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**NORTHERN COLORADO**

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**Environmental Health and Safety**

# **Control of Hazardous Energy Guideline (Lockout/Tagout)**

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**TABLE of CONTENTS**

- I. General
- II. Definitions
- III. Responsibilities
- IV. Energy Isolating Devices
- V. General Lockout Procedures
- VI. Special Situations
- VII. Communication
- VIII. Audits
- IX. Training & Record Keeping

**Appendices**

- A. Lockout/Tagout Checklist
- B. Emergency LOTO Removal Form
- C. Lockout/Tagout Equipment Audit Form



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## **Control of Hazardous Energy Guideline (Lockout/Tagout)**

### **I. General**

This document is to establish minimum guidelines to assist with the safety and health of personnel who may be required to work on any type of equipment capable of being energized or harboring stored energy. Examples of applicable energy sources include, but are not limited to; electrical, thermal, mechanical, hydraulic, pneumatic and chemical.

This guideline will be as a safeguard that equipment is stopped and isolated from all potentially hazardous energy sources and locked out before employees perform service or maintenance where the unexpected/accidental energization, start-up of the equipment, or release of stored energy could result in serious injury or death.

### **II. Definitions**

*Affected Employee* – An employee whose job requires him/her to operate or use equipment on which servicing is being performed under the lock-out/tag-out program, or whose job requires him/her to work in an area where such servicing is being performed.

*Authorized Employee* – A person who locks or tags out equipment in order to perform work on them.

*Energy Isolation Device* – a mechanical device that physically prevents the transmission or release of energy.

*Lock-out* – the placement of a lock-out device to ensure that the energy isolating device and the equipment being controlled may not be operated until the lock-out device is removed.

*Qualified employee* – One who has skills and knowledge related to the construction and operation of the equipment and has received safety training on the hazards involved.

*Tag-out* – the placement of a tag-out on an energy isolating device to indicate that the energy isolating device and the equipment being controlled may not be operated until the tag-out device is removed.

### **III. Responsibilities**

#### **A. Supervisors**

- Assume responsibility for implementation of this guideline.
- Identify employees to be trained in lockout/tagout.
- Ensure employees are trained in department specific lockout/tagout procedures.
- Provide employees with the equipment necessary to adhere to program guidelines, i.e., locks with keys, tags, multiple-lock hasps, blocks, blinds, etc.
- Ensure that personnel adhere to lockout/tagout guidelines.
- Conduct annual equipment audits.

#### **B. Employees**

- Know the dangers associated with equipment that may fall under the Lockout/Tagout guideline.
- Become familiar with these guidelines.
- Be properly training in the use and implementation of the Lockout/Tagout Guidelines before utilizing them in the field.
- Always follow these guidelines and use approved devices when performing maintenance tasks.
- Maintain personal lockout/tagout supplies.
- Report any out of the ordinary circumstances to their supervisor.

#### **C. Environmental Health & Safety Department**

- Maintain and update the Control of Hazardous Energy (Lockout/Tagout) Guidelines.
- Provide annual refresher training to employees and assist in retraining per Supervisors request.
- Maintain training records.

### **IV. Energy Isolating Devices**

Isolating devices, lockout/tagout and/or assisted with ancillary devices, have the sole purpose of taking energy out of the equation during maintenance operations that ensure safety for all parties involved. Under federal regulations all devices shall be uniform and standardized in regards to shape, color, and size. Tagouts, shall be printed in a format recognized by all employees. Duration of devices on equipment shall be divided into three categories; Short-term Lockout consisting of an average 8 hour work day or less, Long-term Lockout consists of 8 hours or longer, and those that are permanently Locked-Out.

## A. Lockout

Under federal regulations, the isolating devices (locks) with a tagout device attached for identification purposes, shall be used to control the energy source(s) that present a hazard to the employee performing maintenance or ones in the immediate area. If the equipment does not allow for such a device (lock) to be used, the reconfiguration of equipment to allow for such a device shall be installed. A lockout device is made and designed to be:

- Capable of withstanding the environment to which they are exposed to for the maximum period of time that exposure is expected, i.e. Weather or chemical exposure.
- Substantial enough to prevent the removal without the use of excessive force or unusual techniques, such as the use of a bolt cutter or other metal cutting tools.

## B. Tagout

If the equipment is not capable of being reconfigured to allow a lockout device, the tagout device shall be used only if and when the level of safety equivalent to that of a lockout device can be proven effective in preventing injury or any accidental releases of energy during these types of operations. The "Tagout" standard is essentially a warning label. Additional means can be utilized as a precautionary step to effectively use the tagout device such as removal of circuits, valve handles or blocking control switches to prevent inadvertent energization. They are to be made and designed to be:

- Constructed and printed so that exposure to weather conditions or wet and damp locations will not cause the tag to deteriorate or allow the message on the tag to become illegible.
- Attached by hand using a non-reusable, self-locking cord that is substantial enough to prevent an inadvertent or accident removal, i.e. environmentally tolerant nylon zip-tie.

## C. Ancillary Devices

Such devices are used in conjunction with a lockout/tagout device that assists in isolating energy from equipment that cannot be locked out by normal means, i.e.

- Circuit Breaker Lockouts
- Gate Valve Cover (Doughnut) Lockout
- Group Lockout Hasps
- Electrical Plug Lockouts
- Wall Switch Lockouts

## V. General Lockout Procedures

This guideline shall be used when equipment has only one energy source. When conducting service or maintenance work on equipment, authorized employees may use the following as a guide for Shutdown and Restart procedures:

### A. Depletion of Energy

#### 1. Shutdown

Locate and identify all energy isolating devices that apply to the machine or equipment to be locked out.

#### 2. Notify

Notify all affected individuals that a lockout is about to occur, the reason for the lockout, the specific equipment affected, and an estimated time frame.

#### 3. Shutdown

Shutdown the equipment by its normal shutdown/stopping procedure per the manufactures recommendations.

#### 4. Isolate

Utilizing the disconnect switch, circuit breaker, valve or other energy isolating device to isolate (disconnect) the equipment from its energy source.

#### 5. Lockout

Apply the individually assigned lockout device and any ancillary devices to assist in isolating the energy source(s).

#### 6. Relieve Stored Energy

Exhaust and relieve stored or residual energy in the equipment by grounding, blocking, bleeding, etc.

#### 7. Verify Isolation

Clear the area around the equipment of all nonessential items, including safe distances of personnel in the area, and attempt to operate or “turn on” the equipment to ensure the energy source has been successfully disconnected.

*Caution:* Ensure the return of controls are in the “neutral” or “off” position before proceeding to maintenance or servicing of equipment.

### B. Restoration of Energy

#### 1. Check Equipment

Check the equipment and surrounding area to ensure that any nonessential tools or personnel have been removed or evacuated, all parts or guards have been reinstalled and the equipment is operationally intact.

#### 2. Verify

Verify all controls on the equipment are in the “neutral” or “off” position and that all employees are safely positioned or removed from the immediate area.

### 3. Remove Lock

Remove lockout and any ancillary devices and restore energy to the equipment.

### 4. Notify

Before restarting the equipment, notify all affected personnel that the maintenance or servicing of equipment is complete and locks have been removed.

## C. Temporary Testing Removal

In situations where lockout/tagout devices must be temporarily removed from the energy isolating device and equipment energized to test or position the equipment or component thereof, use the following steps as a guide to mitigate serious injuries from occurring:

1. Remove any non-essential items and ensure the equipment components are properly intact.
2. Notify affected personnel that the lockout devices have been removed and ensure that all individuals are safely removed or positioned away from the immediate area.
3. Have all who applied their personal lockout device, remove it for the testing duration.
4. Energize and proceed with testing or positioning.
5. De-energize all systems and reapply lockout devices that were previously removed in accordance with section (V)(A)(1-7) of this guideline.

## D. Exclusions

Machinery/equipment where the only source of energy is from the connection to an electrical outlet cord and plug shall be considered to be in compliance with lockout/tagout guidelines if the following conditions are met:

- The plug is removed from the electrical source.
- The person servicing the equipment can be in control of the cord and plug, at all times during the servicing.
- All affected individuals shall be notified of the equipment being serviced.

If the first three steps are not met an alternative means of compliance is to have a plug cap device, in which lockout/tagout devices are affixed to the plug.

## VI. Special Situations

There may be situations that are out of the ordinary and have specific procedures to ensure the safety of individuals under these adverse conditions. The following sections outline these specific situations.

### A. Using Tagout Only

Tagout without locks is allowed ONLY when the equipment is incapable of being locked out. Tagout may be implemented ONLY with the prior knowledge and approval of the appropriate supervisor, using the following procedure:

1. The Authorized Employee will advise the Supervisor that a Tagout Procedure needs to be put into place.
2. The Authorized Employee and Supervisor will determine if other equally effective controls can be implemented, such as the removal of a valve stem (handle), isolating a circuit element, or by blocking a control switch.
3. The authorized employee will follow the Lockout Guidelines.
4. The authorized employee will securely attach his/her tagout device to the energy isolating device where a lockout device would have normally been attached.

### B. Group Lockout

Whenever more than one Authorized Employee performs Lockout/Tagout on a piece of equipment or multiple pieces, a Lockout Procedure must be enacted. Each individual group member will place their respective lock or tag onto the Group Device, an ancillary device designed specifically for Group-Lockout situations. Employees shall NEVER depend upon someone else's lockout device, and shall ALWAYS use their own individually assigned lockout device.

### C. Shift Change/ Personnel Change

When equipment is serviced by more than one person, during different shifts or by the needs of the supervisor it is imperative that authorized personnel exchange locks at the same time, never at different times. When an exchange takes place the original authorize employee shall remove his/her lockout device and the newly appointed authorized employee shall place his/her lockout device immediately onto the isolation area(s) of that equipment.

### D. Emergency Removal

This procedure, Appendix B, may only be used to remove the lock of an Authorized Employee who is not on campus when the equipment must be restarted prior to his/her return to campus, usually in the event of an emergency. This procedure may only be implemented by the Supervisor of the unavailable Authorized Employee, or when deemed necessary by the AVP FM, Director EHS or their designee.



## **VII. Communication**

It is imperative that in all instances of Lockout/Tagout, they are communicated between departments, if the duration of the project extends past one day (an 8 hour shift). This is predetermined a Long-term Lockout before maintenance takes place or is a Permanent Long-term Lockout.

## **VIII. Audits**

Supervisors shall conduct annual audits of their employees and their lockout/tagout equipment. The equipment audit form can be found in Appendix C of this guideline.

## **IX. Training & Record Keeping**

All authorized personnel must receive formal training on the requirements of these guidelines, so they may effectively lock-out / tag-out equipment as needed, ensuring for the safety of themselves and others who may be in the immediate area. Affected and Authorized employees shall receive annual refresher training.

### **A. Initial Training For Authorized Employees**

The training will include the following:

- How to recognize energy sources, types and magnitude.
- How to perform an equipment shutdown and isolate equipment.
- How to safely release stored energy to reach a zero energy state.
- How to apply and remove lock-out/tag-out devices.
- Procedures/requirements for over-ride removal of lock-out/tag-out devices.

Documentation of all training is to be maintained by EHS for a minimum of three (3) years.



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Appendix A - Lockout/Tagout Checklist

INSPECTION CHECKLIST FOR CONTROL OF HAZARDOUS ENERGY			
<b>Employee Name:</b>			
<b>Equipment:</b>		<b>Date:</b>	
<b>Procedure:</b>		<b>Location:</b>	
Hazardous Energies Involved: a) Electrical Voltage: _____ b) Chemical c) Pressure (pneumatic/hydraulic) d) Vacuum e) Thermal: High Temp: _____ Cryogenics: _____		f) Ionizing Radiation g) Non-Ionizing Radiation: Ultraviolet _____ Infrared _____ RF/Microwave _____ Laser _____ Magnetic Fields _____ h) Stored _____ i) Mechanical	
<b>Procedural Steps</b>		<b>YES</b>	<b>NO</b>
<b>TO LOCK OUT THE EQUIPMENT</b>			
1. Notified affected employees and/or outside contractors of LOTO.			
2. Identified all power disconnect points: _____ # of _____			
3. Stopped or powered down equipment.			
4. Isolated equipment from all hazardous energies sources. Number of isolation points: _____			
5. Applied device(s) energy isolating device locked in OFF position.			
6. Attached LOTO Tag to Lock.			
7. Dissipated, drained, or safely released stored or residual energy.			
8. Blocked mechanical parts or removed mechanical links.			
9. Attempted to re-start machinery or re-energize equipment through normal means. Returned switch to OFF position.			
10. Verified no hazardous energies present or isolated. Identify test equipment/meters. _____			
<b>TO RE-ENERGIZE THE EQUIPMENT</b>			
1. Inspected work zone to ensure it is clear of equipment, workers, tools and test equipment.			
2. Unlocked and removed any blocking devices and replaced mechanical linkages.			
3. Repositioned safety valve(s) left open to prevent re-buildup of pressure.			
4. Checked all guarding and safety controls properly replaced.			
5. Warned workers to stay clear of area.			
6. Removed all locks and tags from energy control points.			
7. Verified area clear of personnel.			
8. Restarted/re-energized equipment.			
9. Notified Affected Employees and/or contractors LOTO completed.			



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**Appendix B –Emergency LOTO Lock Removal**

This procedure may be used to remove the lock of a Lockout Authorized Employee who is not on campus when the machinery or equipment must be restarted prior to the Lockout Authorized Employee's return to campus. This procedure may only be implemented by the supervisor of the unavailable Lockout Authorized Employee or, in the event of a group lockout, the Primary Lockout Authorized Employee.

REMOVAL PROCEDURE INFORMATION			
Department:		Date:	
Machine/System:		Machine/System Location:	

Attempt to contact the employee to whom the lock belongs to determine the status of the lockout procedure and advise that the lock will be removed. Method(s) of contact if unable to contact employee:

1. The supervisor or Primary Lockout Authorized Employee must inspect the work area to verify the lockout status and work progress on the machinery or equipment.
2. Remove the Lockout Authorized Person's lock. The supervisor or Primary Lockout Authorized Employee must ensure that lockout integrity is maintained.
3. The supervisor or Primary Lockout Authorized Employee will then assure that the service or maintenance work is completed in order to close the lockout procedure.
4. The supervisor or Primary Lockout Authorized Employee must discuss the status of the work with the Lockout Authorized Employee prior to the Lockout Authorized Employee returning to the work location.

AUTHORIZATION		
I was informed of the status prior to my return to the work location.	Employee Name:	
	Signature	
I certify that I have followed and completed this procedure.	Supervisor Name:	
	Signature:	

