, working on the de-energized equipment are required to apply personal locks and tag to the group LOTO.									
Authorized Person(s) Name	Dept/Shop	Lockbox #? Hasp?	Lock applied: Initials on	Lock applied: Date	Lock applied: Time	Lock removed: Initials	Lock removed: Date	Lock removed: Time	
<input type="checkbox"/> Check here if there is no change to Primary Authorized Person responsibility and <b>skip STEP 11.</b>									
<b>STEP 11: TRANSFER OF PAP AND LOTO RESPONSIBILITY (when applicable) (WAC 296-803-50045):</b> There must always be a PAP that maintains responsibility for the continuous LOTO protection. If shift or personnel changes occur, record the transfer information.									
New Primary Authorized Person Assuming Responsibility	Dept/Shop	Date	Time	Initials	Verification of LOTO?				
					<input type="checkbox"/> Yes <input type="checkbox"/> No				
					<input type="checkbox"/> Yes <input type="checkbox"/> No				
					<input type="checkbox"/> Yes <input type="checkbox"/> No				
					<input type="checkbox"/> Yes <input type="checkbox"/> No				
<b>STEP 12A: RELEASE FROM LOTO AND RETURN TO SERVICE (WAC 296-803-50035):</b> Remove LOTO devices and restore the machine or equipment to service after the service or maintenance is completed.									
<input type="checkbox"/> Work area, machine or equipment is clear of employees and tools have been removed. Complete Step 11A: Removal of LOTO by Step 8.									
<input type="checkbox"/> Machines are fully reassembled and guards and other safety devices have been reinstalled.									
<input type="checkbox"/> Verify that all controls are in their neutral or off position									
<input type="checkbox"/> Notify affected employees that the servicing or maintenance is complete and the machine is ready to use									
<b>STEP 12B: COMPLETION OF LOTO PROCEDURE (WAC 296-803-500035):</b> Primary Authorized Person confirms that the LOTO work has been completed, all the locks, tags and devices have been removed, EIDs are returned to pre-LOTO positions, all Affected Employees have been notified of the completion, and equipment is restored.									
Final PAP's name (printed):			Final PAP's Signature			Date:		Time:	
<b>STEP 13: LOTO REVIEWER (WAC 296-803-70005):</b> A periodic review must be performed at least annually to ensure employees know and can apply energy control procedures and correct any deviations or inadequacies identified. If this procedure is used less frequently than once a year, a reviewer is required.									
Reviewer name (printed):			Reviewer Signature			Date:		Time:	
<b>COMMENTS</b>									

Revised October 2018

Questions? Contact [ehsdept@uw.edu](mailto:ehsdept@uw.edu)

## HAZARDOUS ENERGY CONTROL PROCEDURES AND SAFE WORK PRACTICES

### When an Authorized Person cannot remove their lock and tag

If an Authorized Person, during a LOTO procedure, is not present or able to remove their lock and/or tag from an energy-isolating device or LOTO device, specific procedures must be followed for lock/tag removal.

Prior to lock and tag removal by master key, cutting, or any other method without the assigned lock's Authorized Person, the department must:

- Verify that the Authorized Person who originally applied the lock and tag is not at the facility.
- Make all reasonable efforts to contact and inform the Authorized Person that the lock and tag is going to be removed.
- Ensure that the Authorized Person is informed that their lock and tag has been removed before they return to work.
- Document the lock removal process.

A [Lock Removal Form](#) is provided in [Appendix F](#) and available for download from the EH&S website.

Authorized Persons must be trained about specific lock removal practices and scenarios that may occur to require lock removal. Authorized Persons can verify zero energy before service or maintenance at any time in the LOTO procedure, including after removal of a lock.

### Testing or positioning machines or equipment

Testing or positioning includes the temporary removal of lockout/tagout devices from the EIDs and temporarily energizing the machine or equipment for a test or position adjustment. Removal of lockout/tagout devices and the re-energization of equipment must only occur during the time necessary for the testing or positioning of the machine, equipment, or component, and only when re-energization is essential to accomplish the servicing task. An example of this might be testing the equipment to ensure a valve opens or closes correctly and this requires the equipment to be energized. Safeguards must be in place to protect the worker during the testing or positioning procedure.

Include testing or position adjustments of equipment or machines in the scope of the written equipment LOTO procedure. Include specific details for testing or positioning of machines or equipment by following steps in this order:

1. Remove persons, tools and materials from the machine or equipment area.
2. Remove the lockout/tagout devices.
3. Energize the machine, equipment, or component.



4. Proceed with testing or positioning.
5. Follow normal shut down procedures.
6. Reapply all lockout/tagout devices.
7. Verify zero energy state.

### **Shift or employee changes**

Continuous energy control is required if the service or maintenance work under LOTO procedures must continue between different shifts of Authorized Persons.

Departments/units must determine and document the procedures used for maintaining employee protection during a shift or employee change. Departments/units must also train all Primary Authorized Persons and Authorized Persons on the procedures. Procedures must include:

- Continuous LOTO protection during the shift or employee change
- A provision for the orderly transfer of LOTO device protection between employees
- Authorized Persons performing verification of effective de-energization and isolation of machinery or equipment when LOTO devices remain on EIDs from a previous shift

Departments must document potential shift and employee changes in the equipment-specific LOTO procedures.

The following methods described below are accepted practices for shift and employee changes:

#### Immediate hand-over of LOTO procedure in progress

1. Both Authorized Persons meet at a mutual time to remove and apply their personal LOTO locks and tags.
2. Authorized Person leaving the job removes their personal LOTO locks and tags from the equipment EIDs one at a time with the oncoming Authorized Person present.
3. Oncoming Authorized Person simultaneously applies and secures their LOTO locks and tags at the same equipment EIDs and verifies that a zero-energy state exists in the system.

#### Transfer lock method

1. Outgoing Authorized Person applies a Transfer lock to each equipment EID or the group LOTO device (hasp or lockbox).
2. Outgoing Authorized Person removes their personal lock and tag from each equipment EID or the group LOTO device before oncoming Authorized Person arrives.

3. The Transfer lock and tag remain in place until the next Authorized Person arrives to continue the work.
4. Keys to Transfer locks are controlled by department management and departments must determine how to facilitate safe removal of Transfer locks.
5. The oncoming Authorized Person attaches their personal lock and tag to each equipment EID or the group LOTO device.
6. Oncoming Authorized Person verifies zero-energy state in the system. If zero-energy state confirmed, the Authorized Person may proceed with work.
7. The Transfer lock is removed according to department procedures.

Note: Transfer locks and tags should look different from personal locks by color, notes on the tag, or other features.

Job lock method (for large Group LOTO, multiple crews/trades and shifts)

1. Equipment locks are used to lock out all EIDs on the machine or equipment; the keys for the Equipment locks are placed in a lockbox by the Primary Authorized Person.
2. Keys to Equipment locks are controlled by department management; departments must determine how to facilitate safe removal of Equipment locks.
3. The Primary Authorized Person places a Job lock on the lockbox. Each Primary Authorized Person from each shift controls the key to the Job lock.
4. As work is performed, each Primary Authorized Person places their personal lock and tag on the lockbox, while the Job lock remains in place, and verifies a zero-energy state in the system.
5. Each Authorized Person then places their personal lock and tag on the lockbox and has the opportunity to verify the zero-energy state before work begins.
6. Personal locks and tags are removed when leaving for the day or the work is completed.
7. Lastly, the Job lock and Equipment locks are removed according to department procedures.

## **Group lockout/tagout**

Servicing or maintenance work often involves a group or groups of employees. All Authorized Persons, including contractors, are required to follow equipment-specific lockout/tagout procedures when more than one person is involved in controlling hazardous energy. Any hazardous energy control method used for a group lockout/tagout must provide an equivalent level of protection as would be provided with the use of personal lockout/tagout devices. A Primary Authorized Person must always be responsible for the LOTO procedure.

A Primary Authorized Person provides oversight for any procedure involving more than one person. The Primary Authorized Person:

- Has overall responsibility for the servicing or maintenance
- Attaches their personal lockout and/or tagout device to the EID when the equipment is de-energized and before any work begins
- Is the last person to remove their personal LOTO device once the servicing or maintenance is complete

Each Authorized Person participating in the Group LOTO must:

- Place a personal lock and/or tag on the group lockout device or lockbox before beginning work
- Only remove the personal lock and/or tag device when they have completed work on the machine or equipment
- Have the opportunity to verify the equipment-specific LOTO procedure and application of LOTO devices, and verification of zero-energy conditions

Multi-Group LOTO occurs if more than one group works on a machine or equipment. A group coordinator may be assigned with overall responsibility to coordinate with the different work groups and maintain continuous lockout/tagout protection. Each group must have a Primary Authorized Person responsible for their Group LOTO.

A variety of methods may be used to ensure personal lockout/tagout protection for groups of Authorized Persons. The goal is to maintain continuous LOTO protection of all persons involved throughout the entire service or maintenance procedures. Examples are listed below, and more details and illustrations are given in [Appendix G - Examples of Group Lockout/Tagout Methods](#):



LOTO hasp for small groups

- Lockout/tagout hasp for small groups
- Lockbox for large groups
- Satellite lockbox for multiple groups



Blackmountainsand.com

Lockbox locked and tagged out with equipment keys inside

## **Coordination with contractors**

The outside contractor must follow their own Hazardous Energy Control program when working on UW machines or equipment. The contractor must provide their lockout/tagout program to the Project Manager (hiring manager). The contractor must provide their own energy control lockout devices, including locks, tags, and group lockout devices.

Departments/units/organizations must share previously developed written equipment-specific LOTO procedures with the contractor. Otherwise, departments/units/organizations must communicate the hazardous energy sources to the contractor and the contractor must develop lockout/tagout procedures according to their Hazardous Energy Control program. The department/unit/organization should obtain a copy of the equipment-specific LOTO procedure for their records.

For dual projects where contractors and University employees are working on the same equipment, machine, or system at the same time, the Project Manager must coordinate lockout/tagout with contractors. Ensure all Authorized Persons understand their role and each Authorized Person involved in the LOTO are trained on the written equipment-specific procedures in use. Ensure all Authorized Persons have effective communication procedures, lockout and tagout devices, and an opportunity to verify zero-energy conditions before starting work on equipment.

## **SPECIFIC ENERGY CONTROL OPERATIONS**

### **Confined space hazardous energy control**

Lockout/tagout procedures may be required to control potential hazardous energy sources in permit-required confined spaces. Equipment-specific LOTO procedures must isolate and eliminate hazards, including applicable stored energy. Tagout would not be an acceptable method of eliminating potential hazardous energy sources in a confined space.

Piping systems, commonly found in confined spaces, may contain liquid or gas under pressure. Examples of isolating these lines include:

- Blanking or blinding, which is the absolute closure of a pipe, line, or duct by fastening or inserting a solid plate that completely covers or closes off the opening. It must be capable of withstanding the maximum pressure of the pipe, line, or duct with no leakage beyond the plate.
- Double block and bleed, which is the closure of a line, duct, or pipe by closing and locking two in-line valves, and then by opening and locking a drain or vent valve in the line between the closed valves. (Refer to the double block and bleed system figure in the [Energy-Isolating Devices](#) section.)

Refer to the [UW Confined Space Entry Program Manual](#) and WAC 296-809 for additional Confined Space Entry requirements.

### **Vehicle service and maintenance**

Vehicles may contain various types of hazardous energy, ranging from examples already discussed in this program document or vehicle-specific ones, such as:

- Chemical energy due to contact with battery acid, coolant, lubrications, fuel
- Electric battery shock, arc, and burn hazards
- Air bag explosion
- Fire and explosion hazards associated with fuel and fluid systems
- Gravitational and mechanical hazards from elevated vehicles and lifts
- Hot or cryogenic fluid (e.g., liquid propane, LPG, fuel) and surface thermal hazards
- Hydraulic hazards associated with fluid pressure and fluid loss

General procedures listed below may be applicable for servicing forklift trucks or other vehicles. Additional procedures may be required depending on the type of vehicle:

- Park on a firm, level surface.
- Place controls in park or neutral position.
- If a wing or plow is attached, dead block, secure or place these on the ground so that a zero-energy state exists.
- Set the parking brake.
- Lower forks, buckets, booms, or other attachments to the ground.
- Shut off the engine.
- Allow hot parts to cool if work is near hot area.
- Cycle hydraulic controls to eliminate residual pressure.
- Lock the ignition and remove key.
- Lock all vehicle doors, place “Do Not Operate” LOTO tags on outside door handles if working under vehicle.
- Attach a “Do Not Operate” tag to the steering wheel or lever.
- Block the wheels.
- If working on air brakes or other pneumatic systems, bleed off residual air pressure if appropriate.
- Disconnect the battery (via switch or perform a physical disconnect of the terminals) if working on or around the electrical system.
- Install lift arm restraints or block the cylinders if work must be done with arms in raised position.



Wheel chock

All servicing and maintenance of vehicles must have adequate hazardous energy control procedures documented, including equipment-specific lockout/tagout procedures and other safe work practices.

## **Electrical power generation, transmission, and distribution**

The UW Hazardous Energy Control LOTO Program must meet the requirements of [WAC 296-45-175 Hazardous Energy Control Procedures](#) for the control of energy sources at UW installations for electric power generation, including related equipment for communication or metering. In addition, [WAC 296-45-335 Deenergizing Lines and Equipment for Employee Protection](#) must be followed when deenergizing these systems.

A Central System Operator, who is qualified and trained, must be appointed to ensure compliance with the hazardous energy control requirements of electrical power generation, transmission, and distribution.

If energy-isolating devices are installed in a central location under the exclusive control of a Central System Operator, the following requirements apply:

- A hazardous energy control procedure must provide employees an equivalent level of protection afforded by a personal lockout/tagout device.
- The Central System Operator must place and remove lockout/tagout devices in place of the Authorized Person.
- Hazardous energy control safe work practices must be documented and include:
  - Identification of the Primary Authorized Person (or equivalent) responsible for the lockout/tagout device
  - Transfer of lockout/tagout device responsibility to another Primary Authorized Person (or equivalent)
  - Requests for removal or transfer of responsibility of lockout/tagout devices can only be requested by the Primary Authorized Person (or equivalent).

## **INCIDENT REPORTING**

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Employees must report any work-related injury or illness to their supervisor as soon as possible. After reporting the incident to a supervisor, submit a report of the incident within 24 hours to EH&S via the [UW Online Accident Reporting System \(OARS\)](#).

Departments must hold employees accountable and ensure they understand the consequences and risks associated with non-adherence to hazardous energy control. Failure to follow the UW Hazardous Energy Control LOTO Program may be considered a serious safety violation. Violations of program requirements (including incidents that did not result in an accident or injury) must be documented as a “near miss” using the UW EH&S [Online Accident Reporting System \(OARS\)](#).



## PERIODIC REVIEWS

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Periodic reviews, a regulatory requirement, are inspections of (1) the adequacy of equipment-specific LOTO procedures and (2) the knowledge of Authorized Persons about their LOTO responsibilities. The goal of periodic reviews is to determine if changes are needed to increase employee protection.

Conduct and document periodic reviews at least annually. The hazardous energy control program includes two distinct periodic inspection components that may be conducted together or independently:

- 1) Inspect equipment-specific LOTO procedures annually, or before use if used less frequently than once per year
- 2) Review of each Authorized Person's role and responsibility during lockout/tagout

### **Equipment-specific lockout/tagout procedure periodic review**

The equipment-specific procedure periodic review refers to examining the lockout/tagout procedures for specific equipment, machines and systems. This inspection confirms the accuracy and must determine and address deviations or inadequacies in the hazardous energy control procedure. A [Lockout/Tagout Equipment-Specific Procedure Periodic Review](#) form is shown in [Appendix H](#).

Equipment-specific LOTO procedure periodic reviews must be conducted by an Authorized Person. The Authorized Person conducting the review cannot be an Authorized Person involved in a LOTO procedure being conducted at the same time it is being reviewed.

- Departments/units/organizations must perform an annual review of every equipment-specific lockout/tagout procedure. Review infrequently used equipment-specific lockout/tagout procedures before use, if not annually. Conduct a procedure review of newly created equipment-specific lockout/tagout procedures before application of the procedure.
- If normal work schedule and operation records demonstrate adequate inspection activity and contain the required information, an additional procedure review is not required.
  - An example of this is to implement a procedure reviewer role upon creation of field equipment-specific procedures or before established equipment-specific procedures are used. The reviewer role must be performed by a person that is not directly involved in the LOTO procedure.
- Grouping equipment-specific lockout/tagout procedures for same or similar machines or equipment for inspection purposes may streamline the review process. To determine if procedure grouping is an option, evaluate if the separate procedures meet the requirements listed in the section [Hazardous Energy Control Procedures](#) and summarized below.

- Inspect a representative number of procedures annually and select different individual equipment-specific lockout/tagout procedures every year.
- A representative number of inspections for "like" or similar equipment may be performed. The department/unit/organization is responsible for establishing a representative inspection program based on their operations. An example of a representative inspection schedule is suggested below.
- Suggested amount of equipment in group and percentage to be inspected annually:

Number of "like" Equipment	Percent inspected each year
1–10	100%
2-50	20%
51-100	10%
101-250	7%
251 - 500	5%
> 501	3%

## Authorized Person review

The Authorized Person periodic review refers to inspecting the Authorized Person's role and responsibility established in the UW Hazardous Energy Control LOTO Program and in their [Department Supplemental Hazardous Energy Control LOTO Program](#). The goal is to confirm that the Authorized Person has sufficient knowledge of hazardous energy control procedures and their application of lockout/tagout and tagout only. A [Lockout/Tagout Authorized Person Periodic Review](#) form is shown in [Appendix H](#).

### Authorized Persons conducting lockout/tagout

Departments/units/organizations must perform an annual review of every Authorized Person who performs any lockout/tagout hazardous energy control procedures. Conduct an Authorized Person review for lockout/tagout one-on-one or in a group meeting to re-establish employee procedure responsibilities and proficiency. The inspection may be conducted by observing and talking with employees implementing an equipment-specific energy control procedure.

### Authorized Persons conducting tagout only

Departments/units/organizations must perform an annual review of the Authorized Persons involved in tagout only hazardous energy control procedures. Conduct an Authorized Person review for tagout one-on-one by reviewing the individual's role(s) and responsibilities within the energy control procedure, and the limitation of tagout only devices and application.

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## AUDITS AND INSPECTIONS

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Departments/units/organizations must review their hazardous energy control program annually. An example of a [Department LOTO Program Annual Audit Checklist](#) is given in [Appendix I](#). A mitigation plan shall be developed to correct any program deficiencies identified.

## TRAINING

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Train employees to have the knowledge and skills necessary to carry out the UW Hazardous Energy Control LOTO Program responsibilities. Departments need to train their employees on the specific LOTO procedures, policies, and equipment that are related to their department and detailed in their Department Supplemental Hazardous Energy Control LOTO Program. Train employees on the lockout/tagout program and hands-on procedures in the field, if appropriate. Regardless of the training source, the department or unit employing employees (e.g., faculty, staff, paid student workers, academic employees) is responsible for keeping documentation of all training. Documentation must include the names of employees trained and the date. Instructors must be qualified to train in LOTO procedures.

Lockout/tagout training is required for any employee prior to application of lockout/tagout devices and/or use or creation of equipment-specific energy control procedures. Refresher training is required when changes occur in any of the following:

- Regulations
- Processes
- Energy control procedures
- Job assignments
- Machines/equipment

Refresher training may also be conducted when the department has reason to believe that refresher training is needed to maintain safe LOTO work practices. Retraining may be needed if a periodic review indicates deviation from or inadequate hazardous energy control procedures.

EH&S provides training on the UW Hazardous Energy Control LOTO Program that includes:

1. **Affected Persons** must receive training on the purpose and use of lockout/tagout energy control procedures. Educate to ensure awareness against attempting to restart or reenergize a machine or equipment that is locked out or tagged out.
2. **Authorized Persons and Primary Authorized Persons** must receive training to be able to identify the type and magnitude of hazardous energy, recognize hazardous

energy sources, and learn the methods to isolate and control energy. Instructors must cover the following in LOTO training:

- The purpose and function of the UW Hazardous Energy Control LOTO Program
- Knowledge and the skills necessary to carry out program responsibilities, including creating an equipment-specific lockout/tagout procedure
- How to recognize hazardous energy sources and the methods to isolate and control energy
- How to use equipment-specific lockout/tagout procedures
- **Never** attempt to restart or reenergize equipment that is locked and tagged out.
- The need to communicate with all Affected Persons prior to performing a lockout/tagout procedure
- The purpose and use of tagout devices in the overall energy control program
- Always attach a completed tag with name of the Authorized Person applying the lockout device(s), date(s) of proposed LOTO work, and when expected to be done.
- Basics of Group LOTO procedures, shift changes, employee changes
- Periodic reviews for equipment-specific procedures and Authorized Persons
- Procedures for lock removal when Authorized Person is not available
- The limits and requirements for using tagout only for energy control; tags serve as warning devices and do not provide the same level of physical protection as a lock.
- Tags attached to energy-isolating devices must only be removed by or with the approval of the Authorized Person who placed the tag.
- Tagout devices may never be bypassed, ignored, or otherwise defeated.
- Tags must be legible and clearly state their purpose.
- Tags alone may evoke a false sense of security.

## RECORDKEEPING AND AUDITS

The following records must be retained according to UW policy and regulatory record retention requirements:

Record	Retention Requirement
Periodic reviews	1 year or until the creation of new one
Training documents	7 years

## REFERENCES

1. [University of Washington Administrative Policy Statement 12.6: Lockout/Tagout: A Method of Hazardous Energy Control](#)
2. [Washington Administrative Code WAC 296-803: Lockout/Tagout \(Control of Hazardous Energy\)](#)
3. [Washington Administrative Code WAC 296-155-429: Lockout and Tagging of Circuits \(Construction Standards\)](#)
4. [Washington Administrative Code WAC 296-24-975: Selection and Use of Work Practices \(General Industry Standards\)](#)
5. [Washington Administrative Code WAC 296-45-175: Hazardous Energy Control Procedures](#) (control of energy sources in electric power generation)
6. [Occupational Safety and Health Administration \(OSHA\) 1910.147: The control of hazardous energy \(lockout/tagout\)](#)
7. Occupational Safety and Health Administration (OSHA) Compliance Directive [CPL-02-00-147, The Control of Hazardous Energy – Enforcement Policy and Inspection Procedures](#)
8. American National Standards Institute/American Society of Safety Professionals, [ANSI/ASSP Z244.1-2016 – The Control of Hazardous Energy Lockout, Tagout and Alternative Methods](#)

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## APPENDIX A

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### DEFINITIONS

**Affected Person.** An employee who is required to operate, use, or be in the area where a machine or equipment could be locked or tagged out for service or maintenance.

**Authorized Person.** An employee who locks out or tags out a machine or equipment to do service or maintenance.

**Can be locked out.** An energy-isolating device that can be locked in the "off" or "safe" position.

**Central System Operator.** A designated Authorized Person responsible for the exclusive control of energy-isolating devices installed on an electrical utility system.

**Deenergized.** Isolated from all energy sources and not containing residual stored hazardous energy.

**Employee.** Includes University personnel (as defined in Administrative Policy Statement 40.1), faculty, staff, paid student workers, contractors, and vendors.

**Energized.** Connected to an energy source or containing residual or stored energy.

**Energy-isolating device (EID).** A mechanical device that physically prevents transmitting or releasing energy. This includes, but is not limited to:

- Manually operated electrical circuit breakers
- Disconnect switches
- Manually operated switches that disconnect the conductors of a circuit from all ungrounded supply conductors if no pole of the switch can be operated independently
- Line valves
- Blocks
- Similar devices used to block or isolate energy

Note: 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, including gravity.

**Equipment locks.** Equipment locks are the locks applied to energy-isolating devices during a Group LOTO procedure involving a lockbox. Equipment locks may be commonly keyed and must exclusively be used during LOTO procedures involving a lockbox.

**Group LOTO.** A lockout that involves more than one person. It requires the use of a LOTO hasp for small groups or a lockbox for larger groups. All Authorized Persons must place a lock and tag on the hasp or lockbox to ensure their safety.

**Hot tap.** A procedure which involves welding on pressurized pipelines, vessels, or tanks to install connections or accessories. It is commonly used to replace or add sections of pipeline used in air, gas, water, steam, and petrochemical distribution systems without interrupting service.

**Job Lock.** A lock used to ensure continuous energy isolation during a multiple-shift operation for Group LOTO procedures using a lockbox. Keys are controlled by each assigned Primary Authorized Person from each shift.

**Lockbox.** The lockbox into which all the Equipment lock keys from the lockout/tagout devices securing EIDs on machines or equipment are inserted. Authorized Persons place their personal locks with tags on the box, securing the Equipment lock keys inside.

**Lockout.** Placing a lockout device on an energy-isolating device using an established procedure to make sure the machine or equipment cannot be operated until the lockout device is removed.

**Lockout device.** A device that uses a positive means to hold an energy-isolating device in the "safe" or "off" position. This includes blank flanges and bolted slip blinds.

**Normal production operations.** Using a machine or equipment for its intended production function.

**Personal lock.** Locks that belong exclusively to an Authorized Person.

**Primary Authorized Person.** An Authorized Person who has overall responsibility for meeting the requirements during a Group LOTO procedure.

**Qualified Person.** One who, by possession of a recognized degree, certificate, or professional standing, or who by extensive knowledge, training, and experience, has successfully demonstrated their ability to solve or resolve problems relating to the subject matter, the work, or the project.

**Service and maintenance.** Activities such as constructing, installing, setting up, adjusting, inspecting, modifying, maintaining, and servicing machines or equipment. It also includes lubricating, cleaning, unjamming, and making tool changes.

**Setting up.** Work done to prepare a machine or equipment for normal production operations.

**Tagout.** Placing a tagout device on an energy-isolating device using an established procedure to indicate that the energy-isolating device and the machine or 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. It can be securely fastened to an energy-isolating device to indicate that the energy-isolating device and the machine or equipment being controlled may not be operated until the tagout device is removed.

**Transfer lock.** A lock temporarily placed on an equipment energy-isolating device to ensure continuous LOTO protection for employee changes of Authorized Persons or changes between outgoing and incoming shifts.

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## APPENDIX B

### EXAMPLES OF LOCKOUT/TAGOUT DEVICES

Consult manufacturers and distributors websites for more information, and how-to-install images and videos.

#### Circuit breaker lockout devices



Panel lockout with cable  
[Brady.com](https://www.brady.com)



Universal multi-pole  
breaker lockout  
[Brady.com](https://www.brady.com)



Circuit breaker lockout devices

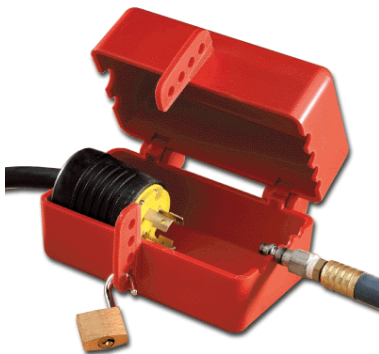


Single pole breaker  
lockout [Brady.com](https://www.brady.com)



Miniature circuit breaker lockouts  
[Brady.com](https://www.brady.com)

#### Electrical lockout devices



Combination electrical plug/pneumatic  
hose lockout device [Brady.com](https://www.brady.com)



3-in-1 Plug lockout [Brady.com](https://www.brady.com)

## Pneumatic and gas lockout devices



Locked compressed air line



Pneumatic quick-disconnect air hose lockout device  
[Brady.com](https://www.brady.com)



Airline regulator lockout device



Valve lockout with cable [Brady.com](https://www.brady.com)



Gas cylinder lockout devices



## Lock and key management



Lockbox [Brady.com](https://www.brady.com)

Some employers manage lockboxes by color coding with red for employee and yellow for contractors. Also, color coding during Group LOTO procedures.



Lockbox [Globalitesafety.com](https://www.globalitesafety.com)

Some employers manage locks by color coding for different trades, contractors, or Primary Authorized Person and Authorized Persons.



Lockout station [Brady.com](https://www.brady.com)



Lockout station [Masterlock.com](https://www.masterlock.com)

## Selecting the right key system for your needs

Finding the right key system for your lockout tagout program ensures the right people have access to lockout equipment during maintenance. The guidelines below will help you determine the right option for your unique needs.

### Keyed Different



#### Keyed different padlocks

Each padlock has its own unique key ideal for ensuring there is no potential key duplication when multiple maintenance personnel need to lockout equipment.

### Keyed Alike



#### Keyed alike padlocks

Each padlock can be opened with the same key. This option is beneficial when multiple locks are assigned to a single employee. However, it's important to remember that under OSHA regulations no employee should be able to open a lock applied by someone else. Therefore, keyed alike locks from the same set should never be distributed to multiple employees.

This type of lock is mostly used when a maintenance individual is responsible for multiple machines or isolation points. It makes it easier to find the right key and reduces the number of keys on a key ring.

### Master Keyed



#### Master keyed padlocks

The master key can open all locks including keyed alike and keyed different locks. This allows supervisors to easily remove a lock in the event of an emergency in order for employees to retain exclusive control, master keys should be kept in a secure location that is only accessible to management.

### Grand Master Keyed



#### Grand master keyed padlocks

The grand master key can open all locks grouped into two or more master keyed systems. This option is best for application with larger teams requiring multiple levels of supervisory access in order for employees to retain exclusive control, grand master keys should be kept in a secure location that is only accessible to management.

[Brady.com](https://www.brady.com)



## APPENDIX C

### MACHINES & EQUIPMENT INVENTORY

This non-mandatory form may be used by departments/units/organizations to inventory equipment requiring an equipment-specific lockout/tagout procedure. Prior to performing LOTO on equipment, use a physical inspection, a study of drawings, or equipment manuals to assist in the inventory and development of equipment-specific LOTO procedure.

Equipment Name & Number	Location (bldg./rm.)	Equipment Energy Sources	Magnitude of Energy Sources	Initial Survey Date & Initials	Review Date & Initials

*Example:*

Equipment Name & Number	Location (bldg./rm.)	Equipment Energy Sources	Magnitude of Energy Sources	Initial Survey Date & Initials	Review Date & Initials
Air compressor #3	Hall Health Building, Mechanical Room, Room 039	Electrical	3 phase, 40 Amps, 480 Volts	1/12/18 ND	1/25/19 ND
		Compressed air	120 psi tank/piping		
		Thermal	Manifold 220°F		
		Rotating/moving parts on equipment	50 lbs. flywheel and belts		

# APPENDIX D

## EQUIPMENT-SPECIFIC LOCKOUT/TAGOUT PROCEDURES

Note: if Departments develop or use a different form, remember to include all necessary information from this template and program.

EH&S provides two templates that meet the requirements of procedure contents:

1. **Equipment-specific lockout/tagout procedure** with photos (better for individuals that work on the same piece of equipment and/or for equipment with fewer steps to de-energize).



Download the [UW LOTO Procedure](http://www.ehs.washington.edu/resource/uw-loto-procedure-806) on the EH&S website at [www.ehs.washington.edu/resource/uw-loto-procedure-806](http://www.ehs.washington.edu/resource/uw-loto-procedure-806).

W ENVIRONMENTAL HEALTH & SAFETY UNIVERSITY of WASHINGTON	
<b>UNIVERSITY OF WASHINGTON LOCKOUT TAGOUT (LOTO) PROCEDURE</b> (WAC 296-803)	
<b>DESCRIPTION:</b> University of Washington Department/Division: _____ Building/Address: _____ Department completing the LOTO procedure: _____ Identify the building name or address: _____ Equipment ID: _____ Equipment assigned identification number: _____ Equipment/System Description: _____ Type of Equipment: _____ Location: _____ Location in building: _____ Procedure last updated: _____ Enter a Date: _____	
<b>PURPOSE:</b> (WAC 296-803-20005) This procedure establishes the minimum requirements necessary to protect employees from injury caused by the unexpected energization, start up, or release of stored energy during service or maintenance. Use this procedure to make sure the machine or equipment is stopped, isolated from all potentially hazardous energy sources, and locked out before any employee begins work.	
<b>AUTHORIZATION:</b> (WAC 296-803-20005) List any authorized persons authorized to lock and tag out the machine or equipment using this procedure: _____	
<b>SCOPE:</b> (WAC 296-803-20005) Provide a description of the scope of work for this service or maintenance work (include the work order #): _____ Work order #: _____	
<b>NOTIFY:</b> (WAC 296-803-20010) Notify all affected employees that the machine or equipment is to be shut down and locked out for service or maintenance: Name/Job Title: _____ Notification Method: _____ List the names or job titles of those being impacted: _____ (i.e. phone, email, meeting, etc.) _____	
<b>NORMAL SHUTDOWN:</b> (WAC 296-803-20010) Shut down the machine or equipment by normal stopping procedures (such as depressing a stop button, opening switches, or closing valves). List the types and locations of machine or equipment operating controls: Shutdown Method: _____ Location: _____	
<b>ISOLATE AND LOCKOUT:</b> (WAC 296-803-20001) Isolate energy sources using appropriate isolating devices. Lock and tag out the energy isolating devices with assigned individual locks and tags: <b>WARNING: The following are the known lock-out steps. If additional steps are discovered, inform your supervisor, lock them out, and modify this procedure accordingly.</b>	
1 Click to insert picture (portrait photo only)	Energy source and magnitude: Type of energy source: _____ Magnitude: _____ volts, amps, psi, temp, lbs., etc. Energy Isolating Device Location: EID location (building/room), EID identification #: _____ Isolation device/procedure: Describe the device the lock/tag is applied to (e.g. circuit breaker, line valve, block, etc.) and the method of the de-energization of equipment. Control Method: Lock/Tag Info (Initial and Date) Provide lock description or specific lock #: If applicable, if tagout only provide description of additional safeguard. Initial/Date of person applying lock/tag. Method to relieve residual/stored energy: If applicable, describe the process for relieving any additional energy sources (i.e. bleeding a valve). Verification Method: Explain how zero energy is confirmed. Restored by: (Initial and Date): _____ Person removing lock.
2 Click to insert picture (portrait photo only)	Energy source and magnitude: Type of energy source: _____ Magnitude: _____ volts, amps, psi, temp, lbs., etc. Energy Isolating Device Location: EID location (building/room), EID identification #: _____ Isolation procedure: Describe the device the lock/tag is applied to (e.g. circuit breaker, line valve, block, etc.) and the method of the de-energization of equipment. Control Method: Lock/Tag Info (Initial and Date) Provide lock description or specific lock #: If applicable, if tagout only provide description of additional safeguard. Initial/Date of person applying lock/tag. Method to relieve residual/stored energy: If applicable, describe the process for relieving any additional energy sources (i.e. bleeding a valve).
<b>GROUP LOTO:</b> (WAC 296-803-50050) Determine which procedures to use if more than one person will be involved in the LOTO procedure: <b>Will more than one person be involved in this procedure?</b> If you select NO, group LOTO will not be used, skip to next section. <input type="checkbox"/> YES <input type="checkbox"/> NO If you select YES, a group LOTO will be used, and describe your group LOTO method below. Choose a group LOTO method: <input type="checkbox"/> A hasp will be used for this procedure <input type="checkbox"/> A lock box will be used for this procedure Lock Box Identification #: _____ <input type="checkbox"/> A Primary Authorized Person Name: _____ Name: _____ During shift or personnel changes, make sure there is continuous LOTO protection and record the new PAF and date each time there is a change. <b>THE MACHINE OR EQUIPMENT IS NOW LOCKED OUT AND SERVICE OR MAINTENANCE CAN BE DONE</b>	

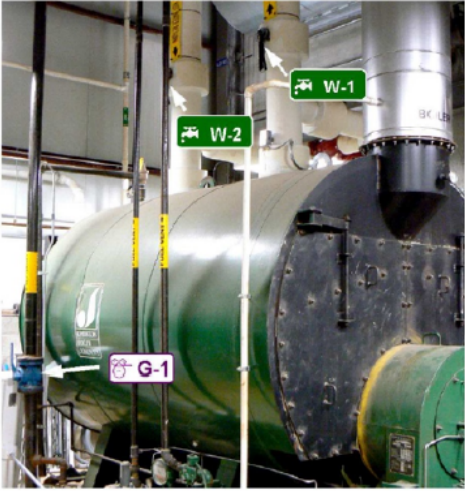


Example below of Group LOTO procedure with two Authorized Persons working on a boiler

<b>W ENVIRONMENTAL HEALTH &amp; SAFETY</b> UNIVERSITY of WASHINGTON	
<b>UNIVERSITY OF WASHINGTON LOCKOUT TAGOUT (LOTO) PROCEDURE</b> (WAC 296-803)	
<b>DESCRIPTION:</b>	
University of Washington Department/Division: EXAMPLE UW DEPARTMENT	Building/Address: UW BUILDING ABC
Equipment ID: BOILER #3	Equipment/System Description: BOILER
Location: BOILER ROOM	Procedure last updated:
<b>PURPOSE:</b> (WAC 296-803-20005) This procedure establishes the minimum requirements necessary to protect employees from injury caused by the unexpected energization, start up, or release of stored energy during service or maintenance. Use this procedure to make sure the machine or equipment is stopped, isolated from all potentially hazardous energy sources, and locked out before any employee begins work	
<b>AUTHORIZATION:</b> (WAC 296-803-20005) List any authorized persons authorized to lock and tag out the machine or equipment using this procedure:	
AUTHORIZED PERSON #1 AUTHORIZED PERSON #2	
<b>SCOPE:</b> (WAC 296-803-20005) Provide a description of the scope of work for this service or maintenance work (include the work order #): Work order #:	
USE THIS PROCEDURE FOR ALL SCHEDULED PM SHUTDOWNS, ANY MAINTENANCE TASK THAT REQUIRES YOU TO PLACE YOUR BODY IN HARMS WAY OF THE EQUIPMENT OR IF YOU LEAVE THE AREA WHILE THE EQUIPMENT IS IN SERVICE.	
<b>NOTIFY:</b> (WAC 296-803-20010) Notify all affected employees that the machine or equipment is to be shut down and locked out for service or maintenance:	
Name/Job Title:	Notification Method:
AFFECTED PERSON #1	EMAIL AND MEETING
AFFECTED PERSON #2	EMAIL AND MEETING
<b>NORMAL SHUTDOWN:</b> (WAC 296-803-20010) Shut down the machine or equipment by normal stopping procedures (such as depressing a stop button, opening switches, or closing valves). List the types and locations of machine or equipment operating controls:	
Shutdown Method:	Location:
ELECTRICAL SHUTDOWN AT CIRCUIT BREAKER PANEL	E-1 (SEE PHOTO IN #1 BELOW)
CLOSE SUPPLY AND RETURN HOT WATER VALVES	W-1 AND W-2 (SEE PHOTO IN #3 BELOW)
CLOSE NATURAL GAS VALVE	G-1 (SEE PHOTO IN #3 BELOW)

<b>W ENVIRONMENTAL HEALTH &amp; SAFETY</b> UNIVERSITY of WASHINGTON	
<b>ISOLATE AND LOCKOUT:</b> (WAC 296-803-20001) Isolate energy sources using appropriate isolating devices. Lock and tag out the energy isolating devices with assigned individual locks and tags:	
<b>WARNING:</b> The following are the known lockout steps. If additional steps are discovered, inform your supervisor, lock them out, and modify this procedure accordingly.	
<b>1 North Wall</b> 	Energy source and magnitude: Type of energy source: Electrical Magnitude: 480 VOLTS Energy Isolating Device Location: EID (E-1 IN PHOTO) DISCONNECT LOCATED AT MCC LOCATED ON NOTRH WALL Isolation device/procedure: MOVE E-1 CIRCUIT BREAKER SWITCH TO OFF. LOCK OUT WITH CIRCUIT BREAKER LOCKOUT DEVICE. Control Method: Lock/Tag Info (Initial and Date) LOCK OUT CIRCUIT BREAKER LOCKOUT DEVICE WITH LOTO HASP AND APPLY PERSONAL LOCKS AND TAGS TO HASP. Method to relieve residual/stored energy: ATTEMPT RESTART. Verification Method: ATTEMPT RESTART AT CONTROL PANEL-1 (CP-1). SEE PHOTO OF CP-1 AT SOUTH SIDE VIEW. Restored by: (Initial and Date):
<b>2 South Side View</b> 	Energy source and magnitude: Type of energy source: HOT WATER SUPPLY Magnitude: BOILING WATER/STEAM Energy Isolating Device Location: EID (W-1 IN PHOTO, NEXT PAGE) HOT WATER SUPPLY VALVE ABOVE BOILER ON WEST SIDE. Isolation procedure: TURN W-1 VALVE OFF. LOCK OUT WITH CABLE LOCKOUT DEVICE. Control Method: Lock/Tag Info (Initial and Date) LOCK OUT CABLE LOCKOUT DEVICE WITH LOTO HASP AND APPLY PERSONAL LOCKS AND TAGS TO HASP. Method to relieve residual/stored energy: BLEED OFF, ALLOW TO COOL.

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3	<p><b>North West Side View</b></p>  <p>Click to insert picture (portrait photo only)</p>	Verification Method: VERIFY PRESSURE HAS BLED OFF.
		Restored by: (Initial and Date):
4		Energy source and magnitude: Type of energy source: HOT WATER RETURN Magnitude: BOILING WATER/STEAM Energy Isolating Device Location: EID (W-2 IN PHOTO) HOT WATER RETURN VALVE ABOVE BOILER ON WEST SIDE. Isolation device/procedure: TURN W-2 VALVE OFF. LOCK OUT WITH CABLE LOCKOUT DEVICE. Control Method: Lock/Tag Info (Initial and Date): LOCK OUT CABLE LOCKOUT DEVICE WITH LOTO HASP AND APPLY PERSONAL LOCKS AND TAGS TO HASP. Method to relieve residual/stored energy: BLEED OFF, ALLOW TO COOL. Verification Method: VERIFY PRESSURE HAS BLED OFF. Restored by: (Initial and Date):
		Energy source and magnitude: Type of energy source: NATURAL GAS Magnitude: GAS UNDER PRESSURE Energy Isolating Device Location: EID (G-1 IN PHOTO) NATURAL GAS UNIVERSAL BALL VALVE ON WEST SIDE OF BOILER Isolation device/procedure: TURN G-1 VALVE OFF. LOCK OUT WITH UNIVERSAL BALL VALVE LOCKOUT DEVICE. Control Method: Lock/Tag Info (Initial and Date): LOCK OUT BALL VALVE LOCKOUT DEVICE WITH LOTO HASP AND APPLY PERSONAL LOCKS AND TAGS TO HASP. Method to relieve residual/stored energy: BLEED OFF.

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		Verification Method: VERIFY PRESSURE HAS BLED OFF.
		Restored by: (Initial and Date):
<b>GROUP LOTO: (WAC 296-803-50050)</b> Determine which procedures to use if more than one person will be involved in the LOTO procedure:		
<b>Will more than one person will be involved in this procedure?</b> If you select NO, group LOTO <u>will not</u> be used, skip to next section If you select YES, a group LOTO <u>will</u> be used, and describe your group LOTO method below		<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO
<b>Choose a group LOTO method:</b> <input checked="" type="checkbox"/> A hasp will be used for this procedure <input type="checkbox"/> A lock box will be used for this procedure Lock Box Identification #: <input checked="" type="checkbox"/> A Primary Authorized Person Name: AUTHORIZED PERSON #1 Name:		
During shift or personnel changes, make sure there is continuous LOTO protection and record the new PAP and date each time there is a change.		
<b>THE MACHINE OR EQUIPMENT IS NOW LOCKED OUT AND SERVICE OR MAINTENANCE CAN BE DONE</b>		
<b>RESTORE: (WAC 296-803-50035)</b> Restore the machine or equipment to service after the service or maintenance is completed.		
<b>Step 1:</b> Check the machine or equipment and the immediate area around it to make sure all non essential items have been removed and that the machine or equipment is in operating condition and ready to energize.		
<b>Step 2:</b> Make sure all employees are safely positioned for starting or energizing the machine or equipment.		
<b>Step 3:</b> Verify that the controls are in neutral.		
<b>Step 4:</b> Remove the lockout devices and reenergize the machine or equipment. <b>Note:</b> Some forms of blocking may require re-energization of the machine before they can be safely removed.		
<b>Step 5:</b> Notify affected employees that the servicing or maintenance is completed and the machine or equipment is ready to use.		



## APPENDIX E

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### DEPARTMENT SUPPLEMENTAL HAZARDOUS ENERGY CONTROL LOTO PROGRAM TEMPLATE

The Department Supplemental Hazardous Energy Control Lockout/Tagout Program Template shown below includes directions, content, and examples for the supplemental, specific information a department must contribute to this UW Hazardous Energy Control LOTO Program. Download the [template](https://www.ehs.washington.edu/resource/departments-supplemental-hazardous-energy-control-lockouttagout-program-template-805) from the EH&S website at [www.ehs.washington.edu/resource/departments-supplemental-hazardous-energy-control-lockouttagout-program-template-805](https://www.ehs.washington.edu/resource/departments-supplemental-hazardous-energy-control-lockouttagout-program-template-805).

[Department/unit/organization name]  
Supplemental Hazardous Energy  
Control LOTO Program

APPROVED BY: \_\_\_\_\_  
[NAME], [TITLE]

[MONTH] 2022



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*[Instructions for the preparer: Complete the template by filling in the data entry boxes with information relevant to your department. This Supplemental Program can be modified as needed to address any/all potential hazards. A draft of this program should be reviewed by appropriate stakeholders in your department and approved by your unit leader before distributing to employees. Review of your department's Supplemental Program by EH&S is not required; however, EH&S can provide consultation as needed by contacting ehsdept@uw.edu.]*

## PURPOSE

This document is the Insert Shop/Department Name - Supplemental Hazardous Energy Control Lockout/Tagout (LOTO) Program ("Supplemental Program") and addresses department\*-specific hazards and safety guidance for controlling hazardous energy when repairing or servicing department equipment or systems, that is not covered in the UW Hazardous Energy Control LOTO Program Manual.

\* The term "department" is used to represent the entities supported by this plan. It applies to all schools, departments, units, and organizations within the University, excluding the University of Washington medical or healthcare facilities. The term "employees" will be used to include all staff, faculty, students, and volunteers in paid positions (permanent, part-time, or seasonal).

## SCOPE

The UW Hazardous Energy Control LOTO Program Manual and this Supplemental Program cover all department job titles or roles that will be assigned the responsibility of an Authorized Person. All employees who could be exposed to uncontrolled hazardous energy during their work activities must follow the requirements outlined in the UW Hazardous Energy Control LOTO Program Manual and this Supplemental Program document. The locations covered in this program include, but are not limited to:

1. Insert location 1
2. Insert location 2
3. Add additional locations as needed

## PROGRAM MANAGEMENT

### ACTIVITIES COVERED UNDER LOTO

Provide a list of the activities specific to the department where LOTO is applied.

*[Examples:*

1. Servicing and repairing
2. Unjamming]
- /
1. Insert activity 1

2. Insert activity 2
3. Add additional activities as needed

### ACTIVITIES EXEMPT FROM LOTO

List department activities exempt from LOTO procedures.

*[Examples:*

1. Minor unjamming where guards or interlocks are not removed
2. Cord and plug equipment – electrical energy only when in exclusive control of one person
3. Taking voltage and current measurements]
1. Insert exempt activity 1
2. Insert exempt activity 2
3. Add additional exempt activities

### RESPONSIBILITIES

The department has identified an employee to be the department LOTO Program Administrator.

The department has identified and ensured the training of employees to be Authorized Persons.

A list identifying the department LOTO Program Administrator and employees who are Authorized Persons shall be maintained and kept current. Refer to the Appendix below for an example log.

### EQUIPMENT LOCKOUT/TAGOUT PROCEDURES

*[Describe how equipment specific procedures are developed, managed, and updated.*

*Departments can use the non-mandatory machine and equipment inventory form in Appendix C of the UW Hazardous Energy Control LOTO Program Manual to list the equipment and/or systems that require equipment specific written LOTO procedures. For departments with many pieces of equipment/systems, an electronic maintenance management system or equivalent system can be used to track equipment and systems.]*

Describe how equipment specific procedures are developed, managed and updated.



## LOCK AND KEY MANAGEMENT POLICIES

### Personal lockout/tagout devices

*[Personal locks and tags are used for personal protection. Multiple personal locks may use a single, common key but it must be assigned to a single Authorized Person. Departments need to describe how personal locks are provided to each Authorized Person, the type of locks, and where they are stored.]*

#### Description:

Personal Lock physical description

Personal Tag physical description

#### Key Management Policy:

Describe Personal Lock key management policy

*[Key Management Policy examples:*

1. *Each Authorized Person has one lock and maintains possession of the only key*
2. *Each Authorized Person has several personal locks, keyed alike, and maintains possession of the only key*
3. *Each Authorized Person has a personal lock, maintains possession of their key, and management maintains a master key (Lock Removal Policies below still apply)*
4. *Authorized Persons checkout a personal lockout device from lockout station, records the lock identifier and their name on the log, maintains possession of the only key]*

### Equipment locks

Equipment locks or department specific alternative name

Equipment Locks are applied to EIDs during a group lockout/tagout involving a lockbox. Equipment Locks may be commonly keyed and must exclusively be used during hazardous energy control procedures involving a lockbox.

#### Description:

Equipment Lock physical description

#### Key Management Policy:

Describe Equipment Lock key management policy

Insert Dept name Supplement to UW Hazardous Energy Control LOTO Program | Insert Mo/Date/Year | Page 5 of 9

### Transfer locks

Transfer locks or department specific alternative name

Off-going employee applies Transfer Lock to equipment EID, then removes personal lock before on-coming employee arrives. The on-coming employee affixes personal lock, then removes the Transfer Lock. Each on-coming employee verifies zero-energy state of the system.

#### Description:

Transfer Lock physical description

#### Transfer lock key management policy:

Describe Transfer lock key management policy

*[Key Management Policy examples:*

1. *Transfer Lock keys are owned by several Authorized Persons in the shop and have a key to the lock.*
2. *Off-going Primary Authorized Person removes Personal Lock and applies Transfer Lock. Off-going Primary Authorized Person gives Transfer Lock key to third party, not involved in LOTO procedure. On-coming Primary Authorized Person obtains Transfer Lock key, verifies zero-energy state, removes Transfer Lock and applies Personal Lock.]*

### Job locks

Job locks or department specific alternative name

The Job Lock is the first lock placed on the lockbox during Group LOTO and is the last lock removed when the job is completed. Each Primary Authorized Person from each shift controls the key to the Job Lock. As work is performed, each Primary Authorized Person attaches personal lock to lockbox, while the Job Lock remains in place, verifies zero-energy state before work begins, and removes their personal lock when leaving for the day or the job is completed.

#### Description:

Job Lock physical description

#### Job lock key management policy:

Describe Job Lock key management policy

*[Key Management Policy examples:*

1. *Job locks and keys may only be checked out by Shop Supervisors from lockout station. Any transfer of Primary Authorized Person responsibility must be documented on equipment-specific energy control procedures.*

Insert Dept name Supplement to UW Hazardous Energy Control LOTO Program | Insert Mo/Date/Year | Page 6 of 9

2. *Job locks are only used for work with contractors. To maintain continuity, the Primary Authorized Person performs and prepares the machine or equipment for contractors and applies the Job Lock on the lockbox. The Job Lock stays on the lockbox for the duration of the project and the Shop Supervisor maintains the key to the Job Lock on the lockbox for the duration.]*

#### Tagout only

Describe procedures and policies when tagout only is used in department specific energy control procedures.

#### Out of service locks/tags

Describe how equipment is locked and tagged out when out of service. Do not use LOTO devices for out of service equipment.

#### LOCK REMOVAL POLICY

Describe department specific procedures for lock removal policy.

The department will use the [Lock Removal Form](#) to document lock removals.

#### PERIODIC REVIEWS

Periodic Reviews are required inspections of the adequacy of equipment-specific LOTO procedures and the knowledge of Authorized Persons about their LOTO responsibilities. The goal is to determine if changes are needed to increase employee protection.

The department must conduct and document periodic reviews at least annually of the following:

1. Inspect equipment-specific LOTO procedures annually or before use, if used less frequently than once a year. Document review and corrective actions. Refer to form: [www.ehs.washington.edu/resource/lockouttagout-equipment-specific-procedure-periodic-review-1249](http://www.ehs.washington.edu/resource/lockouttagout-equipment-specific-procedure-periodic-review-1249).
2. Review each Authorized Person's role during lockout/tagout. Document review and corrective actions. Refer to form: [www.ehs.washington.edu/resource/lockouttagout-authorized-persons-periodic-review-808](http://www.ehs.washington.edu/resource/lockouttagout-authorized-persons-periodic-review-808)

Annual reviews/inspections of each Authorized Person and each equipment-specific LOTO procedure are maintained at Insert location and kept for at least one year.

#### TRAINING

Describe any department-specific LOTO training that is performed.

#### DEPARTMENT LOTO PROGRAM ANNUAL AUDIT

The department LOTO Program Administrator conducts an annual LOTO program review that includes a review of the periodic inspections from the prior year and maintains the program audit result at Insert location and kept for at least one year. Refer to example audit form: [www.ehs.washington.edu/resource/department-loto-program-annual-audit-checklist-1250](http://www.ehs.washington.edu/resource/department-loto-program-annual-audit-checklist-1250).

#### APPENDIX

Example of log to maintain current record of employee who is the department LOTO Program Administrator and employees who are Authorized Persons.

Log of Department LOTO Program Administrator and Authorized Persons	
Department: Enter department name.	Date: Enter date.
LOTO Program Administrator: Enter name.	
Authorized Persons	
1	Enter name.
2	Enter name.
3	Enter name.
4	Enter name.
5	Enter name.
6	Enter name.

## APPENDIX F

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### LOCK REMOVAL FORM

The [Lockout/Tagout Program Lock Removal Form](#) shown below includes directions and specific information a department must document when an Authorized Person (lock owner) is unable or unavailable to remove their personal lock during a LOTO procedure. Download the Lock Removal Form from the EH&S website at [www.ehs.washington.edu/resource/lockouttagout-program-lock-removal-form-807](http://www.ehs.washington.edu/resource/lockouttagout-program-lock-removal-form-807).

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### Lockout/Tagout Program Lock Removal Form

*A department or unit must document specific information on this form when an Authorized Person (lock owner) is unable or unavailable to remove their personal lock during a LOTO procedure.*

1. Date & time of initial request to remove lock: \_\_\_\_\_
2. Lock owner's department/unit: \_\_\_\_\_
3. Name of lock owner whose lock/tag is to be removed: \_\_\_\_\_
4. Name of lock owner's supervisor: \_\_\_\_\_
5. Equipment & location: \_\_\_\_\_
6. Is it absolutely necessary for the equipment to be reenergized before the lock owner can return to personally remove the lock? ☐ Yes ☐ No  
If "Yes", explain why: \_\_\_\_\_

#### DOCUMENT REASON FOR REMOVING LOCK

(e.g., lock owner called in sick, lock owner forgot to remove lock before leaving site, etc.)

\_\_\_\_\_

#### DOCUMENT ATTEMPTS TO CONTACT LOCK OWNER PRIOR TO REMOVAL

Date & Time	Method of attempted contact	Result

#### LOCK REMOVAL

- ☐ Verify that the lock will be removed by the supervisor of the lock owner or the supervisor's direct designee.
- ☐ Verify that the supervisor of the lock owner or the supervisor's direct designee has reviewed the equipment to ensure that it can be safely reenergized.

**Lock removed by:** \_\_\_\_\_

**Date & time of removal:** \_\_\_\_\_

#### NOTIFICATIONS

- ☐ Verify that lock owner has been informed of lock removal prior to beginning the next shift.

**Signature of Lock Owner's Supervisor:** \_\_\_\_\_

Questions? Contact [ehsdept@uw.edu](mailto:ehsdept@uw.edu).

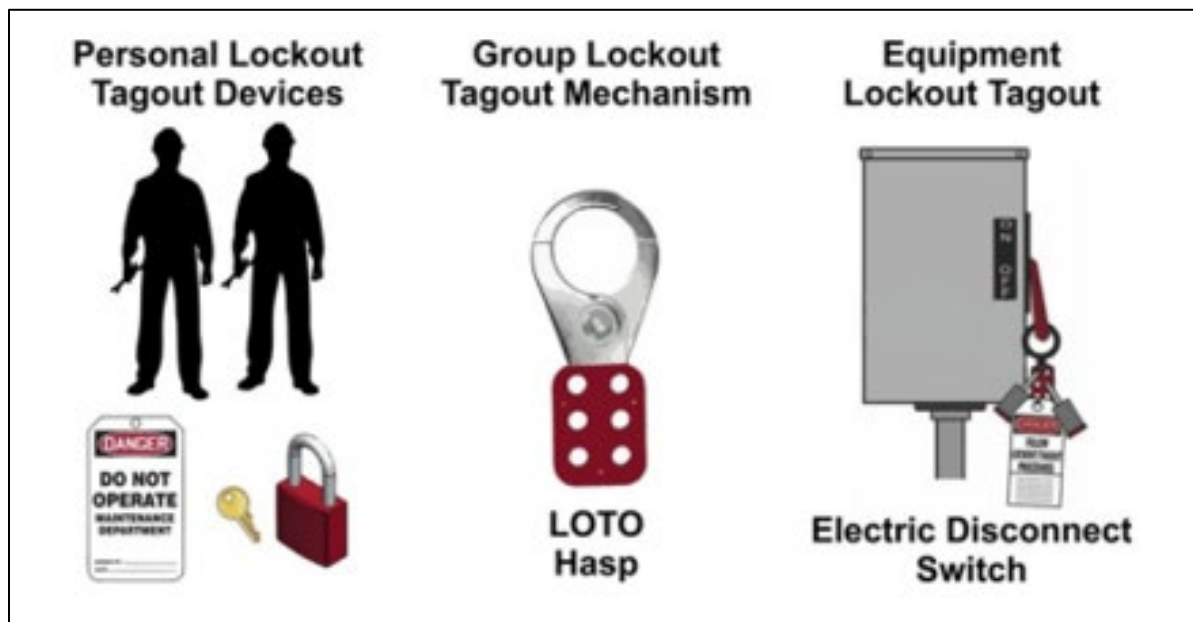
## APPENDIX G

### EXAMPLES OF GROUP LOCKOUT/TAGOUT METHODS

Examples of group lockout/tagout procedures include the following:

#### Example 1 – Lockout/tagout hasp for small group

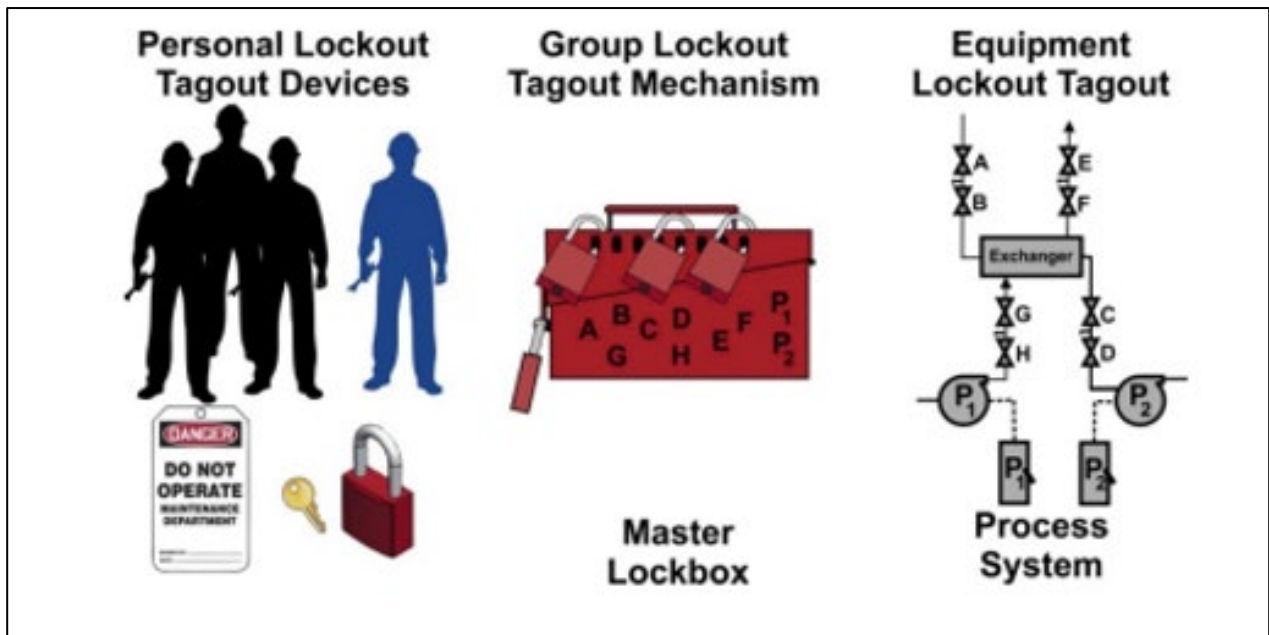
1. Primary Authorized Person places LOTO hasp on the electrical disconnect switch (the EID for the equipment) shown in figure below and places their personal lock and tag on the hasp.
2. Each Authorized Person then places their personal lock and tag on the hasp.
3. The Primary Authorized Person is responsible for verifying zero energy and each Authorized Person verifies or observes the de-energization of the equipment.
4. After work is completed, each Authorized Person removes their lock and tag from the hasp.
5. The Primary Authorized Person is the last to remove their lock and tag.



Group LOTO using hasp

## Example 2 – Lockbox for large group

1. Under a lockbox procedure, an Equipment lock is placed on each energy isolation device after de-energization. In figure below ten Equipment locks are placed on ten EIDs (eight inline valves, and two electrical panels that operate two pumps).
2. The ten key(s) are placed into a lockbox. The Primary Authorized Person confirms zero-energy and places their lock and tag on the lockbox.
3. Each Authorized Person assigned to the job places his/her personal lock and tag on the lockbox. As a member of a group, each assigned Authorized Person verifies or observes the de-energization of the equipment.
4. The LOTO devices cannot be removed, or any EID turned on until each Authorized Person removes their personal lock and tag from the lockbox.
5. The Primary Authorized Person removes their lock last. Then each appropriate key is matched to its lock on each EID, and the equipment can be re-energized.

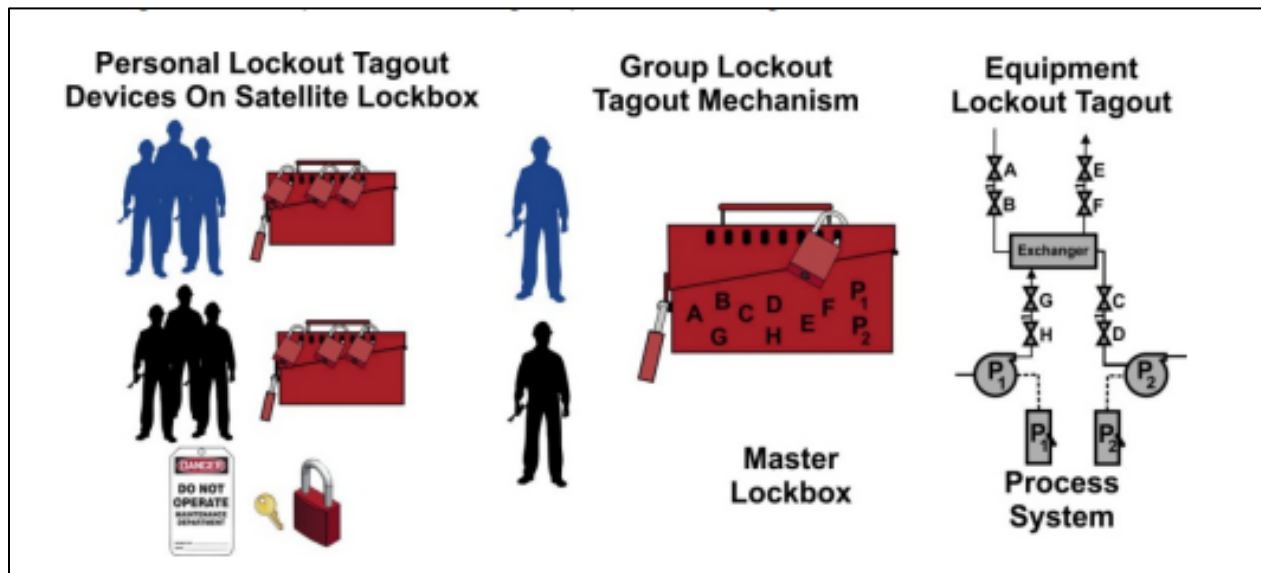


Group LOTO using lockbox



### Example 3 – Satellite Lockbox for multiple groups

1. Equipment locks and tags are placed on all energy-isolating devices after equipment is de-energized. The keys to the Equipment locks are placed into a master lockbox.
2. Each group Primary Authorized Person places their personal lock and tag on the master lockbox.
3. Each group Primary Authorized Person places a key to their personal lock in a satellite lockbox for their group.
4. Each Authorized Person in each satellite group attaches their personal lock and tag to their satellite lockbox.
5. Each Authorized Person verifies or observes the de-energization of the equipment.
6. After each subgroup has completed their maintenance work the Authorized Persons remove their personal locks and tags attached to their group satellite lockbox.
7. The Primary Authorized Person for each subgroup can then remove their lock and tag attached to the satellite lockbox, remove their key inside the satellite box, and lastly, remove their lock from the master lockbox.



Group LOTO using master and satellite lockboxes

Images credit: Bidnet.com (Images based on OSHA CPL 02-00-147 Chapter 4)

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## APPENDIX H

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### PERIODIC REVIEW FORMS

Departments, units, and organizations with a hazardous energy control program must conduct periodic reviews, at least annually, of (1) documented LOTO procedures used on their equipment, and (2) the knowledge of Authorized Persons in their department.

The [Lockout/Tagout Equipment-Specific Procedure Periodic Review](http://www.ehs.washington.edu/resource/lockouttagout-equipment-specific-procedure-periodic-review-1249) form shown below includes directions and content for the review of an equipment-specific lockout/tagout procedure. Download the form from the EH&S website at [www.ehs.washington.edu/resource/lockouttagout-equipment-specific-procedure-periodic-review-1249](http://www.ehs.washington.edu/resource/lockouttagout-equipment-specific-procedure-periodic-review-1249).

The [Lockout/Tagout Authorized Person Periodic Review](http://www.ehs.washington.edu/resource/lockouttagout-authorized-persons-periodic-review-808) form shown below includes directions and content for the review of Authorized Persons that are involved in either lockout/tagout or tagout only. Download the form from the EH&S website at [www.ehs.washington.edu/resource/lockouttagout-authorized-persons-periodic-review-808](http://www.ehs.washington.edu/resource/lockouttagout-authorized-persons-periodic-review-808).

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### Lockout/Tagout Equipment-Specific Procedure Periodic Review

The Equipment-Specific Procedure Periodic Review form includes directions and content for the review of an equipment-specific lockout/tagout procedure. Refer to the [UW Hazardous Energy Control LOTO Program Manual](#).

**Instructions:** Authorized Person conducting review cannot be one of the Authorized Persons using the procedure under review. Conduct review at least annually or before use, if procedure used less frequently than once a year.

**Authorized Person conducting review:** \_\_\_\_\_

**Department/unit:** \_\_\_\_\_

**Procedure under review:** \_\_\_\_\_

**Location of equipment:** \_\_\_\_\_

**Date of review:** \_\_\_\_\_

Name of Authorized Person(s) using this procedure	Has the employee been trained on the equipment-specific LOTO procedure?
1. _____	<input type="checkbox"/> Yes <input type="checkbox"/> No
2. _____	<input type="checkbox"/> Yes <input type="checkbox"/> No
3. _____	<input type="checkbox"/> Yes <input type="checkbox"/> No
4. _____	<input type="checkbox"/> Yes <input type="checkbox"/> No

Question	Yes	No
1. Do Authorized Persons know the location of the written procedure?	<input type="checkbox"/>	<input type="checkbox"/>
2. Do Authorized Persons have access to the procedure?	<input type="checkbox"/>	<input type="checkbox"/>
3. Are Affected Persons notified when the procedure is being used?	<input type="checkbox"/>	<input type="checkbox"/>
4. Have Affected Persons been trained to recognize when the procedure is being used and instructed not to remove lockout/tagout devices or start de-energized equipment?	<input type="checkbox"/>	<input type="checkbox"/>
5. Can energy-isolating devices be locked out? <i>Note: When you replace, renovate, or modify machines and equipment, ensure that the energy-isolating devices will accept lockout devices. New equipment and equipment renovated or modified after January 2, 1990, must be capable of being locked out.</i>	<input type="checkbox"/>	<input type="checkbox"/>

Question	Yes	No
6. Did each Authorized Persons lock out all energy sources?	<input type="checkbox"/>	<input type="checkbox"/>
7. Does this procedure involve group lockout/tagout?	<input type="checkbox"/>	<input type="checkbox"/>
8. Did the Authorized Persons verify that the equipment was de-energized?	<input type="checkbox"/>	<input type="checkbox"/>
9. Did the Authorized Persons follow the lockout/tagout procedure?	<input type="checkbox"/>	<input type="checkbox"/>
10. Does the lockout/tagout procedure adequately protect employees?	<input type="checkbox"/>	<input type="checkbox"/>

If you answered **No** to any question above, list and describe the deficiencies requiring corrective action.

- 1.
- 2.
- 3.



### Lockout/Tagout Authorized Person Periodic Review

The Authorized Person Periodic Review refers to inspecting an Authorized Person's role and responsibility in the hazardous energy control program and confirming that an Authorized Person has sufficient knowledge of hazardous energy control procedures and their application of lockout/tagout and tagout only. Refer to the [UW Hazardous Energy Control LOTO Program Manual](#).

**Instructions:** The Authorized Person conducting the review cannot review themselves. Reviews can be done during a LOTO procedure or in a meeting. If individuals conduct a LOTO procedure, a review can be done by meeting/talking with employees individually or in a group. For individuals conducting tagout only, a review must be done by meeting/talking with employees individually.

**Authorized Person conducting review:** \_\_\_\_\_

**Department/unit:** \_\_\_\_\_

**Equipment used in review:** \_\_\_\_\_

**Review date:** \_\_\_\_\_

This review is for: ☐ Lockout/tagout ☐ Tagout only

Question	Yes	No
1. Since the last review, has the Authorized Person(s):		
a. Had a change in job assignments, machines, equipment or processes?	<input type="checkbox"/>	<input type="checkbox"/>
b. If yes, has the person(s) been re-trained when job assignments, machines, equipment or processes have changed?	<input type="checkbox"/>	<input type="checkbox"/>
2. Are the locks uniquely identified, uniquely keyed, and only used for the purpose of LOTO?	<input type="checkbox"/>	<input type="checkbox"/>
3. Does the tag used with the lock identify the worker servicing the machine or equipment?	<input type="checkbox"/>	<input type="checkbox"/>
4. Does the employee(s) use an equipment-specific LOTO procedure, when required?	<input type="checkbox"/>	<input type="checkbox"/>
5. Does the employee(s) know where the equipment-specific LOTO procedures are located and how to develop one?	<input type="checkbox"/>	<input type="checkbox"/>
6. Does the employee(s) notify affected employees and all other employees in the area before starting the equipment-specific LOTO procedure?	<input type="checkbox"/>	<input type="checkbox"/>

Question	Yes	No
7. Can the employee(s) identify all hazardous energy sources and associated hazards for the equipment or machine to be locked out?	<input type="checkbox"/>	<input type="checkbox"/>
8. Does the employee(s) follow the proper LOTO procedures for de-energizing the equipment or machine, including releasing any stored or residual energy?	<input type="checkbox"/>	<input type="checkbox"/>
9. Does the employee(s) demonstrate the proper steps for the placement, removal and transfer of LOTO devices?	<input type="checkbox"/>	<input type="checkbox"/>
10. Does the employee(s) use the proper methods to verify the equipment or machine was de-energized?	<input type="checkbox"/>	<input type="checkbox"/>
11. Before releasing the machine or equipment from LOTO, does the employee(s) do the following:	<input type="checkbox"/>	<input type="checkbox"/>
a. Inspect the machine or equipment to ensure it is operationally intact?	<input type="checkbox"/>	<input type="checkbox"/>
b. Ensure that all employees are safely positioned?	<input type="checkbox"/>	<input type="checkbox"/>
c. Notify Affected Persons and all other employees in the area that the LOTO devices have been removed?	<input type="checkbox"/>	<input type="checkbox"/>

If answered **No** to any question, list and describe the deficiencies requiring corrective action.

- 1.
- 2.
- 3.

Authorized Person Reviewed (printed name)	Job Title	Date

## APPENDIX I

---

### DEPARTMENT LOTO PROGRAM ANNUAL AUDIT (EXAMPLE)

An example of a checklist for conducting an annual audit of a department LOTO program is given on the next page. The [Department LOTO Program Annual Audit Checklist](#) can be downloaded from the EH&S website at [www.ehs.washington.edu/resource/departments-loto-program-annual-audit-checklist-1250](http://www.ehs.washington.edu/resource/departments-loto-program-annual-audit-checklist-1250).

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### Department LOTO Program Annual Audit Checklist

*Departments/units/organizations can use this example checklist to review their hazardous energy control (LOTO) program annually. A mitigation plan shall be developed to correct any program deficiencies identified. Refer to the [UW Hazardous Energy Control LOTO Program Manual](#).*

**Employee conducting audit:** \_\_\_\_\_

**Department/unit:** \_\_\_\_\_

**Date:** \_\_\_\_\_

Item	Yes	No
1. Has a written Department LOTO Program (supplement to the UW LOTO program) that includes work-site specific procedures been established?	<input type="checkbox"/>	<input type="checkbox"/>
2. Has a department LOTO Program Administrator, with appropriate training and experience, been designated and identified in the written program?	<input type="checkbox"/>	<input type="checkbox"/>
3. Do only trained Authorized Persons perform lockout/tagout?	<input type="checkbox"/>	<input type="checkbox"/>
4. Are appropriate energy control devices (EIDs) for each type of energy control point available?	<input type="checkbox"/>	<input type="checkbox"/>
5. Have all equipment/machines requiring equipment-specific energy control procedures been identified and procedures developed?	<input type="checkbox"/>	<input type="checkbox"/>
6. Do Authorized Persons know where to locate equipment-specific energy control procedures?	<input type="checkbox"/>	<input type="checkbox"/>
7. Do Authorized Persons understand how to utilize equipment-specific energy control procedures?	<input type="checkbox"/>	<input type="checkbox"/>
8. Does each equipment-specific procedure undergo a periodic review at least annually?	<input type="checkbox"/>	<input type="checkbox"/>
9. Are locks and tags standardized, durable, identifiable, and used for no other purpose?	<input type="checkbox"/>	<input type="checkbox"/>
10. Are tags only used for equipment that cannot be locked out?	<input type="checkbox"/>	<input type="checkbox"/>

Item	Yes	No
11. Are Authorized Persons trained and know:	<input type="checkbox"/>	<input type="checkbox"/>
a. Source, type and magnitude of potential hazardous energy in their workplace?	<input type="checkbox"/>	<input type="checkbox"/>
b. Methods and means necessary for energy isolation and control?	<input type="checkbox"/>	<input type="checkbox"/>
12. Do Affected Persons understand the importance of energy control procedures and know not to attempt to restart locked out equipment/machines or remove locks/tags?	<input type="checkbox"/>	<input type="checkbox"/>
13.	<input type="checkbox"/>	<input type="checkbox"/>
14.	<input type="checkbox"/>	<input type="checkbox"/>
15.	<input type="checkbox"/>	<input type="checkbox"/>
16.	<input type="checkbox"/>	<input type="checkbox"/>

Items that need attention/correction	Action plan

Additional comments: