

LOCKOUT/TAGOUT (LO/TO) FOR MACHINES & EQUIPMENT: PROGRAM OVERVIEW

Introduction

During normal operation, guards must be in place to protect employees from contacting moving or dangerous parts of machines or equipment that could lead to entanglement, amputation/laceration, and pinching, pinning, crushing, or other injury. However, it may be necessary to remove or inactivate guards during maintenance and repair operations. In these situations, a lockout/tagout (LO/TO) program must be observed.

LO/TO is a systematic approach to minimizing the risk of injury resulting from the unexpected start-up (energization) of a machine/equipment during servicing and repair. LO/TO consists of several key elements, which are summarized in this SOP.

1. Employee Training and Awareness
2. Written LO/TO Procedures
3. Periodic Inspection

Examples of equipment and machines that may be encountered at UNL that may be subject to LO/TO include but are not limited to: gas, water and steam lines; HVAC equipment including air handlers and boilers; kitchen equipment such as slicers, mixers, dishwashers, trash compactors, and garbage disposals; woodworking and metalworking machines; printing presses; laboratory equipment such as centrifuges, autoclaves and high powered lasers; conveyors; motor vehicles; hydraulic lifts; elevators, etc.

Regulatory Basis

The content of this SOP and UNL's LO/TO program is based on the Occupational Safety and Health Administration (OSHA) general industry standard, 29 CFR 1910.147, *The Control of Hazardous Energy*.

Scope of the Program

All employees who operate, service, maintain, or repair machines and equipment that are associated with any potentially hazardous energy source (i.e., electrical, mechanical, hydraulic, pneumatic, chemical, thermal, gravity, radiation) are subject to one or more elements of UNL's LO/TO program.

In general, LO/TO must be observed during service and maintenance activities including: constructing, installing, setting up, adjusting, inspecting, modifying, lubricating, cleaning or un-jamming, and adjusting or changing tools. See EHS SOP, ***Lockout/Tagout for Machines & Equipment: Special Circumstances***.

This SOP and the cited OSHA standard do NOT apply to work on electric systems operating at 50 volts or more. Rather, these activities are subject to specific energy isolation requirements and work practice controls covered by other OSHA standards (and different EHS SOPs and UNL programs). OSHA depicts the relationship of their energy isolation standards relative to electrical systems and machines/equipment in Figure 3-1, reprinted at the end of this SOP.

Employee Training

All “authorized” and “affected” employees must complete LO/TO training.

- An “**Affected Employee**” is an employee whose job requires him/her to operate or use a machine or equipment on which servicing or maintenance is being performed under LO/TO, or whose job requires him/her to work in an area in which such servicing or maintenance is being performed. Affected employees must be instructed in the purpose and use of the energy control procedure and advised to refrain from attempting to remove a LO/TO device or reenergize a machine or equipment during LO/TO. This training must be conducted by their supervisor or other knowledgeable authority.
- An “**Authorized Employee**” is a person who locks out or tags out machines or equipment in order to perform servicing or maintenance on that machine or equipment. Authorized employees must complete the general awareness training provided by EHS (available as a web-based module titled **Lockout/Tagout for Machines and Equipment**) and supplemental specific training provided by a competent individual who is experienced with the machine/equipment and prescribed, written LO/TO procedures. Generally, this a supervisor or his/her delegate. Specific training must include site-specific equipment/machines and related LO/TO procedures. See EHS SOP, **Lockout/Tagout for Machines & Equipment: Training and Inspections** for additional information.

Written LO/TO Procedures

As a general rule, specific procedures must be documented for each piece of equipment subject to LO/TO. These procedures must contain the following information:

- A specific statement of the intended use of the procedure;
- Specific procedural steps for shutting down, isolating, blocking, and securing machines/equipment to control all sources of hazardous energy;
- Specific procedural steps for the placement, removal, and transfer of LO/TO devices and responsibility for the devices;
- Specific requirements for testing a machine or equipment to determine and verify the effectiveness of LO/TO device and other energy control measures.

See EHS SOP, **Lockout/Tagout for Machines & Equipment: Written Procedures**, which includes a template for documenting LO/TO procedures.

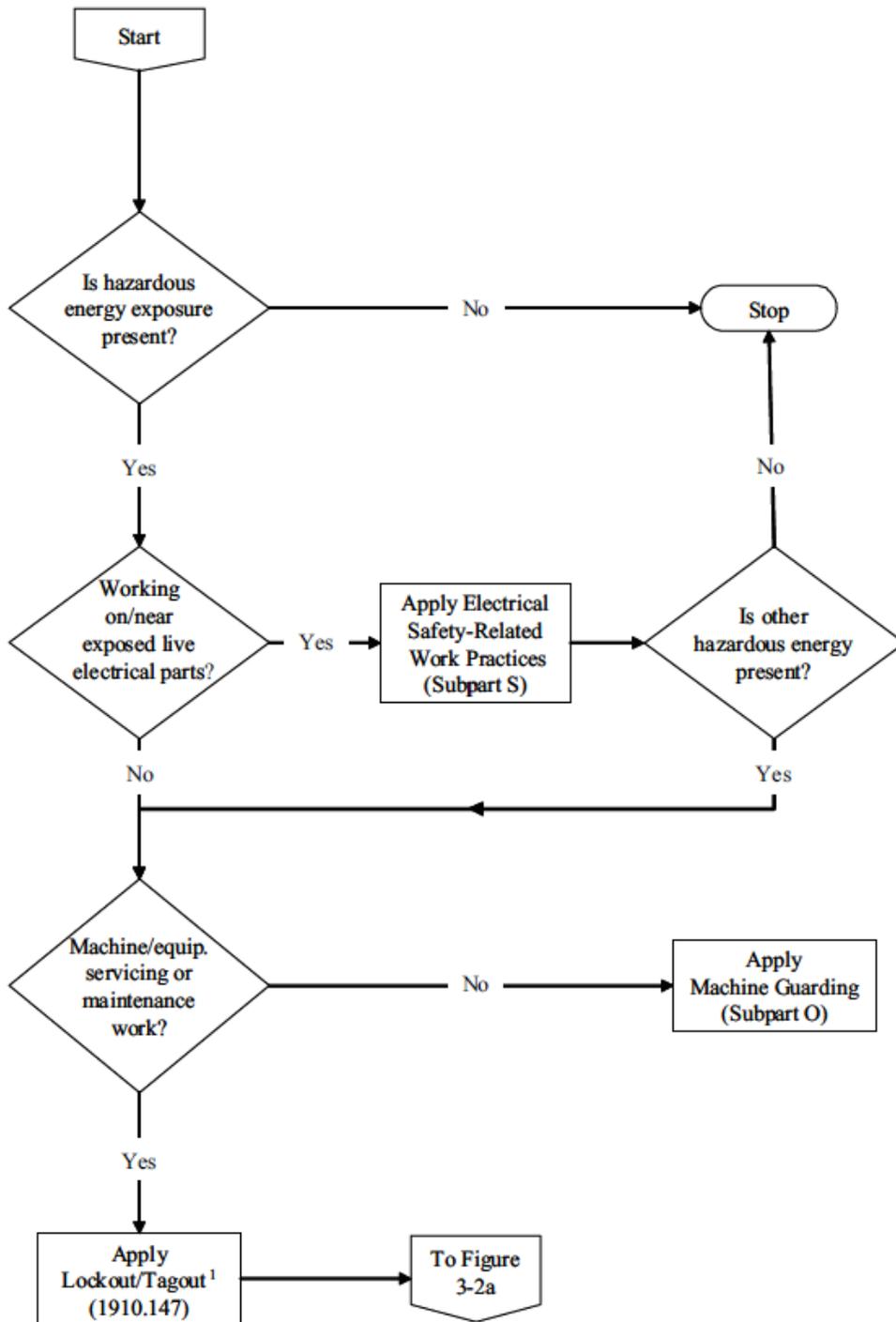
Periodic Review

Supervisors must periodically (at least annually) review written procedures & observe employees performing tasks to verify continued efficacy and employee adherence to LO/TO procedures.

The review must include discussion with “Authorized” and “Affected Employees” to reinforce each employee’s responsibilities relative to the procedure. See the following EHS SOPs for additional information:

- ***Lockout/Tagout for Machines & Equipment: Training and Inspections***
- ***Lockout/Tagout for Machines & Equipment: Written Procedures***

Figure 3-1: LOTO vs. Machine Guarding vs. Electrical Safety-Related Work Practices¹



¹ This flow diagram does not address energy sources covered by §1910.269 requirements and it does not contain the exemptions, including the minor servicing exception, to the LOTO standard [See §1910.147(a)].