



Environmental Health and Safety

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- A. All machinery, equipment, and systems that have the potential to unexpectedly start or release hazardous energy must be isolated, de-energized, and locked and tagged out at each energy source prior to performing maintenance or repair activities. Examples of conditions when hazardous energy must be isolated include, but are not limited to: Adjusting, inspecting, modifying, re-tooling, constructing, clearing jams, lubricating, cleaning, working on energized valves, electrical work, removing or bypassing a safety device, and placing any part of the body in harm's way.
- B. When hazardous energy must be isolated in a confined space, the procedures outlined in Northwestern's [Confined Spaces Program](#) must be followed.
- C. All machinery, equipment, and systems must have a documented lockout/tagout procedure (see) prior to maintenance activities, which must, at a minimum, include the following information:
 - i. A statement of the intended use of the procedure;
 - ii. Required personal protective equipment;
 - iii. Procedural steps for shutting down, isolating, blocking, and securing machines, equipment, or systems;
 - iv. Procedural steps for the placement, removal, and transfer of lockout or tagout devices and the responsibility for them; and
 - v. Specific requirements for testing a machine or equipment to determine and verify the effectiveness of lockout devices, tagout devices, and other energy control measures.
- D. Lockout/tagout procedures developed by designated authorized employees must be reviewed and approved by department supervisors and EHS.
- E. Work involving electrical hazards conducted by trained and qualified electrical workers who install, maintain, repair, and/or replace premise electrical wiring systems must have documented lockout/tagout procedures as follows:
 - i. Documented lockout/tagout procedures may be in form of a copy of paragraph 29 CFR 1910.333(b) (see), which must be made available to all trained and qualified electrical workers, or
 - ii. Documented lockout/tagout procedures are required (see).
- F. Prior to the implementation of the lockout/tagout procedures, employees who will be affected by the shutdown of machinery, equipment, or systems must be notified.
- G. Shutdown the machine, equipment, or system, following normal shutdown procedures for the specific machine, equipment, system.
- H. Disconnect or isolate the machine, equipment, or system from the energy source(s).
- I. Apply the lockout or tagout device(s) to the energy-isolating device(s) to prevent the accidental re-energization of the machine, equipment, or

- b. To achieve a level of safety equivalent to that of using a lockout device, additional safety measures must be implemented to reduce the likelihood of inadvertent energization (e.g., removing

- iii. Communicate and discuss the lockout/tagout procedure and any changes with all other authorized employees who did not implement the procedure during the inspection, to ensure authorized employees (and affected employees, if applicable) understand their responsibilities under the lockout/tagout procedure being inspected. This may be accomplished by hosting one or more meetings in which all authorized employees (and affected employees, if applicable), will be in attendance to review the specific lockout/tagout procedure.
- C. Department supervisors must review and approve

departing group will inform the arriving group of the status of equipment and work in progress.

- A. Inspect the work area to ensure all tools and materials have been removed from the work area.
- B. Remove all personnel from the work area to a safe location.
- C. Remove the lockout/tagout devices.
- D. Reenergize the machine, equipment, or system.
- E. Notify employees affected by the shutdown that the machine, equipment, or system has been put back into service.

Only the person who installed their lockout/tagout devices is authorized to remove them. If a personal lock is left on a piece of equipment and the owner of that lock is not present, only a department or unit supervisor may remove the lock by following these steps:

- A. Verify that the lock's owner is not on campus.
- B. Make a reasonable attempt to contact the lock's owner.
- C. Review all available information (e.g., work orders) to determine the reason the equipment is locked-out and if it is safe to remove the lock(s).
- D. Thoroughly inspect the equipment to determine it is safe to re-energize.
- E. Notify the lock's owner of the removal upon their return to work.

Department and unit supervisors are required to ensure their direct reports receive training to certify the understanding of the purpose and function of the Control of Hazardous Energy (Lockout/Tagout) Program, knowledge and skills required for safe application of lockout/tagout, and usage/removal of controls.

- A. Authorized employees perform service or maintenance on machinery, equipment, or systems around campus. Training for authorized employees is required to cover the following:

- c. Machinery, equipment, systems, or processes that present a new hazard.
 - ii. It is identified that the employee's knowledge or use of the energy control procedures is lacking, such as during annual periodic lockout/tagout procedure inspections or if involved in an incident.
 - iii. Retraining must reestablish the appropriate level of knowledge needed to work safely, and the trainer is required to certify and document the employee's name and training date.

- A. Lockout/tagout procedures and periodic inspections must be maintained by each department and unit.
- B. Training records for authorized, affected, and other employees are maintained in myHR Learn.

Northwestern and contractors will comply with the Occupational Safety and Health Administration's (OSHA) standards and a



This appendix may be used as the lockout/tagout procedure for work involving electrical hazards conducted by trained and qualified electrical workers who install, maintain, repair, and/or replace premise electrical wiring systems. Departments and units must make this procedure available to all trained and qualified electrical workers if using these procedures in lieu of specific written lockout/tagout procedures.

"Working on or near exposed deenergized parts."

"Application." This paragraph applies to work on exposed deenergized parts or near enough to them to expose the employee to any electrical hazard they present. Conductors and parts of electric equipment that have been deenergized but have not been locked out or tagged in accordance with paragraph (b) of this section shall be treated as energized parts, and paragraph (c) of this section applies to work on or near them.

"Lockout and Tagging." While any employee is exposed to contact with parts of fixed electric equipment or circuits which have been deenergized, the circuits energizing the parts shall be locked out or tagged or both in accordance with the requirements of this paragraph. The requirements shall be followed in the order in which they are presented (i.e., paragraph (b)(2)(i) first, then paragraph (b)(2)(ii), etc.). Note 1: As used in this section, fixed equipment refers to equipment fastened in place or connected by permanent wiring methods. Note 2: Lockout and tagging procedures that comply with paragraphs (c) through (f) of 1910.147 will also be deemed to comply with paragraph (b)(2) of this section provided that: [1] The procedures address the electrical safety hazards covered by this Subpart; and [2] The procedures also incorporate the requirements of paragraphs (b)(2)(iii)(D) and (b)(2)(iv)(B) of this section.

"Procedures." The employer shall maintain a written copy of the procedures outlined in paragraph (b)(2) and shall make it available for inspection by employees and by the Assistant Secretary of Labor and his or her authorized representatives. Note: The written procedures may be in the form of a copy of paragraph (b) of this section.

"Deenergizing equipment."

Safe procedures for deenergizing circuits and equipment shall be determined before circuits or equipment are deenergized.

The circuits and equipment to be worked on shall be disconnected from all electric energy sources. Control circuit devices, such as push buttons, selector switches, and interlocks, may not be used as the sole means for deenergizing circuits or equipment. Interlocks for electric equipment may not be used as a substitute for lockout and tagging procedures.

Stored electric energy which might endanger personnel shall be released. Capacitors shall be discharged and high capacitance elements shall be short-circuited and grounded, if the stored electric energy might endanger personnel. Note: If the capacitors or associated equipment are handled in meeting this requirement, they shall be treated as energized.

Stored non-electrical energy in devices that could reenergize electric circuit parts shall be blocked or relieved to the extent that the circuit parts could not be accidentally energized by the device.

"Application of locks and tags."

A lock and a tag shall be placed on each disconnecting means used to deenergize circuits and equipment on which work is to be performed, except as provided in paragraphs (b)(2)(iii)(C) and (b)(2)(iii)(E) of this section. The lock shall be attached so as to prevent persons from operating the disconnecting means unless they resort to undue force or the use of tools.

Each tag shall contain a statement prohibiting unauthorized operation of the disconnecting means and removal of the tag.

If a lock cannot be applied, or if the employer can demonstrate that tagging procedures will provide a level of safety equivalent to that obtained by the use of a lock, a tag may be used without a lock.

A tag used without a lock, as permitted by paragraph (b)(2)(iii)(C) of this section, shall be supplemented by at least one additional safety measure that provides a level of safety equivalent to that obtained by use of a lock. Examples of additional safety measures include the removal of an isolatiLo216a Tm2.57 Tm

