

LOCKOUT/TAGOUT FOR MACHINES & EQUIPMENT: SPECIAL CIRCUMSTANCES

(For assistance, please contact EHS at (402) 472-4925, or visit our web site at <http://ehs.unl.edu/>)

Introduction

This SOP is intended to work in tandem with other EHS SOPs related to Lockout/Tagout (LO/TO):

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

The specific purpose of this SOP is to describe unique circumstances where LO/TO general requirements, as described in the SOPs listed above, are modified.

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*.

Shift Changes

When a LO/TO extends beyond one shift, there is a higher risk of accidents, often attributed to a lack of communication between affected and authorized employees of different shifts. Therefore, the following additional procedural steps are necessary. Authorized employees from BOTH shifts should meet together at the lockout/tagout device(s). The oncoming authorized employee should place their lock/tag on the energy-isolating device BEFORE the exiting authorized employee going off shift removes their lock and/or tag. The oncoming authorized employee must then re-verify that all safety devices (such as blocking) are in place, stored energy has been relieved, and that the system has been effectively locked. On-coming affected employees should also be alerted.

Non-Routine LO/TO Device Removal

Each lockout or tagout device must be removed by the employee who applied the device. When the authorized employee is not available to remove it, their supervisor must contact EHS to document the occurrence and develop specific procedures that provide equivalent safety.

Group LO/TO

In some cases, service/maintenance/repair of a particular machine/equipment may involve more than one person. In this case, a group LO/TO procedure must be

implemented. The process is similar to that described previously, but with a few nuances to account for the involvement of more than one person.

- Each authorized employee must utilize a personalized device.
- Each authorized employee must be afforded the opportunity to verify energy isolation and appropriate placement of energy isolation devices.
- One person must be designated with responsibility to coordinate all authorized employees involved in the process, including overseeing of proper implementation of LO/TO procedures and key control.

Non-UNL Personnel

Contractors and other outside employees (e.g., temporary workers, contract employees, etc.) may be hired to operate or install/service UNL-owned machines/equipment.

- If a contract employee is hired to operate UNL-owned machines/equipment that may be subject to LO/TO requirements, the hiring department is responsible to ensure that the contract employee completes all applicable training in the same manner and with the same content that would apply to a regular employee (as described earlier in this training and consisting of this module as well as on-the-job equipment/machinery/procedure-specific training). The contract employee must follow UNL-established procedures.
- If a contractor is hired to service/repair UNL-owned machines/equipment that is subject to LO/TO requirements, they must provide a copy of their LO/TO procedures and a description of the LO/TO devices that they will use to the hiring department. The hiring department is responsible to communicate this information to all affected employees so that they refrain from any action that may defeat the LO/TO status.

In some cases, the service/repair may require involvement/cooperative actions of both contractors and UNL employees. In this case, the hiring department and contractor must agree whether to use the contractors LO/TO procedures, UNL procedures, or a combination of both. The agreed-upon procedure must be documented, consistent with all requirements of OSHA's LO/TO standard, and be protective of all UNL and contractor employees. All affected and authorized employees (UNL and Contractor) must be appropriately informed, consistent with their roles and responsibilities. **Tag Out** OSHA defines a "**Tagout device**" as a prominent warning device, such as a tag and a means of attachment, which can be securely fastened to an energy-isolating device in accordance with an established procedure, to indicate that the energy-isolating device and the equipment being controlled may not be operated until the tagout device is removed. It differs from a lockout device in that it is not as robust since it does not involve a "lock."

Tagout devices can be used in lieu of lockout devices only in very limited situations, generally, only when an energy isolation device is not capable of being locked out. Like lockout devices, tagout devices must also be personal, unique/distinct, and durable. They must identify the person placing them by name; they must not be used for a purpose other than controlling hazardous energy sources; and they must be standardized (print and format). Other OSHA-required tagout device attributes and placement requirements include the following:

- Tags must warn against hazardous conditions if the machine is energized, and offer clear instruction such as: “Do Not Start,” “Do Not Open,” “Do Not Close,” “Do Not Energize,” or “Do Not Operate.”
- Tags and their means of attachment must be substantial.
 - The tag should be made of materials that are durable enough to withstand the environmental conditions encountered in the workplace.
 - Tag attachments, used to attach the tag, must be non-reusable, self-locking, and non-releasable, with a minimum unlocking strength of 50 pounds.
 - Tags must be attachable by hand, and the device for attaching the tag should be a one-piece nylon cable tie or its equivalent.
- Tags must be securely attached to energy-isolating devices so that they cannot be inadvertently or accidentally detached during use.
- Where a tag cannot be affixed directly to the energy-isolating device, the tag must be located as close as safely possible to the isolation device, in a position that will be immediately obvious to anyone attempting to operate the isolating device.
- Tagout devices must be affixed in such a manner to clearly indicate that operation or movement of the energy-isolating device from the "safe" or "off" position is prohibited.
- As with lockout devices, tagout devices are to be removed only by the person placing them and are never to be bypassed, ignored, or otherwise defeated.
- When a tagout device is used, an equivalent level of safety to a lockout device must be achieved. This is generally accomplished by supplemental safety measures such as removal of an isolating circuit element, blocking of a controlling switch, opening of an extra disconnecting device, removal of a valve handle, etc.

Temporary Energization

In some cases, it may be necessary to temporarily re-energize a machine/ equipment that is under LO/TO for the purpose of testing, troubleshooting, or positioning the machinery/equipment or one of its components prior to completing service/maintenance/repair.

In these situations, an inspection must be conducted prior to temporarily removing the LO/TO device. It must be confirmed that:

- The machinery/equipment has been cleared of tools and unnecessary materials;
- Machinery/equipment components are operationally intact; and
- Employees have been positioned safely.

Following temporary energization and testing/positioning, de-energize all systems and reapply energy control measures in the order previously described.

Under NO CIRCUMSTANCES should any part of an employee’s body be exposed to a hazardous area of the machine/equipment (i.e., point-of-operation or in-going nip point area) while the machine is temporarily running or energized.

Appropriate supplemental safeguards must be used (i.e., personal protective equipment to protect against hot surfaces, use of a tarp(s) to shield a hot surface(s) or in-going nip point(s), safe work positioning, etc.).

Minor Servicing

Minor tool changes and adjustments and other minor servicing activities which take place during normal production operations are not subject to LO/TO standards provided ALL of the following criteria are met.

- The activity is routine. It is performed as part of a regular and prescribed course of action/procedure and is performed in accordance with established practices/industry standards.
- The activity is repetitive. It is repeated regularly as part of the production process or cycle.
- The activity is integral to the use of the equipment for production (the activity must be essential to the production process).
- The activity is conducted with effective production-mode safeguards in place.
- The activity does not require extensive disassembly of the machinery/equipment.
- The activity is performed using alternative measures (tools or guarding) which provide effective employee protection.

Cord & Plug

The LO/TO procedural requirements do NOT apply if the machinery/equipment is completely de-energized simply by unplugging it and the cord/plug remains under the control of the person conducting the service/repair. If the equipment/machine is not unplugged; if the cord/plug does not remain under the exclusive and immediate control of the person conducting the repair/service, or; if the equipment has multiple energy sources, then the LO/TO standard applies and all procedural steps must be followed. Pneumatic tools may also fall into this category provided that they can be completely isolated from their energy source and bled of stored energy.

Hot Tap

The term “Hot Tap” refers to repair, maintenance, and servicing activities involving welding on a piece of equipment (pipelines, vessels or tanks) under pressure, in order to install connections or appurtenances (parts added to the piece of equipment). Hot tap operations are commonly used to replace or add sections of pipeline without interruption of service for air, gas, water, steam, and petrochemical distribution systems. Hot tap operations are to be conducted only when all of the following conditions are met:

- Continuity of service is essential;
- Shutdown of the system is impractical;
- Documented procedures are followed; and
- Special equipment is used that provides proven, effective employee protection.
- This exception should be used very sparingly and only when industry standard procedures are strictly followed.

Motor Vehicle Repair

Coverage under OSHA's LO/TO standard extends to vehicles, such as but not limited to, automobiles, trucks, tractors, refrigeration transport vehicles, small engine equipment (e.g., lawn mowers, snow blowers, chain saws, etc.) and material handling equipment (i.e., forklifts, etc.). At a minimum, removal of the ignition key (or removal of the spark plug wire for small engines) is a procedural LO/TO step that must be observed during vehicle maintenance/repair. The key must remain in the exclusive control of the technician conducting the work. Additional accidental ignition control measures must be implemented if the work could result in unexpected start-up of the vehicle regardless of the absence of the key (for example, accidental short circuit of the ignition system, lurching that causes "jump starting" etc.).

All potentially hazardous energy sources must be considered and controls implemented, as appropriate and based on the work being conducted. For example, removal of an ignition key is not sufficient to protect employees from devices that may operate or activate independently of the ignition system. Thus, it may be necessary to disconnect the battery cable for some repair tasks, such as working on some cooling fans, which can automatically start up even after the key has been removed.

It is essential to consult and incorporate specific vehicle manufacturer servicing and maintenance guidelines (e.g., operating manuals and bulletins) and other relevant materials to establish the appropriate hazardous energy control procedures. These manuals and materials often provide specific step-by-step instructions on how to safely perform servicing or maintenance tasks.

Laser Alignment

Alignment of lasers is exempt from LO/TO requirements, provided that appropriate PPE (eye protection and skin protection, when necessary) is worn by all persons in the room.