

# Written Energy Control Procedures



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# Written Energy Control Procedures

- Employers must develop, document, and use specific procedures to control potentially hazardous energy when employees are servicing equipment or machinery

# What is Covered by LOTO?

- **Servicing and maintenance**
- Normal production operations where:
  - Employees by-pass guard(s)
  - Employees place any part of their body in a hazardous area

# What is Not Covered by LOTO Rules?

- Construction, agriculture, and maritime
- Normal production operations (subpart O)
- Cord-and-plug under the control of employee (written procedure still required)
- Exposure to electrical conductors (subpart S and electrical safety-related work practices)

# When are Written Procedures Not Required?

- The equipment has **no potential for stored or residual energy** or re-accumulation of stored energy;
- the equipment has a **single energy source** which can be isolated;
- the isolation and locking out of that energy source will completely de-energize and deactivate the machine or equipment;
- the **equipment is isolated from that energy source** and locked out during servicing or maintenance;
- a **single lockout device** will achieve a locked-out condition;
- the lockout device is under the **exclusive control of the authorized employee** performing the servicing or maintenance;
- the **maintenance does not create hazards** for other employees;
- the employer has had **no prior accidents** involving the unexpected activation or re-energization of the machine

# Written Energy Control Procedures

- The procedures shall clearly and **specifically outline the scope, purpose, authorization, rules, and techniques to be utilized** for the control of hazardous energy, and the means to enforce compliance including, but not limited to, the following:
  - A specific statement of the **intended use of the procedure**;
  - **Specific steps for shutting down, isolating, blocking and securing equipment** to control hazardous energy;
  - Specific procedural **steps for placement, removal & transfer of lockout/tagout devices**
  - Specific **requirements for testing equipment to determine and verify the effectiveness of lockout devices**, tagout devices, and other energy control measures.

# Written Energy Control Procedures

## Periodic Procedure Review

- Employer shall conduct **annual energy control procedure inspection** to ensure that the process is unchanged
- Inspection shall be performed by an **authorized employee other than the ones(s) utilizing the energy control procedure**
- The periodic inspection is conducted to **correct deficiencies**
- **LOCKOUT:** shall include a review, between **the inspector and each authorized employee**, of that employee's responsibilities under the energy control procedure
- **TAGOUT:** inspection shall include a review, between the **inspector and each authorized and affected employee**, of that employee's responsibilities under the energy control procedure
- The employer shall **certify periodic inspections** have been performed.
- The certification shall **identify the equipment, the date of the inspection, and the employees included** in the inspection

# Specific Energy Control Procedures

- To assure that before any employee performs servicing or maintenance on a machine or equipment, the machine or equipment was isolated and rendered inoperative, you need to develop and document specific procedures for each machine or group of machines. To assure compliance you should:
  - **Make an inventory** of each machine or process for the entire worksite where servicing and maintenance are performed.
  - Group the machines/processes by similar characteristics (i.e. cord-n-plug; single energy source; types of energy - hydraulic, pneumatic, kinetic, thermal, chemical) which can cause unexpected energization or start up of the machines/processes or release of stored energy.
  - **Develop specific procedures to indicate the proper method to lockout and tagout equipment** while servicing or maintenance is performed. Note: should be done for each machine/process group identified.



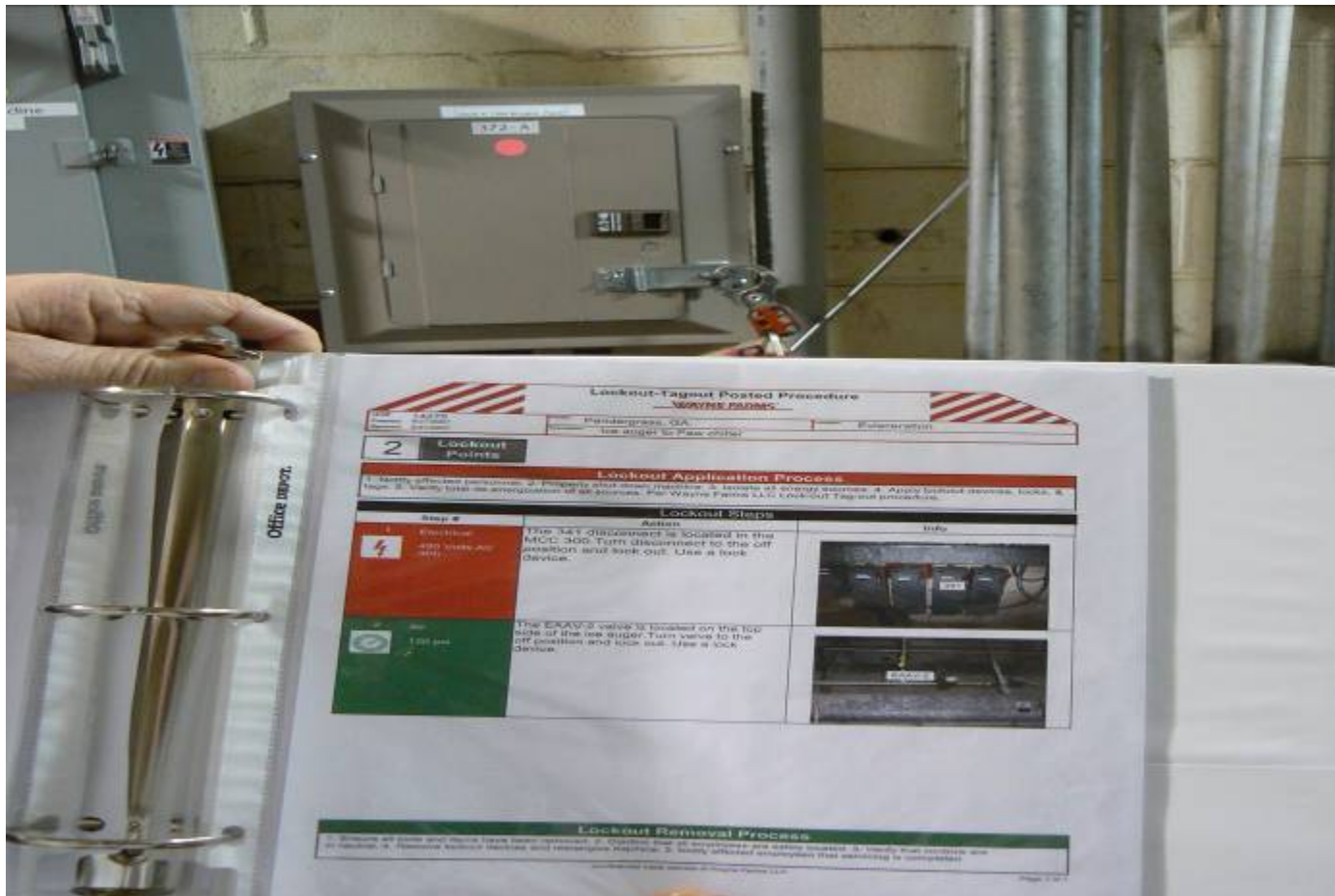
# Specific Energy Control Procedures

- Use a worksheet to help you develop specific procedures as follows:
  - **Operator Controls** - The type of controls available to the operator need to be determined. This should help identify energy sources and lockout capacity.
  - **Energy Sources** - Can the machine be locked out at the main power source? Some machine installations involve complex wiring schemes. A qualified electrical should evaluate machines where necessary to determine if all electrical circuits can be locked out. Check and/or list energy sources present on this equipment.
  - **Shutdown Procedures** - List in order the steps necessary to shut down and de-energize the equipment. **You must be specific. For stored energy, be specific about how the energy will be dissipated** or restrained.
  - **Startup Procedure** - List in order the steps necessary to re-activate (energize) the equipment. Ensure during each step that personnel are clear during any testing or activation.

# Energy Control Procedure

- Notification of affected and authorized employees
- Preparation for shutdown (i.e.: purging)
- Machine or equipment shutdown
- Machine or equipment isolation
- Lockout/tagout device application
- Release stored energy
- Verification of isolation
- Maintenance performed
- Release from lockout/tagout
- Notification of employees

# Equipment Specific Procedures



# Lockout Procedure – Step 1

- NOTIFICATION OF AFFECTED EMPLOYEES
  - Before controls are applied, and before they are removed

# Lockout Procedure – Step 2

- PREPARATION FOR SHUTDOWN
  - Review existing procedure for changes
  - EDIT EXISTING SOP or write a new procedure, if necessary
- Knowledge of the type and magnitude of energy and methods to control energy

# Lockout Procedure – Step 3

- MACHINE OR EQUIPMENT SHUTDOWN
  - Orderly shutdown to avoid increased hazard

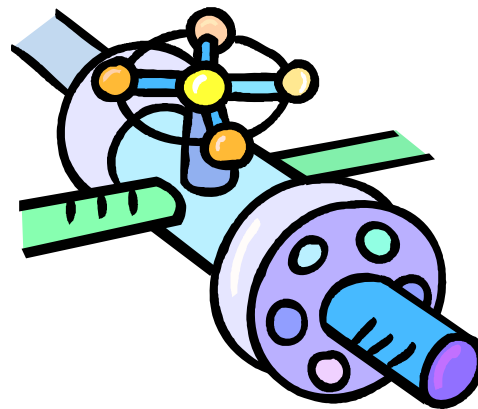


# Lockout Procedure – Step 4

- MACHINE OR EQUIPMENT ISOLATION
  - All energy isolation devices located and operated to isolate machine

# Line Breaking

Means the intentional opening of a pipe, line, or duct that is or has been carrying flammable, corrosive, or toxic material, an inert gas, or any fluid at a volume, pressure, or temperature capable of causing injury





# Line Blanking or Blinding

- Means the absolute closure of a pipe, line, or duct by fastening of a solid plate that completely covers the bore and that is capable of withstanding the maximum pressure of the pipe, line, or duct with no leakage beyond the plate.

# Double Block and Bleed

Means the closure of a line, duct, or pipe by closing and locking or tagging two in-line valves and by opening and locking or tagging a drain or vent valve in the line between the two closed valves.



# Lockout procedure – Step 5

- LOCKOUT OR TAGOUT DEVICE APPLICATION

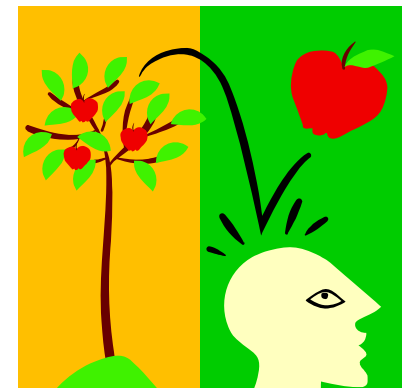
- Affixed by authorized employee holding energy isolating device in the safe or off position

# Proper Lockout



# Lockout procedure – Step 6

- STORED ENERGY
  - Relieve all stored energy and continue to verify if there is a chance of re-accumulation
- Batteries and capacitors
- Pressure differential
  - Hydraulic
  - Pneumatic
  - Vacuum
- Springs
- Gravity



# Lockout procedure – Step 7

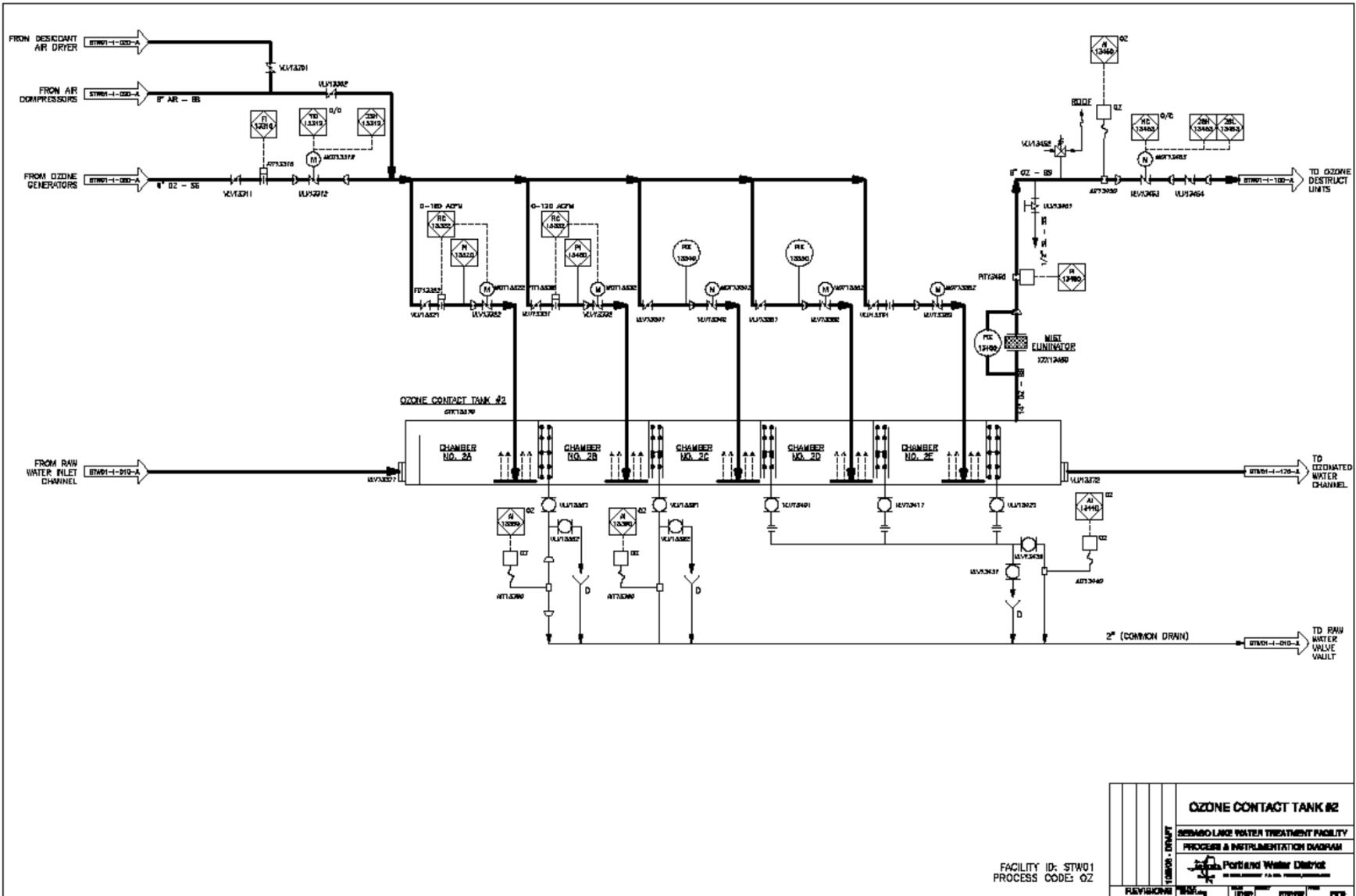
## ■ VERIFICATION OF ISOLATION

- Prior to servicing or maintenance, authorized employee must verify machine has been de-energized
  - Test start buttons
  - Open valves safety to atmosphere
  - Read pressure gauges

# Lockout procedure – Step 8

- RELEASE FROM LOCKOUT OR TAGOUT
- Inspect work area to ensure removal of tools and non-essentials
- Employees safely positioned and notified
- Lockout/tagout removal (by employee who applied)

# Using P&IDs for Energy Control SOP





**MACHINE SPECIFIC ENERGY CONTROL PROCEDURES (LOCKOUT/TAGOUT)**

**Machine/equipment:**

**Equipment Identification:**

**Operator Controls:**

**Energy Sources:**

- Electrical     Steam     Pneumatic     Other  
 Natural Gas     Hydraulic     Stored Energy Source \_\_\_\_\_

**Identify Energy Source/location**

**Lockable  
(Yes)(No)**

**Type Device Required**

**Shutdown Procedures:**

**Lock Type & Procedure:**

**De-energized & Verified (How):**

**Startup Procedure:**

SAMPLE MACHINE SPECIFIC ENERGY CONTROL PROCEDURES (LOCKOUT/TAGOUT)		
<b>Machine/equipment</b>	Part Revolution Mechanical Power Press	
<b>Equipment Identification</b>	Minster straight-side press #38 Minster OBI press #40	
<b>Operator Controls</b>	Control panel	
<b>Energy Sources:</b> <input checked="" type="checkbox"/> Electrical <input type="checkbox"/> Steam <input checked="" type="checkbox"/> Pneumatic <input type="checkbox"/> Other <input type="checkbox"/> Natural Gas <input type="checkbox"/> Hydraulic <input checked="" type="checkbox"/> Stored Energy Source - Kinetic		
<b>Identify Energy Source/location</b>	<b>Lockable</b>	<b>Type Device Required</b>
Electrical	Yes	Padlock
Hydraulic (lube system)	No	De-energized when power off
Pneumatic Overhead Air Supply	Yes	Padlock
<b>Shutdown Procedures:</b>		
1. Notify all affected employees of lockout 2. Position slide to desired position 3. Turn off all motors 4. Place tag on controls indicating lockout 5. Check to assure the flywheel is stopped 6. Turn press controls "off" and remove key 7. Install die block	8. Turn off main electrical supply 9. Turn off pneumatic supply and bleed system 10. Turn all pressure regulators to zero 11. Bleed residual air counterbalance and die cushions 12. Turn hydraulic pumps off bleed and check gauges, read "zero" pressure	
<b>Lock Type &amp; Procedure:</b>		
_ Electrical - disconnect at bus duct, plug open door, remove fuses, close door. Secure with padlock (if needed, use multiple lock device) _ Pneumatic - locate main shutoff valve at overhead air supply line. Close valve and lock (use multiple locking device when needed). All valves are self bleeding type. Check and bleed down counterbalance and verify all gauges read "zero".		
<b>De-energized &amp; Verified (How):</b>		
_ Electrical - Use voltmeter to verify power has been de-energized. Attempt to start press by activating start button. _ Pneumatic - Verify all pressure gauges read "zero". Hydraulic - Verify all pressure gauges read "zero".		
<b>Startup Procedure</b>		
1. Remove all tools and materials from area. 2. Replace all covers and guarding devices 3. Remove die block 4. Check that all personnel are in a safe area out from any hazards	5. Restore energy sources 6. Adjust pressures to air and hydraulics 7. Restart equipment and verify operation 8. Notify all affected employees	