



NORTH CAROLINA Office of  
*State Human Resources*

## OFFICE OF STATE HUMAN RESOURCES

**NUMBER:** LOTO-1

**TOTAL PAGES:** 19

**SUBJECT:** Lockout/Tagout Program

**Effective Date:**

**Revision Date:**

**Revision #:**

### RELATED LEGISLATION:

North Carolina Occupational Safety and Health Standards for General Industry, 29 CFR 1910.147.

### I. Purpose

Each employee shall be informed that the purpose of the lockout/tagout procedure is to provide a system for the lockout and/or tagout of energy isolating devices and thereby protect employees from potentially hazardous energy. Wherever possible, energy-isolating devices should be locked out. Before employee's service, repair or perform maintenance, the machine or equipment must be isolated from all potentially hazardous energy, and the isolating energy device(s) for the machine or equipment must be locked out or tagged out.

### II. Types and Magnitude of Energy and Hazards

Each employee must be instructed in the types and magnitude of energy used by the company. The following types of energy are used:

(a) \_\_\_\_\_ (b) \_\_\_\_\_

(c) \_\_\_\_\_ (d) \_\_\_\_\_

The magnitude of energy (a) ( \_\_\_\_\_ energy) used is: \_\_\_\_\_;  
the magnitude of hazards presented by the \_\_\_\_\_ energy is: \_\_\_\_\_.

The magnitude of energy (b) ( \_\_\_\_\_ energy) used is: \_\_\_\_\_;  
the magnitude of hazards presented by the \_\_\_\_\_ energy is: \_\_\_\_\_.

The magnitude of energy (c) ( \_\_\_\_\_ energy) used is: \_\_\_\_\_;  
the magnitude of hazards presented by the \_\_\_\_\_ energy is: \_\_\_\_\_.

The magnitude of energy (d) ( \_\_\_\_\_ energy) used is: \_\_\_\_\_;  
the magnitude of hazards presented by the \_\_\_\_\_ energy is: \_\_\_\_\_.

### **III. Training and Retraining of Affected and Authorized Employees**

Each employee must be thoroughly trained with respect to lockout/tagout procedure used by the company. Each employee must know that lockout/ tagout is used to protect employees against hazardous energy from inadvertent operation of equipment or machinery. Each employee must understand that he or she is never to attempt to operate an energy-isolating device when it is locked or tagged. Each employee must be *retrained* if there is:

1. a change in the employee's job assignment;
2. a change in machinery or equipment that presents a new hazard;
3. a change in energy control procedures; or
4. management considers that retraining is necessary.

Training or retraining must include:

- how to recognize hazardous energy sources
- type and magnitude of energy used (especially with respect to the machinery or equipment to which the employee will be exposed)
- purpose of the lockout/tagout procedure
- steps for shutting down, isolating, blocking and securing equipment to which the employee will be exposed
- steps for placement, removal and transfer of lockout/tagout devices and the division of responsibility for accomplishing those tasks
- requirements for testing to determine and verify effectiveness of lockout/tagout devices
- the proper use and limitations of tags

Employees who will (actually implement) the lockout/tagout procedure must receive written authorization from supervision.

Training and retraining must be documented for each employee. Documentation must be maintained in the department where the employee currently works and must be available at all times to supervisor and other employees. A separate copy of Form B will be used to document training and retraining for each employee. Form B concludes this training procedure.

### **IV. Energy-Isolating Device(s)**

Each employee must be instructed that every department has conducted a survey of *all* machinery, equipment and processes that possess potentially hazardous energy. The survey must locate all equipment and identify all isolating devices that must be locked or tagged to render the equipment safe for service, maintenance or repair. The survey must also describe applicable lockout/tagout procedure. The information for each item of machinery or equipment shall be recorded on a separate form A, which is maintained in the respective department and is readily available for use in conjunction with the lockout/tagout procedure. An example form A follows:

**Form A**

**Types/Locations of Energy-Isolating Devices**

1. Name of department: \_\_\_\_\_

2. Name of equipment or machine: \_\_\_\_\_

3. Serial number of equipment or machine: \_\_\_\_\_

4. Location of equipment or machine: \_\_\_\_\_

5. Each type of energy used by the equipment or machine:

a. \_\_\_\_\_

b. \_\_\_\_\_

6. Magnitude of each source of energy:

a. \_\_\_\_\_

b. \_\_\_\_\_

7. Hazards to be expected from each source of energy:

a. \_\_\_\_\_

b. \_\_\_\_\_

8. Type and location of each device for isolating energy to the machine or equipment and the method of lockout/tagout to be used (use an additional form, if needed):

	<b>Type</b>	<b>Location</b>	<b>Method of lockout/tagout</b>
a.	_____	_____	_____
b.	_____	_____	_____
c.	_____	_____	_____
d.	_____	_____	_____

9. Identification of each device and manner by which energy can be stored in the machine or equipment and identification of the procedure for dissipating or restraining the stored energy (use additional form, if needed):

	<b>Device/Manner</b>	<b>Procedure</b>
a.	_____	_____
b.	_____	_____

## V. Sequence of Lockout/Tagout System—Procedure and Form

Each employee will be informed of the lockout/tagout sequence used by the company. That sequence includes the following steps:

*Step 1.* The authorized employee (designated by supervision to implement lockout/tagout) will notify all affected employees (operators and others in the area) that lockout/tagout is to be used and the reason for its use. (Form A for the respective machine or equipment lists all pertinent information, including the magnitude of energy and the hazards to be expected.)

*Step 2.* The machine must be shut down by normal procedure.

*Step 3.* Each energy-isolating device must be located. (See form A for the respective machine or equipment.) Each device must be operated to isolate the equipment from the energy source(s).

*Step 4.* Each device or manner by which energy can be stored must be located. (See form A for the respective machine or equipment.) Dissipate or restrain all stored energy.

*Step 5.* After responding to *Important Notes* (below), each energy isolating device (see form A for the respective machine or equipment) must now be locked or tagged with assigned individual locks or tags.

### Important Notes:

1. If a lock can be used and you choose to use a tag, complete part VI before going to step 6.
2. If more than one authorized employee is required to affix a lockout/tagout device (see part X), the designated group coordinator must have each authorized employee who affixes a lockout/tagout device sign his/her name and enter the job title. Use a separate sheet, if needed.

*Step 6.* a. Ensure that personnel are not exposed; b. attempt to start the equipment with the normal operating controls to ensure that lockout/tagout has been effective; c. *return the operating control(s) to “neutral” or “off.”* The equipment is now locked or tagged out.

## VI. Tagout Justification System

If the machine, equipment or process can be locked out and/or tagged out and you choose to tagout, respond to parts 1 and 2 of the following tagout justification system, then return to part V, step 6.

### Requirement 1

A. *Full Employee Protection.* If you cannot indicate a “yes” answer by checking each of the following items, do not use the tagout system.

- Tagout system provides full employee protection
- Tagout devices placed at the same location where the lockout device would have been placed
- Tagout system provides safety equivalent to the lockout program
- Employees can fully comply with all tagout-related provisions

B. *Additional Safety Measures.* Check the measure(s) used to provide equivalent protection and/or state any other alternative used.

- Isolating circuit element removal
  - Control switches blocked
  - Extra disconnecting device opened
  - Removal of valve handles
  - Alternative measures used to provide equivalent protection:
- 

C. *Tagout Devices*. Check the tagout device against each criterion listed below. The tagout device should satisfy each criterion.

- Singularly identified
- Device used only for controlling energy
- Not used for other purposes
- Durable/substantial
- Able to withstand its intended environment
- Non-reusable
- Attachable by hand
- Self-locking
- Indicates employee identity
- Exposure will not cause deterioration
- Does not deteriorate in corrosive environment
- Standardized as to: \_\_\_ color; \_\_\_ shape and size; \_\_\_ print and format
- Minimum unlocking strength of no less than 50 pounds
- Equivalent to a one-piece, all environment-tolerant nylon cable tie

D. *Warning Message*. Ensure that the tagout device:

- Warns against hazardous conditions
- Includes “Do Not Start (Open, Close, Energize, Operate, etc.)”

E. *Training*. Be certain that the employees have been trained that:

- Tags are simply warning devices
- Tags do not provide physical restraint
- Tags must never be removed without authorization
- Tags may evoke a false sense of security
- Tags are only part of the overall program
- Tags must be securely attached
- Tags must never be ignored or bypassed

## Requirement 2

A. State your reasons for using the tagout system:

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B. State how equivalent employee protection was provided:

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C. Describe the training provided to employees:

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At which location was the training provided:

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Provide the date of the employee training:

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Include the signature of the person who performed the training:

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Include the signature of the person who authorized the use of the tagout system:

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Date of authorization:

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## **VII. Restoring Machines or Equipment to Normal Production Operations----Procedure and Form**

- 1. When servicing, maintenance or repair is complete and the equipment/machine is ready to be started up, the authorized employee will ensure that: (a) no one is exposed to the equipment/machine; (b) all tools have been removed from the machine/equipment; (c) guards have been reinstalled; (d) there are no exposed electrical wires; (e) and that he or she is satisfied that it is safe for start-up.**
- 2. After responding to IMPORTANT NOTES (below), remove all lockout/tagout devices.**

### **Important Notes:**

- 1. If the authorized employee is not available to remove the lockout/tagout device(s), the device(s) may only be removed by or under the direction of the supervisor who completes the following: (a) identify the authorized employee whose device is being removed (name: \_\_\_\_\_); (b) describe all reasonable efforts to locate this employee (describe: \_\_\_\_\_); (c) describe the action taken to ensure that, prior to his/her resumption of work, this employee knows that their device was removed (describe: \_\_\_\_\_); and (d) enter signature and date of supervisor to certify the above steps were taken: \_\_\_\_\_.**
- 2. If more than one authorized employee is required to remove a lockout/tagout device (see Parts V and X), the designated group coordinator must have each employee who removes a device sign his/her name and enter the job title.  
Name(s)/Titles: \_\_\_\_\_**

- 3. Operate the devices to restore energy to the machine/equipment.**

## **VIII. Temporary Removal of Lockout/Tagout Devices**

**When testing, the positioning of machines/equipment, or other requirements demand the temporary removal of lockout/tagout device(s), the authorized employee or supervisor must:**

**(a) follow the steps in part VII, 1-3; (b) conduct the tests or position the equipment; and (c) de-energize all systems and reapply energy control measures in accordance with part V.**

#### **IX. Outside Contractors**

**If the maintenance, service or repair is performed by an outside contractor, their supervisor must appoint an employee to serve as the outside contractor's authorized employee for the purposes of parts V, VII and VIII.**

#### **X. Group Lockout or Tagout**

**When group lockout/tagout is required and when more than one group is involved, a group coordinator must be designated by supervision. The designated group coordinator must seek agreement from the other authorized employees and must ensure that each authorized employee: (a) places their personal lockout or tagout device on the energy isolating device(s); or (b) places the device on a multiple lockout/tagout device (hasp), if the device cannot accept multiple locks/tags; or (c) secures the personal lock to a multiple-lock lockout box or cabinet which holds the key to the single lock on the energy isolating device; and (d) signs and enters his/her job title at the time of affixing and removing the device.**

#### **XI. Documentation of Employee Training**

**Form B must be completed for each employee following every training or retraining session.**

**FORM B**

**LOCKOUT/TAGOUT TRAINING DOCUMENTATION**

**Employee Name:** \_\_\_\_\_

**Employee Address:** \_\_\_\_\_

**Home Phone #:** \_\_\_\_\_ **Cell #:** \_\_\_\_\_

**Job Title:** \_\_\_\_\_

**Department:** \_\_\_\_\_

**Date of Training or Retraining:** \_\_\_\_\_

**Signature of Employee:** \_\_\_\_\_

**Signature of Trainer:** \_\_\_\_\_

**Is the employee authorized to implement lockout/tagout procedure? YES or NO (circle one)**

**Date Authorized:** \_\_\_\_\_

**Authorizing Supervisor's signature:** \_\_\_\_\_

## OSHA Lockout/Tagout Standard Implementation Plan

(29 CFR 1910.147)

Step	Description	Responsibility	Target Completion Date
1.	Standard reviewed with top management:	_____	_____
2.	Standard reviewed with safety and health committee:	_____	_____
3.	Lockout/tagout procedure prepared per 1910.147:	_____	_____
4.	Lockout/tagout materials such as locks, tags, chains, provided:	_____	_____
5.	Energy-isolating devices checked throughout the facility to ensure needed isolation devices provided:	_____	_____
6.	Authorized and affected employees trained:	_____	_____
7.	Retraining provided when changes in jobs, machinery or processes present a new hazard or procedure:	_____	_____
8.	Retraining provided when inspections reveal a need or supervisor sees a need:	_____	_____
9.	Energy control procedure inspected at least annually:	_____	_____
10.	Records maintained of all inspections and training:	_____	_____

# Appendix A

## Other Standards Related to Lockout/Tagout or the Control of Hazardous Energy

The standard, 29 CFR 1910.147, was never intended to invalidate other specific lockout and/or tagout provisions. Rather, the standard was intended to supplement and support the other provisions with requirements for using a written procedure, for training employees and for periodic inspections.

The information below was *adapted* from standards promulgated under the federal Occupational Safety and Health Act. The information relates each standard as it applies to lockout/tagout or the control of hazardous energy during maintenance (it does not attempt to quote each standard verbatim or relate each standard in its entirety). Consult the standard for specific language.

The standards can be found in *OSH Standards for General Industry* and *OSH Standards for the Construction Industry*. For copies of the standards, consult the Bureau of Education, Training and Technical Assistance, Division of Occupational Safety and Health, N.C. Department of Labor at 1-800-NCLABOR.

### ***General Industry***

#### **Accident Prevention Signs and Tags**

[29 CFR 1910.145(f)(1)] The tags are a temporary means of warning all concerned of a hazardous condition, defective equipment, radiation hazards, etc. The tags are not to be considered as a complete warning method, but should be used until a positive means can be employed to eliminate the hazard. For example, a “Do Not Start” tag on power equipment must be used for a few moments or a very short time until the switch in the system can be locked out; a “Defective Equipment” tag shall be placed on a damaged ladder and immediate arrangements made for the ladder to be taken out of service and sent to the repair shop.

[29 CFR 1910.145(f)(3)] “Use.” Tags shall be used as a means to prevent accidental injury or illness to employees who are exposed to hazardous or potentially hazardous conditions, equipment or operations that are out of the ordinary, unexpected or not readily apparent.

[29 CFR 1910.145(f)(5)] “Danger” tags should be used only where an immediate hazard exists. There should be no variation in the type of design of tags posted or hung to warn of specific dangers.

[29 CFR 1910.145(f)(6)] “Caution” tags should be used only to warn against potential hazards or to caution against unsafe practices.

[29 CFR 1910.145(f)(7)] “Out of Order” tags should be used only for the specific purpose of indicating that a piece of equipment, machinery, etc., is out of order and to attempt to use it might present a hazard.

#### **Powered Industrial Trucks**

[29 CFR 1910.178(q)(4)] Trucks in need of repairs to the electrical system shall have the battery disconnected prior to such repairs.

### **Overhead and Gantry Cranes**

[29 CFR 1910.179(g)(5)(i)] The power supply to the runway conductors shall be controlled by a switch or circuit breaker located on a fixed structure, accessible from the floor and arranged to be locked in the open position.

[29 CFR 1910.179(g)(5)(ii)] On cab-operated cranes a switch or circuit breaker of the enclosed type, with provision for locking in the open position, shall be provided in the leads from the runway conductors. A means of opening this switch or circuit breaker shall be located within easy reach of the operator.

[29 CFR 1910.179(g)(5)(iii)] On floor-operated cranes, a switch or circuit breaker of the enclosed type, with provision for locking in the open position, shall be provided in the leads from runway conductors. This disconnect shall be mounted on the bridge or foot walk near the runway collectors. (See the provision for acceptable types of floor-operated disconnects.)

[29 CFR 1910.179(l)(2)(i)] Before adjustments and repairs are started on a crane, the following precautions shall be taken:

(b) All controllers shall be at the off position.

(c) The main or emergency switch shall be open and locked in the open position.

(d) Warning or “out of order” signs shall be placed on the crane, and on the floor beneath or on the hook where visible from the floor.

### **Derricks**

[29 CFR 1910.181(f)(2)(i)(c)] The main or emergency switch shall be locked in the open position, if an electric hoist is used.

[29 CFR 1910.181(f)(2)(i)(d)] “Warning” or “Out of Order” signs shall be placed on the derrick and hoist.

### **Woodworking Machinery Requirements**

[29 CFR 1910.213(a)(10)] It is recommended that each power-driven wood working machine be provided with a disconnect switch that can be locked in the off position.

[29 CFR 1910.213(b)(3)] On applications where injury to the operator might result if motors were to restart after power failures, provisions shall be made to prevent machines from automatically restarting upon restoration of power.

[29 CFR 1910.213(b)(5)] On each machine operated by electric motors, positive means shall be provided for rendering such controls or devices inoperative while repairs or adjustments are being made to the machines they control.

### **Mechanical Power Presses**

[29 CFR 1910.217(b)(8)(i)] A main power disconnect switch capable of being locked only in the off position shall be provided with every power press control system.

[29 CFR 1910.217(d)(9)(iv)] The employer shall provide and enforce the use of safety blocks for use when-ever dies are being adjusted or repaired in the press.

### **Forging Machines**

[29 CFR 1910.218(a)(3)(iii)] Means shall be provided for disconnecting the power to the machine and for locking out or rendering cycling controls inoperable.

[29 CFR 1910.218(a)(3)(iv)] The ram shall be blocked when dies are being changed or other work is being done on the hammer. Blocks or wedges shall be made of material the strength and construction of which should meet or exceed the specifications and dimensions shown in Table O-11.

[29 CFR 1910.218(d)(2)] Shutoff valve. Steam hammers shall be provided with a quick closing emergency valve in the admission pipeline at a convenient location. This valve shall be closed and locked in the off position while the hammer is being adjusted, repaired or serviced or when the dies are being changed.

[29 CFR 1910.218(e)(1)(ii)] Air-lift hammers shall have an air shutoff valve as required in paragraph (d)(2) of this section and should be conveniently located and distinctly marked for ease of identification.

[29 CFR 1910.218(e)(1)(iii)] Air-lift hammers shall be provided with two drain cocks: one on main head cylinder and one on clamp cylinder.

[29 CFR 1910.218(f)(1)] Mechanical forging presses. When dies are being changed or maintenance is being performed on the press, the following shall be accomplished:

- (i) The power to the press shall be locked out.
- (ii) The flywheel shall be at rest.
- (iii) The ram shall be blocked with a material the strength of which shall meet or exceed the specifications or dimensions shown in Table O-11.

[29 CFR 1910.218(f)(2)] Hydraulic forging presses. When dies are being changed or maintenance is being performed on the press, the following shall be accomplished:

- (i) The hydraulic pumps and power apparatus shall be locked out.

[29 CFR 1910.218(g)(1)] Hot trimming presses. The requirements of paragraph (f)(1) of this section shall also apply to hot trimming presses.

[29 CFR 1910.218(h)(2)] Lockouts. Upsetters shall be provided with a means for locking out the power at its entry point to the machine and rendering its cycling controls inoperable.

[29 CFR 1910.218(h)(5)] Changing dies. When dies are being changed, maintenance performed or any work done on the machine, the power to the upsetter shall be locked out, and the flywheel shall be at rest.

[29 CFR 1910.218(i)(1)] Boltheadings. The provisions of paragraph (h) of this section shall apply to bolt-heading.

[29 CFR 1910.218(i)(2)] Rivet making. The provisions of paragraph (h) of this section shall apply to rivet making.

[29 CFR 1910.218(j)(1)] Billet shears. A positive-type lockout device for disconnecting the power to the shear shall be provided.

### **Resistance Welding**

[29 CFR 1910.255(a)(1)] Installation. All equipment shall be installed by a qualified electrician in conformance with subpart S of this part. There shall be a safety-type disconnecting switch or a circuit

breaker or circuit interrupter to open each power circuit to the machine, conveniently located at or near the machine, so that the power can be shut off when the machine or its controls are to be serviced.

[29 CFR 1910.255(b)(2)] Capacitor welding. Stored energy or capacitor discharge type of resistance welding equipment and control panels involving high voltage (over 550 volts) shall be suitably insulated and protected by complete enclosures, all doors of which shall be provided with suitable interlocks and contacts wired into the control circuit (similar to elevator interlocks). Such interlocks or contacts shall be so designed as to effectively interrupt power and short circuit all capacitors when the door or panel is open. A manually operated switch or suitable positive device shall be installed, in addition to the mechanical interlocks or contacts, as an added safety measure assuring absolute discharge of all capacitors.

### **Pulp, Paper and Paperboard Mills**

[29 CFR 1910.261(b)(1)] Lockouts. Devices such as padlocks shall be provided for locking out the source of power at the main disconnect switch. Before any maintenance, inspection, cleaning, adjusting or servicing of equipment (electrical, mechanical or other) that requires entrance into or close contact with the machinery or equipment, the main power disconnect switch or valve, or both, controlling its source of power or flow of material shall be locked out or blocked off with padlock, blank flange, or similar device.

[29 CFR 1910.261(e)(2)] Slasher tables. Saws shall be stopped and power switches shall be locked out and tagged whenever it is necessary for any person to be on the slasher table.

[29 CFR 1910.261(e)(10)] Stops. All control devices shall be locked out and tagged when knives are being changed.

[29 CFR 1910.261(e)(12)(iii)] Whenever it becomes necessary for a workman to go within a drum, the driving mechanism shall be locked and tagged, at the main disconnect switch, in accordance with paragraph (b)(4) of this section. (Note: Refer to paragraph (b)(1) of this section; paragraph (b)(4) removed from this section of standard.)

[29 CFR 1910.261(e)(13)] Intermittent barking drums. In addition to motor switch, clutch, belt shifter or other power disconnecting device, intermittent barking drums shall be equipped with a device that may be locked to prevent the drum from moving while it is being emptied or filled.

[29 CFR 1910.261(f)(6)(i)] When cleaning, inspection or other work requires that persons enter rag cookers, all steam and water valves, or other control devices, shall be locked and tagged in the closed or *off* position. Blank flanging of pipelines is acceptable in place of closed and locked valves.

[29 CFR 1910.261(g)(4)(ii)] A man shall be stationed outside to summon assistance if necessary. All intake valves to a tank shall be blanked off or disconnected.

[29 CFR 1910.261(g)(15)(i)] Valves controlling lines leading into a digester shall be locked out and tagged. The keys to the locks shall be in the possession of a person or persons doing the inspecting or making repairs.

[29 CFR 1910.261(g)(16)(i)] Safety regulations governing inspection and repairing of pressure tanks-accumulators (acid) shall be the same as those specified in subparagraph (15) of this paragraph.

[29 CFR 1910.261(g)(19)(iii)] When blow lines from more than one digester lead into one pipe, the cock or valve of the blow line from the tank being inspected or repaired shall be locked or tagged out, or the line shall be disconnected and blocked off.

[29 CFR 1910.261(g)(21)] Inspection and repair of tanks. All piping leading to tanks shall be blanked off or valved and locked or tagged. Any lines to sewers shall be blanked off to protect workers from air contaminants.

[29 CFR 1910.261(j)(1)(iii)] Repairs for cleaning of blockage shall be done only when the shredder is shut-down and control devices locked.

[29 CFR 1910.261(j)(4)(ii)] When cleaning, inspecting or other work requires that persons enter the beaters, all control devices shall be locked or tagged out, in accordance with paragraph (b)(4) of this section.

(Note: Refer to paragraph (b)(1) of this section; paragraph (b)(4) removed from this section of standard.)

[29 CFR 1910.261(j)(5)(iii)] When cleaning, inspecting or other work requires that persons enter pulpers, all steam, water or other control devices shall be locked or tagged out. Blank flanging and tagging of pipe lines are acceptable in place of closed and locked or tagged valves. Blank flanging of steam and water lines shall be acceptable in place of valve locks.

[29 CFR 1910.261(j)(6)(i)] All control devices shall be locked or tagged out when persons enter stock chests, in accordance with paragraph (b)(4) of this section. (Note: Refer to paragraph (b)(1) of this section; paragraph (b)(4) removed from this section of standard.)

[29 CFR 1910.261(k)(2)(ii)] All drives shall be provided with lockout devices at the power switch that interrupts the flow of current to the unit.

### **Textiles**

[29 CFR 1910.262(c)(1)] Means of stopping machines. Every textile machine shall be provided with individual mechanical or electrical means for stopping such machines. On machines driven by belts and shafting, a locking-type shifter or an equivalent positive device shall be used. On operations where injury to the operator might result if motors were to restart after power failures, provision shall be made to prevent machines from automatically restarting upon restoration of power.

[29 CFR 1910.262(n)(2)] Protection for loom fixer. Provisions shall be made so that every loom fixer can prevent the loom from being started while he is at work on the loom. This may be accomplished by means of a lock, the key to which is retained in the possession of the loom fixer, or by some other effective means to prevent starting the loom.

[29 CFR 1910.262(p)(1)] J-box protection. Each valve controlling the flow of steam, injurious gases or liquids into a J-box shall be equipped with a chain, lock and key, so that any worker who enters the J-box can lock the valve and retain the key in his possession. Any other method that will prevent steam, injurious gases or liquids from entering the J-box while the worker is in it will be acceptable.

[29 CFR 1910.262(q)(2)] Kier valve protection. Each valve controlling the flow of steam, injurious gases or liquids into a kier shall be equipped with a chain, lock and key, so that any worker who enters the kier can lock the valve and retain the key in his possession. Any other method which will prevent steam, injurious gases or liquids from entering the kier while the worker is in it will be acceptable.

### **Bakery Equipment**

[29 CFR 1910.263(k)(12)(i)] Where pan cooling towers extend to two or more floors, a lockout switch shall be provided on each floor in order that mechanics working on the tower may positively lock the mechanism against starting. Only one start switch shall be used in the motor control circuit.

[29 CFR 1910.263(l)(3)(iii)(b)] Main shutoff valves shall be locked in the closed position when men must enter the oven or when the oven is not in service.

[29 CFR 1910.263(l)(8)(iii)] A main disconnect switch or circuit breaker shall be provided. This switch or circuit breaker shall be so located that it can be reached quickly and safely. The main switch or circuit breaker shall have provisions for locking it in the open position if any work on the electrical equipment or inside the oven must be performed.

### **Sawmills**

[29 CFR 1910.265(c)(13)] Hydraulic systems. Means shall be provided to block, chain or otherwise secure equipment normally supported by hydraulic pressure so as to provide for safe maintenance.

[29 CFR 1910.265(c)(26)(iii)] Blocking hoisting platform. Means shall be provided to positively block the hoisting platform when employees must go beneath the stacker or unstacker hoist.

[29 CFR 1910.265(c)(26)(v)] Locking main control switches. Main control switches shall be so designed that they can be locked in the open position.

[29 CFR 1910.265(e)(1)(iv)] Carriage control. A positive means shall be provided to prevent unintended movement of the carriage. This may involve a control locking device, a carriage tie-down or both.

### **Telecommunications**

[29 CFR 1910.268(l)(2)] Before the voltage is applied, cable conductors shall be isolated to the extent practicable. Employees shall be warned, by such techniques as briefing and tagging at all affected locations, to stay clear while the voltage is applied.

[29 CFR 1910.268(m)(7)(i)] Prior to grounding a radio transmitting station antenna, the employer shall insure that the rigger in charge: (A) prepares a danger tag signed with his signature, (B) requests the transmitting technician to shutdown the transmitter and to ground the antenna with its grounding switch, (C) is notified by the transmitting technician that the transmitter has been shutdown, and (D) tags the antenna ground switch personally in the presence of the transmitting technician after the antenna has been grounded by the transmitting technician.

## ***Construction Industry***

### **General Safety and Health Provisions**

[29 CFR 1926.20(b)(3)] The use of any machinery, tool, material or equipment that is not in compliance with any applicable requirement of this part is prohibited. Such machine, tool, material or equipment shall either be identified as unsafe by tagging or locking the controls to render them inoperable or shall be physically removed from its place of operation.

### **Nonionizing Radiation**

[29 CFR 1926.54(e)] Beam shutters or caps shall be utilized, or the laser turned off, when laser transmission is not actually required. When the laser is left unattended for a substantial period of time, such as during lunch hour, overnight or at change of shifts, the laser shall be turned off.

### **Accident Prevention Signs and Tags**

[29 CFR 1926.200(h)(1)] Accident prevention tags shall be used as a temporary means of warning employees of an existing hazard, such as defective tools, equipment, etc. They shall not be used in place of, or as a substitute for, accident prevention signs.

### **Woodworking Tools**

[29 CFR 1926.304(a)] All fixed power driven woodworking tools shall be provided with a disconnect switch that can either be locked or tagged in the *off* position.

### **Welding and Cutting**

[29 CFR 1926.352(g)] For the elimination of possible fire in enclosed spaces as a result of gas escaping through leaking or improperly closed torch valves, the gas supply to the torch shall be positively shut off at some point outside the enclosed space whenever the torch is not to be used or whenever the torch is left unattended for a substantial period of time, such as during the lunch period. Overnight and at the change of shifts, the torch and hose shall be removed from the confined space. Open end fuel gas and oxygen hoses shall be immediately removed from enclosed spaces when they are disconnected from the torch or other gas-consuming device.

[1926.417(a)] **Control.** Controls that are to be deactivated during the course of work on energized or de-energized equipment or circuits shall be tagged.

[1926.417(b)] **Equipment and circuits.** Equipment and circuits that are de-energized shall be rendered inoperative and shall have tags attached at all points where such equipment or circuits can be energized.

[1926.417(c)] **Tags.** Tags shall be placed to identify plainly the equipment or circuits being worked on.

### **Base-Mounted Drum Hoists**

[29 CFR 1926.553(a)(3)] Electric motor operated hoists shall be provided with:

- (i) A device to disconnect all motors from the line upon power failure and not permit any motor to be restarted until the controller handle is brought to the off position.
- (iii) A means whereby remotely operated hoists stop when any control is ineffective.

### **Conveyors**

[29 CFR 1926.555(a)(7)] Conveyors shall be locked out or otherwise rendered inoperable and tagged out with a “Do Not Operate” tag during repairs and when operation is hazardous to employees performing maintenance work.

### **Motor Vehicles, Mechanized Equipment and Marine Operations**

[29 CFR 1926.600(a)(3)(i)] Heavy machinery, equipment or parts thereof that are suspended or held aloft by use of slings, hoists or jacks shall be substantially blocked or cribbed to prevent falling or shifting before employees are permitted to work under or between them. Bulldozer and scraper blades, end-loader buckets, dump bodies, and similar equipment, shall be either fully lowered or blocked when being repaired or when not in use. All controls shall be in a neutral position, with the motors stopped and brakes set, unless work being performed requires otherwise.

[29 CFR 1926.600(a)(3)(ii)] Whenever the equipment is parked, the parking brake shall be set. Equipment parked on inclines shall have the wheels chocked and the parking brake set.

[29 CFR 1926.601(b)(10)] Trucks with dump bodies shall be equipped with positive means of support, permanently attached and capable of being locked in position to prevent accidental lowering of the body while maintenance or inspection work is being done.

[29 CFR 1926.601(b)(11)] Operating levers controlling hoisting or dumping devices on haulage bodies shall be equipped with a latch or other device that will prevent accidental starting or tripping of the mechanism.

[29 CFR 1926.603(a)(5)] A blocking device, capable of safely supporting the weight of the hammer, shall be provided for placement in the leads under the hammer at all times while employees are working under the hammer.

### **Initiation of Explosive Charges—Electric Blasting**

[29 CFR 1926.906(j)] In underground operations when firing from a power circuit, a safety switch shall be placed in the permanent firing line at intervals. This switch shall be made so it can be locked only in the *off* position and shall be provided with a short-circuit arrangement of the firing lines to the cap circuit.

[29 CFR 1926.906(l)] When firing from a power circuit, the firing switch shall be locked in the open or *off* position at all times, except when firing. It shall be so designed that the firing lines to the cap circuit are automatically short-circuited when the switch is in the *off* position. Keys to this switch shall be entrusted only to the blaster.

### **Power Transmission and Distribution**

[29 CFR 1926.950(d)(1)] When de-energizing lines and equipment operated in excess of 600 volts and the means of disconnecting from electric energy is not visibly open or visibly locked out, the provisions of subdivisions (i) through (vii) of this subparagraph shall be complied with.

[29 CFR 1926.950(d)(1)(i)] The particular section of line or equipment to be de-energized shall be clearly identified, and it shall be isolated from all sources of voltage.

[29 CFR 1926.950(d)(1)(ii)] Notification and assurances from the designated employee shall be obtained that:

- (a) All switches and disconnectors through which energy may be supplied to the particular section of line or equipment to be worked have been de-energized.
- (b) All switches and disconnectors are plainly tagged indicating that men are at work.
- (c) And that where design of such switches and disconnectors permits, they have been rendered inoperable.

[29 CFR 1926.950(d)(1)(iii)] After all designated switches and disconnectors have been opened, rendered inoperable and tagged, visual inspection or tests shall be conducted to insure that equipment or lines have been de-energized.

[29 CFR 1926.950(d)(1)(iv)] Protective grounds shall be applied on the disconnected lines or equipment to be worked on.

[29 CFR 1926.950(d)(1)(v)] Guards or barriers shall be erected as necessary to adjacent energized lines.

[29 CFR 1926.950(d)(1)(vi)] When more than one independent crew requires the same line or equipment to be de-energized, a prominent tag for each such independent crew shall be placed on the line or equipment by the designated employee in charge.

[29 CFR 1926.950(d)(1)(vii)] Upon completion of work on de-energized lines or equipment, each designated employee in charge shall determine that all employees in his crew are clear, that protective grounds installed by his crew have been removed, and he shall report to the designated authority that all tags protecting his crew may be removed.

[29 CFR 1926.950(d)(2)] When a crew working on a line or equipment can clearly see that the means of disconnecting from electric energy are visibly open or visibly locked out, the provisions of subdivisions (i) and (ii) of this subparagraph shall apply.

[29 CFR 1926.950(d)(2)(i)] Guards or barriers shall be erected as necessary to adjacent energized lines.

### **Construction in Energized Substations**

[29 CFR 1926.951(c)(1)] **Ladders.** Portable metal or conductive ladders shall not be used near energized lines or equipment except as may be necessary in specialized work such as in high voltage substations where nonconductive ladders might present a greater hazard than conductive ladders. Conductive or metal ladders shall be prominently marked as conductive and all necessary precautions shall be taken when used in specialized work.

[29 CFR 1926.957(b)] De-energized equipment or lines. When it is necessary to de-energize equipment or lines for protection of employees, the requirements of paragraph 1926.950(d) shall be complied with.

### **References**

Boylston, Raymond P. August 1982. *Locking and Tagging Guide for Industrial Operations*. Professional Safety. pp. 21–25.

National Safety Council. 1981. Principles of Guarding. *Accident Prevention Manual for Industrial Operations—Engineering and Technology*. 8th ed. Chapter 8.

NIOSH (1999). NIOSH Alert: Preventing Worker Deaths From Uncontrolled Release of Electrical, Mechanical and Other Types of Hazardous Energy; U.S. Department of Health and Human Services, Public Health Service, Centers for Disease Control and Prevention, National Institute of Occupational Safety and Health; DHHS (NIOSH) Publication No. 99-110.

U.S. Department of Labor, OSHA 3120, 1997 (Revised), Control of Hazardous Energy (Lockout/Tagout).

### **Additional Help**

OSHA Instruction STD 1-7.3. September 11, 1990. Directorate of Compliance Programs. 29 CFR 1910.147, the Control of Hazardous Energy (Lockout/Tagout)—Inspection Procedures and Interpretive Guidance. Occupational Safety and Health, U.S. Department of Labor, Washington, D.C.

OSHA Instruction STD 1-7.3 is a public document. It can be obtained by writing to the U.S. Department of Labor. It is also published by Commerce Clearing House Inc. in the *Employment Safety and Health Guide*, at 10,655, ¶13,566 *et seq.*

OSHA Instruction STD 1-7.3 addresses: periodic inspections by the employer, required by the standard, and equipment testing or positioning. Appendix C of OSHA Instruction STD 1-7.3 discusses at length group lockout/tagout, including simple and complex operations.