Hazardous Energy Control/Lockout

MESH 8.0 - Process Safety – Awareness Training
Scope/Purpose

• The hazardous energy control/lockout program establishes requirements for the control of **hazardous energy**

• Covers **maintenance and servicing tasks** when **unexpected** activation or release of stored energy can occur

• Primary purpose of the program is to furnish lockout procedures that will reduce the risk of injury to employees and contractors performing maintenance and servicing tasks on equipment
Definitions

• **Affected Person**
  • The individual who operates equipment or an individual who works in an area in which servicing or maintenance activities under lockout are being performed.

• **Authorized Person**
  • The individual who is authorized to lockout a piece of equipment in order to perform servicing or maintenance activities

• **Stored Energy**
  • A potential hazard that exists after a primary energy source has been locked out.
  • For example, a pump motor for a hydraulic system may be locked out, effectively stopping fluid flow, but energy in the form of hydraulic pressure may still exist in the machine or hydraulic line. This pressure must be released before work proceeds.

• **Zero Energy State**
  • When all sources of hazardous energy have been locked out and stored energy has been released such that the possibility of unexpected activation or movement has been eliminated.
Energy control is the process of turning off a piece of equipment, placing a lock on each source of hazardous energy.

Energy control also involves releasing stored energy in order to bring the equipment to a zero energy state.

Energy control is also called “lockout.”
Hazardous energy is any level of energy present in a piece of equipment that can cause unexpected activation, start-up, or movement that can cause injury.

Types of hazardous energy include:

- Electrical
- Pneumatic (Pressurized Air)
- Chemical (Ammonia, Natural Gas, Nitrogen, Coolants)
- Hydraulic (Fluids Under Pressure)
- Water
- Thermal (Hot or Cold)
- Radiation
- Magnetic
- Stored Energy
  - Rotation
  - Gravity
  - Tension
Application

• Lockout must be used when performing **SERVICING OR MAINTENANCE** on equipment when a safeguard is bypassed or when any part of the body is placed into an area where injury would result if the equipment starts unexpectedly (danger zone).

• Minor servicing activities which take place during **NORMAL PRODUCTION OPERATIONS** do not require the use of lockout provided that the tasks are *routine, repetitive, and integral* to the use of the equipment for production and safeguarding or another approved method is provided to protect operators performing the task.
Lockout is **NOT** required for plug connected equipment if the equipment or tool can be unplugged, nor is an equipment specific procedure required.

- The person performing work on the piece of equipment must unplug the equipment before beginning work
- The plug must be under the exclusive control of the person performing the work
Partial Energy Work Permit
- There may be situations when a piece of equipment must be partially energized to perform a task.
- A *Partial Energy Work Permit* must be utilized to authorize such activities.
- Work on partially energized equipment is only allowed when it is absolutely necessary for energy to be present.
- Convenience or time savings may not be used as justification.

Line Breaking Permit
- A Line Breaking Permit is required whenever breaking into a hazardous substance line.
- Hazardous substance process lines include:
  - Fluids or gases at pressures greater than 10 psig (0.7 bar)
  - Thermal temperatures > 135°F (57°C) or < 41°F (5°C)
  - Liquids with a flash point less than 100°F (38°C)
  - Any substance for which an SDS is required to be maintained.
- Hazardous substance process lines at Sumter include:
  - Compressed air distribution lines
  - Natural gas lines
  - Wastewater conveyance lines
  - Water lines
  - Oxygen lines
  - Paint Line Washer Feed lines
Energy Isolation Devices

An energy isolation device is a physical device that prevents the transmission or release of energy.

Examples include:

- Electrical disconnects
- Circuit breakers
- Lockable valves
- Blanks or blinds
- Blocks/pins under suspended objects
Can emergency stops, feed hold buttons, or key switches be used for lockout?

No. Locking of buttons or other control circuitry such as PLC controls does not qualify as energy isolation. Control circuits can fail due to component failure, program errors, magnetic field interference, electrical surges, improper use, or lack of maintenance.

When lockout is required, electrical energy must be isolated using an approved energy isolation device – such as an electrical disconnect or circuit breaker – that provides a physical separation between the hazardous energy source and machine.
Written energy control procedures are required for each piece of equipment. These procedures tell us the steps that we must take in order to bring the equipment to a zero energy state and must be located on the equipment.

Lockout procedures must contain the following information:

- Equipment identification;
- Identification of applicable production-related tasks that require lockout;
- The type and magnitude of all hazardous energy sources;
- List of all energy isolation devices;
- Specific steps necessary to obtain zero energy state; and
- Specific steps for verifying that stored energy has been released and the machine is in a zero energy state condition.

The applicable written energy control procedure must be reviewed by employees before locking out a piece of equipment.
Locks

- The use of tags without locks is not permitted for lockout.

- All employees working on a piece of equipment must affix locks to the applicable energy isolating devices in accordance with the written procedure.

- Employees may not work under the protection of another employee’s lock.

- Locks used for energy control may only have one key.

- May not be used for any other purposes.

- Never remove a lock you did not place unless you are following the lock removal procedure.

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**Affected**

- Yes

**Authorized**

- Yes

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<th>Color</th>
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Basic Lockout Sequence

1 - Notify employees in area that the equipment will be locked out

2 - Bring equipment to a complete stop

3 - Turn off energy isolation devices listed in written procedure

4 - Place lockout adaptors on energy isolation devices  
   IF REQUIRED

5 - Affix a multi-lock hasp to each energy isolation device

6 - Place red lock on each energy isolation device

7 - Verify that e-stops have been released

8 - Verify zero energy state

9 - Maintain key to locks

10 - Complete the work

Affected
Authorized ✓
Contractors

• Contractors must follow Eaton Energy Control policies.

• Eaton will issue each contractor employee a sufficient number of RED locks if they do not have their own.

• Equipment lockout will be supervised by an Eaton Authorized supervisor

• RED locks must be returned to Eaton at the end of the project
Inspections and Review

- Periodic documented inspections will be conducted at least quarterly as a “spot check” to verify that energy control is utilized properly.
- Verification of Proficiency is performed annually to evaluate each individual’s energy control competency.
- Annual review of Energy Control program must be completed.

Affected
Authorized ✓