



VANDERBILT  
UNIVERSITY

# Control of Hazardous Energy (Lockout/Tagout)

Division of Occupational Safety and Health

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## I. Purpose

This program outlines the required steps to prevent injuries resulting from the unexpected startup or release of stored energy when working on equipment, machinery, or systems that could release stored energy (e.g., mechanical, electrical, steam, hydraulic, pneumatic, chemical, thermal, gravity).

## II. Scope

This program applies to contractors and Vanderbilt faculty, students, and staff who perform service or maintenance on machines, equipment, and/or systems in which the unexpected energization or startup of the machines, equipment, or system could cause harm. This includes all academic shops that maintain or house machines or equipment.

Contractors may use their own control of hazardous energy policy if it meets, at a minimum, the guidance set forth in this policy.

This program does not apply to work being performed on new construction projects and controlling hazardous energy in installations for the exclusive purpose of power generation, transmission, and distribution, including related equipment for communication or metering.

Specific tasks are exempt from this program and are defined as follows:

- A. Minor tool changes and adjustments, and other minor servicing activities, which take place during normal production operations, so long as they meet the following requirements:
  - i. The work is routine, repetitive, and integral to the use of the equipment or machinery for production, and
  - ii. The work is performed using alternative measures, such as machine guards, which provide effective protection against hazardous energy sources.
- B. Work on cord- and plug-connected electric equipment for which exposure to the hazards of unexpected energization or start-up of the equipment is controlled by:
  - i. The unplugging of the equipment from the energy source, and
  - ii. By the plug being under the exclusive control of the employee performing the servicing or maintenance.

## III. Responsibilities

- A. **Occupational Safety and Health (OSH)**
  - i. Maintain and update Vanderbilt's Control of Hazardous Energy (Lockout/Tagout) Program.
  - ii. Review and audit lockout/tagout procedures developed by designated authorized employees at a minimum of annually.
  - iii. Provide or coordinate lockout/tagout training to Vanderbilt faculty, staff, and students.
  - iv. Provide consultation and guidance to departments, units, and contractors.
- B. **Departments and Units**
  - i. Designate authorized employees to:
    - a. Develop documented lockout/tagout procedures for the machinery and equipment they perform servicing and maintenance on (see **Appendix 1** for a blank equipment specific lockout/tagout procedure template)

- b. Conduct documented annual periodic inspections of lockout/tagout procedures, and update when necessary (see **Appendix 2** for a blank annual periodic inspection template form).
  - ii. Report all incidents (e.g., injuries, property damage, near misses) to OHS.
  - iii. Ensure contractors adhere to this program.
  - iv. Contact OHS to evaluate any safety concerns, or as specified in this program.
- C. **Supervisors**
  - i. Identify and ensure authorized and affected employees are trained in lockout/tagout.
  - ii. Provide the resources to ensure staff have lockout/tagout hardware.
  - iii. Ensure all employees attend lockout/tagout training.
  - iv. Review and approve lockout/tagout procedures developed by designated authorized employees.
  - v. Review and approve annual periodic inspections of lockout/tagout procedures.
  - vi. Ensure authorized employees carry out lockout/tagout procedures, including conducting annual periodic inspections.
- D. **Authorized Employees**
  - i. Attend lockout/tagout training.
  - ii. Identify and recognize hazardous energy sources that require lockout/tagout procedures.
  - iii. Review and follow written lockout/tagout procedures on equipment and machinery prior to performing any maintenance or repair activities.
  - iv. Report to your supervisor if there is no written lockout/tagout procedure prior to commencing any work involving hazardous energy sources that requires lockout/tagout.
  - v. Report unsafe conditions to your supervisor.
- E. **Affected Employees**
  - i. Develop an awareness of machinery, equipment, and systems within each employee's respective work area(s) that is subject to hazardous energy control procedures.
  - ii. Do not remove or tamper with any locks or tags on machinery, equipment, or systems under the control of lockout/tagout.
  - iii. Attend lockout/tagout awareness training.
- F. **Contractors**
  - i. Prior to beginning work on any machine, equipment, or system that requires lockout/tagout, ask your Vanderbilt contact (e.g., project manager) for Vanderbilt's Control of Hazardous Energy (Lockout/Tagout) Program and procedure(s) for review. Contractors are required to coordinate with Zone Manager prior to initiating Lockout.
  - ii. All group lockout/tagout activities involving VUMO and contractors must be completed in the form of group lockout/tagout. Vanderbilt Facilities will shut down and lockout/tagout machines, equipment, and systems prior to any work beginning, then all parties will apply their locks and tags (i.e., contractors and Vanderbilt Facilities Operations) (see **Section VI**).
  - iii. Contractors are responsible for supplying their own locks and tags. These devices must meet the requirements outlined in **Section V** of this program.
  - iv. Contractors engaged in projects without VUMO support or assistance must adhere to the applicable regulatory requirements for construction.

- v. Contractors engaged in new construction projects must adhere to the applicable regulatory requirements for construction.

#### IV. Lockout/Tagout

- 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 Vanderbilt's [Confined Spaces Program](#) must be followed.
- C. All machinery, equipment, and systems must have a documented lockout/tagout procedure (see **Appendix 1**) 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 audited by department supervisors and OSH on a rolling annual basis.
- 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 **Appendix 3**), which must be made available to all trained and qualified electrical workers, or
  - ii. Documented lockout/tagout procedures are required (see **Section V.C.**).
- 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) following the electrically safe work practice of testing power with meter while system is on and once isolated, testing again to confirm meter reads zero and that power is isolated properly.
- 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 system to be serviced or maintained.
  - i. Vanderbilt departments and units must provide specialized locks, tags, and all other hardware necessary to isolate, secure, and block machines, equipment, or systems from energy sources.
  - ii. When feasible, locks must be utilized to isolate hazardous energy sources.
  - iii. In the event an energy-isolating device is not capable of accepting a lockout device, a tagout system must be utilized.

- a. Tagout device(s) must be attached at the same location that the lockout device would have been attached.
    - 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 an isolating circuit element, blocking a controlling switch, opening an extra disconnecting device, removing a valve handle).
  - iv. The hardware provided by Vanderbilt must be:
    - a. **Durable** – Capable of withstanding the environment to which they are exposed for as long as the exposure is expected without deteriorating or the text becoming illegible.
    - b. **Standardized** – Devices must be standardized in at least one of the following criteria: color, shape, or size. Additionally, tags must have a standardized print and format.
    - c. **Substantial** – Lockout devices must be substantial enough to prevent removal without the use of excessive force or unusual techniques (e.g., bolt cutters). Tagout devices, including their means of attachment, must be substantial enough to prevent inadvertent or accidental removal.
    - d. **Identifiable** – Lockout device(s) must indicate the identity of the employee applying the device(s). Tagout devices must warn against hazardous conditions (e.g., “Do not start”).
      - i. Locks will be color coded by department as follows:
        - a.) Powerhouse operators: Red
        - b.) Zone BMT: Various colors with stripe
        - c.) Contractors: Brown
        - d.) Group Lockout: Green
        - e.) High Voltage team: Yellow
        - f.) Fabrication Shop – Black
        - g.) Controls PMT - White
- J. Reposition, block, bleed, etc. the machine, equipment, or system to relieve, disconnect, and restrain stored or residual energy (e.g., springs, capacitors, rotating flywheels, hydraulic systems, air, gas, steam, water pressure). If a possibility exists for re-accumulation of hazardous energy (e.g., leaking valve), regularly verify during the service and maintenance that such energy has not re-accumulated to hazardous levels.
- K. Verify the isolation and de-energization of the machine, equipment, or system.
  - i. Prior to verification of the lockout/tagout procedures, check the area to ensure all personnel are in a safe location.
  - ii. Attempt to restart the machine, equipment, or system to ensure all energy sources have been properly isolated.
  - iii. Upon completion of the verification process, all controls must be returned to their original position.

## V. Periodic Inspections

- A. Documented periodic inspections (see **Appendix 2**) of each lockout/tagout procedure are required annually to ensure:
  - i. The lockout/tagout procedure steps are being followed,
  - ii. Employees involved know their responsibilities under the procedure, and
  - iii. The procedure is adequate to provide the necessary protection, and, if inadequate, what modifications are necessary.

- B. The inspector, who must be an authorized employee (designated by departments or units) other than the one(s) utilizing the lockout/tagout procedure being inspected, must:
  - i. Observe authorized employee(s) implement the lockout/tagout procedure for the servicing and/or maintenance activities being evaluated,
  - ii. Update any procedural steps that require edits, additions, or removal (note: all procedural changes must be approved by department or unit supervisors),
  - 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 the periodic inspection form.
- D. Approved annual periodic inspection forms must be kept on file and with the most current lockout/tagout procedure by each department or unit to demonstrate compliance with the required annual inspections.
- E. Lockout/tagout procedures used less frequently than once a year need to be inspected only when used.

## VI. Group Lockout/Tagout

If maintenance or servicing of a machine, piece of equipment, or system is performed by multiple individuals (e.g., contractors and employees), each authorized employee must follow the individual lockout/tagout instructions, including:

- A. The Vanderbilt employee who is responsible for the maintenance or servicing of a machine, equipment, or system must:
  - i. Authorize the lockout/tagout out of that machine, equipment, or system;
  - ii. Be the primary initiator (i.e., first person to apply their lock and tag) of the lockout/tagout procedure;
  - iii. Be responsible for the employees working under the protection of the group lockout/tagout device; and
  - iv. Be responsible for notifying affected employees before and after lockout/tagout procedures are performed.
- B. Each person who is going to perform maintenance must affix a personal lockout or tagout device to the group box or hasp before work begins.
- C. When servicing or maintenance is complete, each authorized employee will be responsible for removing their individual lockout or tagout device. The primary initiator must authorize the energizing of the machine, equipment, or system after the maintenance or servicing is complete.

## VII. Shift or Personnel Changes

To maintain continuity in the protection provided for those involved in the lockout/tagout procedures, and for the orderly transfer of the lockout/tagout devices, the steps below are necessary during personnel or shift changes:

### A. Personnel Changes

The arriving authorized employee's lock and tag must be applied before the departing

authorized employee's lock and tag are removed. The departing personnel will inform the arriving personnel of the status of the equipment and work in progress.

**B. Group Lockout/Tagout Shift Changes**

- i. The lock and tag of at least one authorized employee (i.e. project initiator) on the arriving shift must be applied before the last group member of the departing group removes their lock. The departing group will inform the arriving group of the status of equipment and work in progress.
- ii. Group lockouts that run several days or shifts should only maintain a single point of isolation during non-working hours or between shifts to prevent unnecessary delays in identifying or locating authorized employees.

**C. Work that spans several days with only one responsible technician**

Maintenance performed under lockout that runs several days and will be performed by one technician should only maintain a single point of isolation. The technician performing the work shall apply their lock during non-working hours to prevent unnecessary delays in identifying or locating authorized employees.

## VIII. Removing Locks and Tags

- 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 following agreed upon procedures.
- E. Notify employees affected by the shutdown that the machine, equipment, or system has been put back into service.

## IX. Forcible Removal of Locks or Tags

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 and/or make a reasonable attempt to contact the lock's owner.
- B. 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).
- C. Thoroughly inspect the equipment to determine it is safe to re-energize.
- D. Notify the lock's owner of the removal upon their return to work.

## X. Training

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**

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

- i. Recognition of applicable hazardous energy sources.
- ii. Type and magnitude of the energy available.



- iii. Methods and means necessary for energy isolation and control.
- iv. Steps for placement and removal of lockout/tagout devices.
- v. Instruction on how to verify energy isolation.

**B. Affected and Other Employees**

Affected and other employees work in or occupy an area in which lockout/tagout procedures may be used. This group of employees must be instructed about lockout/tagout procedures in their area and taught that it is prohibited to attempt to restart/energize machines, equipment, or systems that are de-energized.

**C. Retraining**

Retraining must be provided to all authorized or affected employees whenever:

- i. There is a change in:
  - a. Job assignment,
  - b. Energy control procedures,
  - 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.

## XI. Recordkeeping

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

## XII. Regulatory Authority

Vanderbilt and contractors will comply with the Occupational Safety and Health Administration's (OSHA) standards and any other applicable codes and standards, including:

[OSHA 29 CFR 1910.147 – Control of Hazardous Energy \(Lockout/Tagout\)](#)

[OSHA 29 CFR 1910.331 – Electrical – Selection and Use of Work Practices](#)

[OSHA Directive CPL 02-00-147 – The Control of Hazardous Energy – Enforcement Policy and Inspection Procedures](#)

## XIII. Contact

For questions, contact the Division of Occupational Safety and Health at [OSH@Vanderbilt.edu](mailto:OSH@Vanderbilt.edu).

## Appendix 1 – Equipment-Specific Lockout/Tagout Procedure Template

General Information					
<b>Building or Location</b>		<b>Intended Use</b>			
<b>Manufacturer and Equipment Name</b>		<b>Asset Number(s)/ Equipment ID(s)</b>			
<b>Required Device(s)</b>					
Permit(s) Required					
<input type="checkbox"/> Hot Work		<input type="checkbox"/> Confined Space		<input type="checkbox"/> Other (specify)	
Hazardous Energy Identification					
<input type="checkbox"/> Chemical	<input type="checkbox"/> Electrical	<input type="checkbox"/> Falling Objects	<input type="checkbox"/> Hydraulic potential	<input type="checkbox"/> Kinetic	
<input type="checkbox"/> Mechanical	<input type="checkbox"/> Pneumatic potential	<input type="checkbox"/> Radiation	<input type="checkbox"/> Thermal		
Personal Protective Equipment Required					
<b>ONLY TRAINED AND AUTHORIZED PERSONNEL SHALL CONDUCT LOCKOUT/TAGOUT.</b>					
Shutdown Overview					
Shutdown Procedure					
1	Notify all affected employees that servicing or maintenance is required on the machine or equipment and all energy sources will be shut down and locked out to perform the servicing and maintenance.				
	<b>Energy Source(s)</b>	<b>Control Method and Location(s)</b>	<b>Required Devices</b>	<b>Verification Method and Location(s)</b>	<b>Picture(s) (optional)</b>
2					
3					
4					
5					
6					
<b>Final step</b>	Perform servicing and maintenance on equipment.				
<b>IF THE SYSTEM CANNOT BE LOCKED OUT OR IF SYSTEM FAILS VERIFICATION, CONTACT YOUR SUPERVISOR.</b>					

Startup Procedure	
1	
2	
3	
4	
5	
6	
Final step	Notify affected employees that the servicing or maintenance is complete and the equipment is ready for use.

Version History and Approvals		
Date:	Name and Position:	Status: (Created/Approved/Annual Review*)

*\*Procedure must be annually reviewed*

## Appendix 2 – Lockout/Tagout Periodic Inspection Form

*Instructions:* Use this form to conduct a periodic inspection (annual) of a lockout/tagout procedure. The inspector must observe an authorized employee perform each step of the procedure. If any corrective actions to the procedure are required, an authorized employee must correct the procedure. The inspector must communicate and discuss the procedure with all other authorized employees who did not implement the procedure during the inspection. This form must be approved by a department supervisor and kept on file with the most current procedure.

General Information			
Building or Location		Intended Use	
Manufacturer and Equipment Name		Asset Number(s)/ Equipment ID(s)	
Name of Inspector		Signature and Date	
Authorized Employee		Signature and Date	
Name of Supervisor		Signature and Date	

Inspection Review Questions		Yes	No
1	Does the authorized employee understand how/where to access the lockout/tagout procedure?	<input type="checkbox"/>	<input type="checkbox"/>
2	Was the equipment or system properly shutdown at each hazardous energy source?	<input type="checkbox"/>	<input type="checkbox"/>
3	Did the authorized employee apply locks, devices, and tags to each energy isolation device?	<input type="checkbox"/>	<input type="checkbox"/>
4	Did the authorized employee apply warning tags to each energy isolation device identifying their name, department or shop, and contact information?	<input type="checkbox"/>	<input type="checkbox"/>
5	Was a warning tag used in place of a lock? If so, was it obvious to anyone in the area that the equipment or system must not be started up?	<input type="checkbox"/>	<input type="checkbox"/>
6	Did the authorized employee properly dissipated or control hazardous energy?	<input type="checkbox"/>	<input type="checkbox"/>
7	Are the verification methods effective and complete prior to starting servicing and maintenance (i.e., attempt restart, drain/bleed, check gauges, etc.)?	<input type="checkbox"/>	<input type="checkbox"/>
8	Was the startup procedure effective and completed properly at the completion of servicing and maintenance?	<input type="checkbox"/>	<input type="checkbox"/>
9	Did the authorized employee understand their responsibilities under the procedure?	<input type="checkbox"/>	<input type="checkbox"/>
10	Were all steps in the procedure effective to safely shutdown and lockout/tagout hazardous energy to the equipment or system?	<input type="checkbox"/>	<input type="checkbox"/>

Results	Yes	No
The lockout/tagout procedure is adequate and provides the necessary protection with no corrective actions needed. <b>If no, please list the required corrective actions below.</b>	<input type="checkbox"/>	<input type="checkbox"/>

## Appendix 3 – Lockout/Tagout Procedure for Electrical Work – 29 CFR 1910.333(b)

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.

### **1910.333(b)** "Working on or near exposed deenergized parts."

**1910.333(b)(1)** "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.

**1910.333(b)(2)** "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.

**1910.333(b)(2)(i)** "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.

#### **1910.333(b)(2)(ii)** "Deenergizing equipment."

**1910.333(b)(2)(ii)(A)** Safe procedures for deenergizing circuits and equipment shall be determined before circuits or equipment are deenergized.

**1910.333(b)(2)(ii)(B)** 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.

**1910.333(b)(2)(ii)(C)** 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.

**1910.333(b)(2)(ii)(D)** 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.

#### **1910.333(b)(2)(iii)** "Application of locks and tags."

**1910.333(b)(2)(iii)(A)** 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.

**1910.333(b)(2)(iii)(B)** Each tag shall contain a statement prohibiting unauthorized operation of the disconnecting means and removal of the tag.

**1910.333(b)(2)(iii)(C)** 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.

**1910.333(b)(2)(iii)(D)** 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 isolating circuit element, blocking of a controlling switch, or opening of an extra disconnecting device.

**1910.333(b)(2)(iii)(E)** A lock may be placed without a tag only under the following conditions:

**1910.333(b)(2)(iii)(E)(1)** Only one circuit or piece of equipment is deenergized, and

**1910.333(b)(2)(iii)(E)(2)** The lockout period does not extend beyond the work shift, and

**1910.333(b)(2)(iii)(E)(3)** Employees exposed to the hazards associated with reenergizing the circuit or equipment are familiar with this procedure.

**1910.333(b)(2)(iv)** Verification of deenergized condition. The requirements of this paragraph shall be met before any circuits or equipment can be considered and worked as deenergized.

**1910.333(b)(2)(iv)(A)** A qualified person shall operate the equipment operating controls or otherwise verify that the equipment cannot be restarted.

**1910.333(b)(2)(iv)(B)** A qualified person shall use test equipment to test the circuit elements and electrical parts of equipment to which employees will be exposed and shall verify that the circuit elements and equipment parts are deenergized. The test shall also determine if any energized condition exists as a result of inadvertently induced voltage or unrelated voltage backfeed even though specific parts of the circuit have been deenergized and presumed to be safe. If the circuit to be tested is over 600 volts, nominal, the test equipment shall be checked for proper operation immediately after this test.

**1910.333(b)(2)(v)** "Reenergizing equipment." These requirements shall be met, in the order given, before circuits or equipment are reenergized, even temporarily.

**1910.333(b)(2)(v)(A)** A qualified person shall conduct tests and visual inspections, as necessary, to verify that all tools, electrical jumpers, shorts, grounds, and other such devices have been removed, so that the circuits and equipment can be safely energized.

**1910.333(b)(2)(v)(B)** Employees exposed to the hazards associated with reenergizing the circuit or equipment shall be warned to stay clear of circuits and equipment.

**1910.333(b)(2)(v)(C)** Each lock and tag shall be removed by the employee who applied it or under his or her direct supervision. However, if this employee is absent from the workplace, then the lock or tag may be removed by a qualified person designated to perform this task provided that:

**1910.333(b)(2)(v)(C)(1)** The employer ensures that the employee who applied the lock or tag is not available at the workplace, and

**1910.333(b)(2)(v)(C)(2)** The employer ensures that the employee is aware that the lock or tag has been removed before he or she resumes work at that workplace.

**1910.333(b)(2)(v)(D)** There shall be a visual determination that all employees are clear of the circuits and equipment.