## Lockout - Tagout

Control of Hazardous Energy OSHA Standard 1910.147



Document No. WW - 403 Revised: 04/10/25 Reviewed: 4/10/25



## You will learn...

Purpose of Lockout-Tagout
Requirements for LOTO
Types of Hazardous Energy
Procedures for LOTO
Information Tag Usage





## **Types of Energy**

- ✓ Electrical
- Mechanical
- ✓ Chemical
- ✓ Thermal
- ✓ Hydraulic
- ✓ Pneumatic



(Water or oil pressure)



Electricity



Mechanical





Thermal (Steam or Heat)



Pneumatic (Air or gas pressure)





#### LOTO Q1

Hi, Amy. When you submit this form, the owner will see your name and email address.

 When performing a lockout, which of the energy sources listed below apply to the work done at Wastewater? (1 Point)

Electrical

	Pneumatic
--	-----------

Mechanical

-	Th	e	rr	n	a	1
		~			-	

N		
Lud	mar il	1.0
	l du	IIC.

All of the Above



w

## **Electric shock can kill**

- Almost any voltage can carry enough current to kill under the right condition.
- Only licensed electricians are authorized to work on electrical components



## Safe Electrician Practices

- Use non-conducting tools
- Check circuits are dead before working
- Lock & Tag circuit breakers not control switches (ALL Employees)
- Ensure all control power is deenergized
- Discharge all capacitors after Lockout





#### LOTO Q2

Hi, Amy. When you submit this form, the owner will see your name and email address.

- \* Required
- 1. When performing an electrical LOTO, what should be locked out? (1 Point) \*



The breaker







## **Mechanical Energy Hazards**

#### 2 Types

- Kinetic in motion
- Potential stored



Moving energy Also known as kinetic energy



Stored energy Also known as potential energy





#### LOTO Q3

Hi, Amy. When you submit this form, the owner will see your name and email address.

- \* Required
- 1. What are two types of mechanical energy hazards? (1 Point) \*
  - Potential stored energy



Jumper - hopping





Sleeper - lowered brain activity







## **Kinetic Energy Hazards**

**Energy of moving machinery can cause** 

- Amputations
- Lacerations
- Fractures
- **Loss of life**



## Chemical Energy Hazards

Every chemical should be evaluated before engaging in a task where you might encounter it. Review SDS online (via the Wastewater Homepage) to review the hazards related to the particular chemicals involved in the LOTO at hand. Chemical hazards can include:

- Burns
- Poisoning
- Long-term health issues such as lung disease or cancer
- Respiratory problems
- Suffocation





#### LOTO Q4

Hi, Amy. When you submit this form, the owner will see your name and email address.

\* Required

- 1. When dealing with chemical energy hazards, it is important to know the safe handling procedures. Where can you find this information? (1 Point) \*
  - OSHA book of standards
  - Wastewater Division Gold Book
  - SDS Online
  - Wastewater Policies and Procedures
  - ) Use a combinationo of SDS Online and Wastewater Procedures





## **Potential Energy Hazards**

- Energy stored in machinery
- Weights & Springs
- Pistons under pressure
- Hydraulic controls

Stored potential energy can be released during work causing injury or death



# \_\_\_\_

٠



## **Thermal Energy Hazards**

#### **Energy of Heat (and cold)**

- Hot equipment & fluids will burn you
- Cold fluids can cause injury also
- Quick release of compressed gases can freeze your skin
- Allow equipment to reach a safe temperature before starting work.



## **Hydraulic Energy**

**Energy of Liquids Under Pressure** 

- pressure can cause equipment to move
- **a** rapid release can cause injury
- **or ejection of system parts**

Relieve pressure slowly into a proper container





## **Pneumatic Energy Hazards**

#### **Energy of Compressed Gases**

- uncontrolled release can cause injury
- rapid de-pressurization creates extreme low temperature

Properly vent all systems before starting work



## First Step In LOTO

Know your equipment & systems

- hazards
- isolation points
- Procedure(s) for Lockout

Working on unfamiliar machinery is a hazard Ask for clarification!!





## Who Can Lockout Equipment?

Only Employees who have been trained and authorized by management





#### LOTO Q6

Hi, Amy. When you submit this form, the owner will see your name and email address.

\* Required

1. Who can lockout equipment? (1 Point) \*

All Wastewater employees

- All trained employees
- ) Trained employees that are authorized by management
- Anyone if there is a danger present



w

## **Items used for LOTO**

- Written LOTO procedure(s)
- LOTO Checklist
- Locks & Tags identified to the worker
- Hasps for placing locks & tags
- Breaker Clips for electrical LOTO
- Blank Flanges (pancakes)- for fluid lines
- Valve Covers for LOTO of Valves
- Plug Buckets for electrical plugs



#### LOTO Checklist

• Some procedures require use and completion of the LOTO checklist. Review with your Lead or Supervisor

	То	be foll	Lockout/Tagout (LOTO) Checklist lowed when indicated by specific lockout tagout procedures.		
Work	Order Lea	ad:	Steps to Apply LOTO		
Work	Order #:	Involve	d:		
Work	Order De	scriptio	n:		
S	tep		Action		
1.		Emplo	oyees conducting LOTO has received and are current on LOTO training.		
2.	2. 🗌 P		are for shutdown.		
			Notify Console and all workers in affected area*. Console Operator to notify other affected Operators and shifts.		
			Review applicable LOTO procedures.		
			Identify all energy sources. Work section Supervisors/Leads must work together as a team and agree that all energy sources have been identified.		
			Identify any supporting equipment or systems that must also be shutdown.		
3.		Shutd	Shutdown equipment by normal methods.		
		Note:	Note: Use an orderly shutdown to avoid additional hazards.		
4.		Isolate or block all energy sources for the equipment.			
5.		Apply <u>lockout</u> locks and tags. If group LOTO is used, the employee correctly uses grou devices such as a group lockout box, hasp capable of accepting multiple lockout device			
Affix devices, tags, and locks to each energy-isolating de includes locking gates and valves in the open position so working in an adjacent channel.)		Affix of includ working	devices, tags, and locks to each energy-isolating device in a safe or off configuration (This les locking gates and valves in the open position so they cannot be operated when staff is ng in an adjacent channel.)		
6.		Physically verify energy isolation by operating controls or measuring the energy state. If operation can be initiated by the DCS or other remote location, verify the equipment will not start from the remote location. Return operating control(s) to "off" or "neutral" position after the test.			
7.		Release all stored energy (electrical, pneumatic, hydraulic, fluids, gases, and mechanic			
			Release, restrain, block, disconnect, or otherwise render residual or stored energy safe.		
			Use energy drains (drain pressurized lines, free-wheeling shafts, active ground) whenever possible.		
			If energy can re-accumulate during shutdown, continually verify a safe energy level until lockout/tagout is removed.		
8.		Emplo	oyee identifies unique hazards or circumstances:		

Lockout/Tagout (L	OTO) Checklist Continued
Signatures verify all <u>applicable</u> work sections involved in agree that steps 1-8 have been completed.	identifying equipment for lockout/tagout and applying locks and tags
Facilities Maintenance Supervisor, Lead or designee Signature:	Date:
Electrical Maintenance Supervisor, Lead or designee Signature:	Date:
Equipment Maintenance Supervisor, Lead or designee Signature:	Date:
BMF Supervisor, Lead or designee Signature:	Date:
Operations Supervisor, Lead or designee Signature:	Date:
9.	Perform Work
Steps	Note: If the worksite has been left unattended, verify the integrity of locks and tags before continuing work. to remove LOTO
10.	Inspect the work area to ensure that nonessential items have been removed and the work has been completed and ensure that machine or equipment components are operationally intact.
11.	Ensure that the work area is clear of personnel. Notify the Operations Consciol or BMF staff before lockout or tagout devices are removed and before the equipment are energized. Notify all affected employees in the immediate area that the lockout or tagout device will be removed.
12.	Remove LOTO devices
13.	Inform Console Operator* and affected employees that the work has been completed and that locks and tags have been removed. Console Operator to enter in log book.
14.	Restore Equipment to desired status.
	Comments:
Signatures verify all <u>applicable</u> work sections involved in and/or restoring equipment to service, agree that steps 9-	communication to affected employees, removal of locks and tags, 14 have been completed.
Facilities Maintenance Supervisor, Lead or designee Signature:	Date:
Electrical Maintenance Supervisor Lead or designee	Date:
Lieurical maniferiance Supervisor, Leau or designee	

in anteriarice Supervisor, Lead of designee	
nt Maintenance Supervisor, Lead or designee	Date:
pervisor, Lead or designee Signature:	Date:
ns Supervisor, Lead or designee Signature:	Date:
etain for 1 year)	

cc: DC (retain for 1 year)

Signature Equipme Signature BMF Sup Operation

\*Console for plant and pump stations not including BMF. BMF to notify affected workers



## **Use of Locks & Tags**

- Use only those identified to you
- Never use another workers lock or tag
- Ask your supervisor if you need more LOTO equipment





#### LOTO Q7

Hi, Amy. When you submit this form, the owner will see your name and email address.

\* Required

1. When there is only one lock available, is it ok to share? (1 Point) \*

Yes

No No

Submit



## **6 Step LOTO Procedure**

- **1.** Prepare for Shutdown
- 2. Shutdown Equipment
- **3.** Isolate all energy sources
- 4. Place Locking devices & Tags
- **5.** Release or contain Stored Energy
- 6. Verify Equipment Isolation





## 1. Prepare for Shutdown

**Understand equipment hazards** 

LOTO Procedures need to be written, documented and used for the control of potentially hazardous energy. The only exception would be for a piece of equipment or machine when all of the following elements exist:

- 1. The machine or equipment has no potential for stored energy or reaccumulation of stored energy.
- 2. The machine or equipment has a single energy source.

#### Cont. on next slide >



## 1. Prepare for Shutdown

- 3. The isolation and locking out of that energy source will completely deenergize and deactivate the machine or equipment.
- 4. The machine or equipment is isolated from that energy source and locked out during servicing or maintenance.
- 5. A single lockout device will achieve a locked out condition.
- 6. The lockout device is under the exclusive control of the employee performing the service or maintenance.

Cont. on next slide >



## 1. Prepare for Shutdown

- 7. The servicing or maintenance does not create a hazard for other employees.
- 8. The employer, in utilizing this exception, has had no accidents involving the unexpected activation or reenergization of the machine or equipment during servicing or maintenance.

In other words:

We need to write procedures for almost all LOTO's we Perform.

Note: Procedures must be written before a lockout can be performed. Use the template LOTO Multiple Energy in word to complete procedures.

Notify Console or BMF Admin and other workers of shutdown





## 2. Shutdown Equipment

Use appropriate shutdown procedure

**Turn all switches to OFF** 

**Shut all control valves** 

**Disable all sources of energy** 



## **3. Isolate All Energy Sources**

#### Energy isolating device(s).

All energy isolating devices used to control the energy to the machine or equipment must be physically located and placed in the "off" position to disconnect the machine or equipment from its energy source and deenergize it. Control circuitry does not provide a physical barrier that controls hazardous energy and, therefore, is not an energy isolation device. For example, push buttons, selector switches, and interlocking gates are not energy isolation devices and are not permissible substitutes for energy isolation devices under the standard.

Approved Energy Isolating Devices allowed at the Wastewater Division include the MCC breakers, manually operated electrical circuit breakers or disconnect switches used to block or isolate energy. Under no circumstances can a push button, selector switch or other control circuit type devices be used and are not isolating devices.





## **3. Isolate All Energy Sources**







Using switch only, energy can still kill



Always isolate energy sources



## 3. Isolate All Energy Sources

Shut valves

Open breakers & disconnects



## 4. Place Your Locks & Tags and devices on

#### Valves

**Breakers / electrical disconnects** 

**Block or disconnect all lines** 

**Tag blank flanges** 



## 5. Release or Block all Stored Energy

- ✓ Discharge capacitors (electricians only)
- ✓ Block or release springs
- ✓ Block elevated parts
- ✓ Stop rotating flywheels
- ✓ Relieve system pressure
- ✓ Drain fluids
- ✓ Vent gases
- ✓ Allow system to cool or warm as needed



## 6. Verify Equipment Isolation

- **Check that all other workers are clear**
- **Check that locking devices are securely placed**
- Check isolation
- **Attempt manual startup**
- ❑ Attempt DCS start by contacting console
- **Return Controls to OFF/Neutral**





#### LOTO Q8

Hi, Amy. When you submit this form, the owner will see your name and email address.

\* Required

1. After locking out a piece of equipment, the procedure to verify equipment isolation is done in what order? (1 Point) \*

Check isolation/locking device securely placed

Attempt normal startup

Check all other workers are clear

Return controls to off/neutral



## **Release from LOTO**

- **Inspect Area and Equipment**
- **Ensure all Machine Guards in place**
- Move tools away from equipment
- Inform console or BMF Admin and others of startup
- **Restore system connections**
- **Remove Locks & Tags**
- **Restore equipment to normal**
- **Conduct normal startup**



## **Group Lockout**

- A group of authorized employees may need to service equipment that has several energy sources and several energy isolating devices.
- Under group lockout, just one designated person in the group assumes responsibility for securing each energy-isolating device.
- There are a number of variations of group lockout; the group lockbox variation (see next 2 slides) reduces the number of locks and makes it easier for employees to coordinate their activities.



# Group lockout with multiple energy-isolating devices

- The designated person (shown in red see next slide) locks out each of these energy-isolating devices and puts the key into a group lockbox with a multi-lock hasp.
- These authorized employees (shown in blue see next slide) place their locks on the group lockbox before they begin work.
- After each worker finishes, the worker removes his lock from the box. The designated person's lock is the last lock removed.



## Group lockout with multiple energy-isolating devices continued

This designated person locks out each of these energy-isolating devices and puts the key into a group lockbox with a multi-lock hasp.





These authorized employees place their locks on the group lockbox before they begin work. After each worker finishes, the worker removes his or her lock from the box.





#### Group lockout: Fewer lockout devices required

For complicated energy-control systems, group lockout can reduce the number of lockout devices that employees must use.

Here is an example: Ten employees do maintenance on a machine that has five energy sources that need to be isolated.

- Traditional lockout requires 50 locks. (*Each employee places a lock on each energy-isolating device.*)
- Group lockout requires 15 locks. (A designated person in the group places a lock on each of the five energy-isolating devices. Each authorized employee places his or her own lock on the group lockbox containing the five keys.)

Group lockout can also reduce the risk of injury for service and maintenance employees, contractors, and other affected employees who do not regularly work with complicated energy control systems.





- Step 1 A designated, authorized employee in the group secures each energyisolating device with a personal lock.
- Step 2 The same designated, authorized employee places the key that fits each lock in a group lockbox with a multilock hasp.
- Step 3 The other authorized employees in the group secure the lockbox they attach their personal locks to the box before beginning their service work.
- Step 4 After each employee finishes service work on the equipment, that employee removes his or her personal lock from the lockbox.
- Step 5 After all the employees have finished their service work and removed their personal locks from the lockbox, the designated, authorized employee who placed the key in the box removes it.
- Step 6 The designated, authorized employee uses the key to remove the
- lock from each energy-isolating device.





#### LOTO Q9

Hi, Amy. When you submit this form, the owner will see your name and email address.

\* Required

1. If a piece of equipment already has a lock and tag, do you need to place your own lock and tags before working on the equipment? (1 Point) \*

) Yes

) No

Submit



## Contractors

<u>All contractor employees</u> must follow OR-OSHA procedures!

• The contract administrator shall inform Eugene employees of contractors restrictions and prohibitions.



## Info vs LOTO tags



Front & Back of Info Tag





Front & Back of LOTO Tag

Info tags look different from LOTO tags. Whichever tag it is – READ THE TAG.



## Who can remove Locks & Tags?

Only the employee who placed the tag or

Supervisor (Lead or Manager in absence of Supervisor), <u>after confirming employee is</u> <u>not at facility.</u> Worker who placed the tag needs to be informed of tag removal before resuming work at facility



### A piece of equipment already has a lock and tag. Do I have to place my own locks & tags?

YES. Each person working on the equipment must place their own lock(s) and tag(s) to ensure their safety.



A piece of equipment has a local control switch that supports a locking device. Can I lock the equipment at the switch instead of the breaker? **NO.** Local control switches used to operate or isolate the equipment are not acceptable lockout points. The breaker must be opened and locked out.





#### LOTO Q10

Hi, Amy. When you submit this form, the owner will see your name and email address.

\* Required

1. Information Tags are for what purpose? (1 Point) \*

Information tags, as opposed to lockout tags, may not be applied to devices designed to accept locks for control of hazardous energy.

The sole purpose of communicating information that is not relevant to lockout or control of hazardous energy.

Both are true

Submit





## Lockout-Tagout Protects YOU!

USE Proper Lockout - Tagout Procedures Please be careful when working on equipment





## Removed Lockout Tags

- Removal of Lockout tags must be authorized as described in LOTO procedure
- Tags that are removed by someone other than the originator should be returned to originators supervisor.
- The supervisor communicates the removal to the tag originator



When you have completed this training, send an Email/Teams message to the Safety Manager to review your quiz answers.