Lockout / Tagout

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Lockout/Tagout Class Agenda

1. Introduction
2. Pretest
3. Overview of Lockout/Tagout, Safe Work Practices, State codes
4. OSHA regulation 1910.147 and 1926.417
5. Safety Related Work Practices

Lockout / Tagout Course Objectives

The major objectives of this course are to assist the students to acquire:

- Knowledge of the nomenclature and operation of Lockout/Tagout (LO/TO)
- The ability to conduct a safety inspection for LO/TO
- The knowledge of the training needed for employees and supervisors
- The knowledge and training needed for Safety Related Work Practices
- The ability to write LO/TO procedures for a specific machine or piece of equipment

Lockout/Tagout and Safety-Related Work Practices

Follow-up Activities

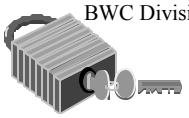
- Recognized the need to review and modify our current procedure for all equipment use.
- Developed a written program.
- Gave a one hour presentation on site-specific equipment.
- Provide a detail assessment for each piece of equipment.
- Provide a written outline of site specific training for employees.
- Establish an energy control program that meets or exceeds OSHA CFR 1910.147 and 1910.331 thru 1910.335.
- Develop three machine specific de-energized procedures.
- Conducted annual review of each procedure.

Activity Plan

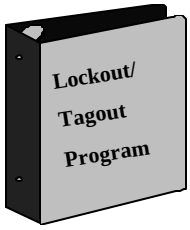
	Activity	Other people involved	Target Deadline
❑			
❑			
❑			
❑			
❑			
❑			
❑			
❑			

Elements of a Lockout/Tagout Program

BWC Division of Safety & Hygiene



I. Purpose and Scope



Other Part 1910 Regulations With Lockout/Tagout - Related Requirements

The following listing, taken from OSHA Instruction CPL 2.82, an OSHA guidance document on inspection procedures and compliance clarification for the Control of Hazardous Energy Sources regulation, indicates a number of OSHA regulations that currently impose lockout/tagout - related requirements. The list does not necessarily include all lockout/tagout - related OSHA 29 CFR 1910 regulations.

Title of Related Regulation	Regulatory Citation of Related Regulation
Powered Industrial Trucks	Part 1910.178(q)(4)
Overhead & Gantry Cranes	Part 1910.179(g)(5)(i),(ii),(iii) Part 1910.179(l)(2)(i)(c), (d)
Derricks	Part 1910.181(f)(2)(i)(c), (d)
Woodworking Machinery	Part 1910.213(a)(10) Part 1910.213(b)(5)
Mechanical Power Presses	Part 1910.217(b)(8)(i) Part 1910.217(d)(9)(iv)
Forging Machines	Part 1910.218(a)(3)(iii), (iv) Part 1910.218(j)(1)
Welding, Cutting & Brazing	Part 1910.252(a)(3)(i)
Pulp, Paper & Paperboard Mills	Part 1910.261(b)(4) Part 1910.261(g)(15)(i)
Textiles	Part 1910.262(c)(1)
Sawmills	Part 1910.262(p)(1) Part 1910.265(c)(13) Part 1910.265(c)(26)(v)
Electric Power Generation, Transmission & Distribution	Part 1910.269(d)(1)-(8) Part 1910.269(m)(1)-(3)
Grain Handling	Part 1910.272(e)(1)(ii) Part 1910.272(l)(4)
Electrical	Part 1910.305(j)(4)(ii)(A) Part 1910.333(b)(2)(v)(A)

The following accidents, taken from a NIOSH report entitled, *Guidelines for Controlling Hazardous Energy During Maintenance and Servicing,* are typical of the hazards of common industrial equipment and machines and demonstrate the protective function of the Standard 29 CFR Part 1910.147

Incident	Lockout/Tagout Standard Provision That Protects From The Hazard
1. An employee was removing paper from a waste hogger. The hogger had been shut down, but the conveyor feeding the hogger had not been. The employee climbed onto the machine, fell onto the conveyor, was pulled into the hogger opening and was crushed. There was no energy control procedure at this operation.	Document and Implement an effective energy control procedures - Part 1910.147(c)(4)
2. An employee was partially inside an asphalt-mixing machine, changing its paddles. Another employee, while dusting in the control room, accidentally hit a toggle switch that caused the door of the mixer to close, striking the first employee on the head and killing him. Electrical switches to activate the machine were not de-energized and air pressure to move the doors was not shut off.	Isolate equipment from energy sources -Part 1910.147(d)(3)

The following accidents, taken from a NIOSH report entitled, *Guidelines for Controlling Hazardous Energy During Maintenance and Servicing,* are typical of the hazards of common industrial equipment and machines and demonstrate the protective function of the Standard 29 CFR Part 1910.147.

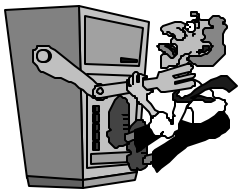
Incident	Lockout/Tagout Standard Provision That Protects From The Hazard
3. An employee was setting up a vacuum-forming machine for a run of violin cases. He leaned over the press and accidentally activated the starting switch. His head was crushed between an air cylinder and the frame hogger opening. There was no energy control procedure at this operation.	Document & implement an energy effective control procedures - Part) 1910.147(c) (4)
4. An employee was cleaning scrap from beneath a large shear when a fellow employee hit the control button, activating the blade. The blade came down and decapitated the employee	Isolate, lockout/tagout or otherwise disable all potential hazardous energy sources b efore attempting any repair, maintenance or servicing – Part 1910.147(c)(2)

II. List & Identify all Sources Of Energy

- Electrical
- Hydraulic
- Pneumatic
- Thermal
- Chemical
- Mechanical
- Cord & Plug Equip.
- Other Types

III. Procedures For Each Piece Of Equipment

- Written procedures must be documented for each piece of equipment.
- If machinery or pieces of equipment are similar, just one procedure will cover all like pieces.



Lockout / Tagout
Energy Source Identification

Machine: Compressor **Date:** 12 - 30 - 97
Location: Auto Shop **Dept:** Maintenance
Person Identifying Sources: John Doe, Maintenance Supervisor

Type Of Energy	Yes	No	Method, Device or System Selected to De-energize. Quantity of Energy Source (i.e. Voltage, Velocity, PSI, etc.
Electrical	X		Close disconnect on wall behind unit & lockout. Check with tester. 480 Volts.
Hydraulic	X		Close valve on left end. Open pressure release valve below it. Allow pressure to escape(15 minutes). 150 PSI
Pneumatic (Air)	X		Lockout Shut valve on right end and open bleeder valve, lockout, wait 15 minutes for pressure to bleed down. 300 PSI
Chemical		X	
Thermal		X	
Mechanical		X	
Cord & Plug Connected		X	
Engulfment Hazard		X	
Other		X	

IV. Safe Procedures for Energy Control Program

- Steps for Shutting down all energy sources.
- Steps for Placement, Removal & Transfer Of LO/TO Devices.
- Steps for testing to verify LO/TO.
- Enforcement Policy.

V. Identify Different Personnel

- Authorized
- Affected
- Other

Elements of a Lockout / Tagout Program

VI. Lockout Devices.

- Standardize All Locks and Tags.
- Identify The User.
- Must Be Durable.
- Used Only For Lockout/Tagout.

Elements of a Lockout / Tagout Program

VII. Training Of Authorized Employees.

- Types of Energy.
- Magnitude Of Energy Sources
- Locations & How to Lockout Energy Sources.
- Types of Devices to Be Used.

Elements of a Lockout / Tagout Program

VIII. Training Affected & Other Employees

- Purpose Of The Energy Control Program.
- Types & How to Identify Lockout Devices.
- To Understand That They Should Not Tamper With Any Devices Used In Lockout/Tagout Procedures.

Elements of a Lockout / Tagout Program

IX. Shift & Personnel Changes.

- How to transfer locks at the end of shifts.
- How to transfer locks when personnel leave.

Elements of a Lockout / Tagout Program

X. Develop Procedures on how you will Communicate with Contractors on LO/TO.

- Who
- What
- When
- Where
- How

Elements of a Lockout / Tagout Program

XI. Miscellaneous Items in Your Program.

- Procedures for removal of a lock when that person is not present.
- Notifying affected employees when locks are to be applied or removed.

Elements of a Lockout / Tagout Program

XII. Group Lockout Procedures.

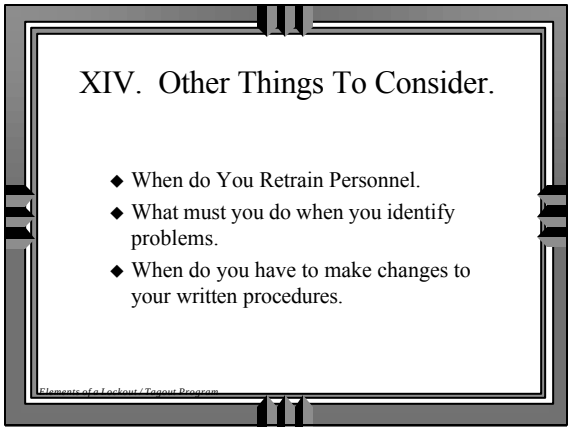
Procedures on how you will handle more than one individual working on the same piece of equipment.

Elements of a Lockout / Tagout Program

XIII. Annual Inspection of Your Procedures.

- Date of Inspection.
- Machine or Process to review Identified.
- Names of persons involved in LO/TO.
- Name of person doing Inspection.
- Copy of Inspection kept on record.

Elements of a Lockout / Tagout Program


XIV. Other Things To Consider.
◆ When do You Retrain Personnel.
◆ What must you do when you identify problems.
◆ When do you have to make changes to your written procedures.
Elements of a Lockout / Tagout Program

Other Part 1910 Regulations With Lockout/Tagout - Related Requirements

The following listing, taken from OSHA Instruction STD 1-7.3, the 1990 compliance document for the Lockout/Tagout standard, indicates a number of OSHA regulations that currently impose lockout/tagout - related requiremets. The list does not necessarily include all lockout/tagout - related OSHA 29 CFR 1910 regulations.

Title of Related Regulation	Regulatory Citation of Related Regulation
Powered Industrial Trucks	Part 1910.178(q)(4)
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Sawmills	Part 1910.265(c)(13)
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Electric Power Generation,	Part 1910.269(d)(1)-(8)
Transmission & Distribution	Part 1910.269(m)(1)-(3)
Grain Handling	Part 1910.272(e)(1)(ii)
	Part 1910.272(l)(4)
Electrical	Part 1910.305(j)(4)(ii)(A)
	Part 1910.305(j)(4)(ii)(C)(1)
	Part 1910.333(b)(2)

The following accidents, taken from a NIOSH report entitled, *Guidelines for Controlling Hazardous Energy During Maintenance and Servicing,* are typical of the hazards of common industrial equipment and machines and demonstrate the protective function of the Standard 29 CFR Part 1910.147

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2. An employee was partially inside an asphalt-mixing machine, changing its paddles. Another employee, while dusting in the control room, accidentally hit a toggle switch that caused the door of the mixer to close, striking the first employee on the head and killing him. Electrical switches to activate the machine were not de-energized and air pressure to move the doors was not shut off.	Isolate equipment from energy sources -Part 1910.147(d)(3)

The following accidents, taken from a NIOSH report entitled, *Guidelines for Controlling Hazardous Energy During Maintenance and Servicing*, are typical of the hazards of common industrial equipment and machines and demonstrate the protective function of the Standard 29 CFR Part 1910.147.

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4. An employee was cleaning scrap from beneath a large shear when a fellow employee hit the control button, activating the blade. The blade came down and decapitated the employee	**Isolate, lockout/tagout or otherwise disable all potential hazardous energy sources before attempting any repair, maintenance or servicing – Part 1910.147(c)(2)**

Lockout / Tagout
Energy Source Identification

Machine: Compressor **Date:** 12 - 30 - 97
Location: Auto Shop **Dept.:** Maintenance
Person Identifying Sources: John Doe, Maintenance Supervisor

Type Of Energy	Yes	No	Method, Device or System Selected to De-energize. Quantity of Energy Source (i.e. Voltage, Velocity, PSI, etc.
Electrical	X		Close disconnect on wall behind unit & lockout. Check with tester. 480 Volts.
Hydraulic	X		Close valve on left end. Open pressure release valve below it. Allow pressure to escape(15 minutes). 150 PSI Lockout
Pneumatic (Air)	X		Shut valve on right end and open bleeder valve, lockout, wait 15 minutes for pressure to bleed down. 300 PSI
Chemical		X	
Thermal		X	
Mechanical		X	
Cord & Plug Connected		X	
Engulfment Hazard		X	
Other		X	

Elements of a Lockout / Tagout Program

Lockout/Tagout

Energy Source Identification

Machine: **Date:**

Location: **Dept.:**

Person Identifying Sources:

TYPE OF ENERGY	YES	NO	METHOD, DEVICE OR SYSTEM SELECTED TO DE-ENERGIZE, POWER SOURCE (Voltage, Pressure, etc.)
ELECTRICAL			
HYDRAULIC			
PNEUMATIC (AIR)			
CHEMICAL			
THERMAL			
MECHANICAL			
CORD & PLUG CONNECTED			
OTHER			

OSHA Regulations (Standards - 29 CFR)
Lockout and tagging of circuits. - 1926.417

- **Standard Number:** 1926.417
- **Standard Title:** Lockout and tagging of circuits.
- **SubPart Number:** K
- **SubPart Title:** Electrical - Safety-Related Work Practices

(a)

Controls. Controls that are to be deactivated during the course of work on energized or deenergized equipment or circuits shall be tagged.

(b)

Equipment and circuits. Equipment or circuits that are deenergized shall be rendered inoperative and shall have tags attached at all points where such equipment or circuits can be energized.

(c)

Tags. Tags shall be placed to identify plainly the equipment or circuits being worked on.

[58 FR 35181, June 30, 1993; 61 FR 9227, March 7, 1996; 61 FR 41738, August 12, 1996]

OSHA Regulations (Standards - 29 CFR)
The control of hazardous energy (lockout/tagout). - 1910.147

- **Standard Number:** 1910.147
- **Standard Title:** The control of hazardous energy (lockout/tagout).
- **SubPart Number:** J
- **SubPart Title:** General Environmental Controls

(a)
"Scope, application and purpose" -

(a)(1)
"Scope"

(a)(1)(i)
This standard covers the servicing and maintenance of machines and equipment in which the "unexpected" energization or start up of the machines or equipment, or release of stored energy could cause injury to employees. This standard establishes minimum performance requirements for the control of such hazardous energy.

(a)(1)(ii)
This standard does not cover the following:

(a)(1)(ii)(A)
Construction, agriculture and maritime employment;

(a)(1)(ii)(B)
Installations under the exclusive control of electric utilities for the purpose of power generation, transmission and distribution, including related equipment for communication or metering; and

(a)(1)(ii)(C)
Exposure to electrical hazards from work on, near, or with conductors or equipment in electric utilization installations, which is covered by Subpart S of this part; and

(a)(1)(ii)(D)
Oil and gas well drilling and servicing.

(a)(2)
"Application."

(a)(2)(i)

This standard applies to the control of energy during servicing and/or maintenance of machines and equipment.

(a)(2)(ii)

Normal production operations are not covered by this standard (See Subpart O of this Part). Servicing and/or maintenance which takes place during normal production operations is covered by this standard only if:

(a)(2)(ii)(A)

An employee is required to remove or bypass a guard or other safety device; or

(a)(2)(ii)(B)

An employee is required to place any part of his or her body into an area on a machine or piece of equipment where work is actually performed upon the material being processed (point of operation) or where an associated danger zone exists during a machine operating cycle.

Note: Exception to paragraph (a)(2)(ii): Minor tool changes and adjustments, and other minor servicing activities, which take place during normal production operations, are not covered by this standard if they are routine, repetitive, and integral to the use of the equipment for production, provided that the work is performed using alternative measures which provide effective protection (See Subpart O of this Part).

(a)(2)(iii)

This standard does not apply to the following:

(a)(2)(iii)(A)

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 the unplugging of the equipment from the energy source and by the plug being under the exclusive control of the employee performing the servicing or maintenance.

(a)(2)(iii)(B)

Hot tap operations involving transmission and distribution systems for substances such as gas, steam, water or petroleum products when they are performed on pressurized pipelines, provided that the employer demonstrates that-

(a)(2)(iii)(B)(1)

continuity of service is essential;

(a)(2)(iii)(B)(2)

shutdown of the system is impractical; and {3} documented procedures are followed, and special equipment is used which will provide proven effective protection for employees.

(a)(3)

"Purpose."

(a)(3)(i)

This section requires employers to establish a program and utilize procedures for affixing appropriate lockout devices or tagout devices to energy isolating devices, and to otherwise disable machines or equipment to prevent unexpected energization, start up or release of stored energy in order to prevent injury to employees.

(a)(3)(ii)

When other standards in this part require the use of lockout or tagout, they shall be used and supplemented by the procedural and training requirements of this section.

(b)

"Definitions applicable to this section."

> "Affected employee." An employee whose job requires him/her to operate or use a machine or equipment on which servicing or maintenance is being performed under lockout or tagout, or whose job requires him/her to work in an area in which such servicing or maintenance is being performed.

"Authorized employee." A person who locks out or tags out machines or equipment in order to perform servicing or maintenance on that machine or equipment. An affected employee becomes an authorized employee when that employee's duties include performing servicing or maintenance covered under this section.

"Capable of being locked out." An energy isolating device is capable of being locked out if it has a hasp or other means of attachment to which, or through which, a lock can be affixed, or it has a locking mechanism built into it. Other energy isolating devices are capable of being locked out, if lockout can be achieved without the need to dismantle, rebuild, or replace the energy isolating device or permanently alter its energy control capability.

"Energized." Connected to an energy source or containing residual or stored energy.

"Energy isolating device." A mechanical device that physically prevents the transmission or release or energy, including but not limited to the following: A manually operated electrical circuit breaker, a disconnect switch, a manually operated switch by which the conductors of a circuit can be disconnected from all ungrounded supply conductors and, in addition, no pole can be operated independently; a line valve; a block; and any similar device used to block or isolate energy. Push buttons, selector switches and other control circuit type devices are not energy isolating devices.

"Energy source." Any source of electrical, mechanical, hydraulic, pneumatic, chemical, thermal, or other energy.

"Hot tap." A procedure used in the repair maintenance and services activities which involves welding on a piece of equipment (pipelines, vessels or tanks) under pressure, in order to install connections or appurtenances. it is commonly used to replace or add sections of pipeline without the interruption of service for air, gas, water, steam, and petrochemical distribution systems.

"Lockout." The placement of a lockout device on an energy isolating device, in accordance with an established procedure, ensuring that the energy isolating device and the equipment being controlled cannot be operated until the lockout device is removed.

"Lockout device." A device that utilizes a positive means such as a lock, either key or combination type, to hold an energy isolating device in the safe position and prevent the energizing of a machine or equipment. Included are blank flanges and bolted slip blinds.

"Normal production operations." The utilization of a machine or equipment to perform its intended production function.

"Servicing and/or maintenance." Workplace activities such as constructing, installing, setting up, adjusting, inspecting, modifying, and maintaining and/or servicing machines or equipment. These activities include lubrication, cleaning or unjamming of machines or equipment and making adjustments or tool changes, where the employee may be exposed to the unexpected energization or startup of the equipment or release of hazardous energy.

"Setting up." Any work performed to prepare a machine or equipment to perform its normal production operation.

"Tagout." The placement of a tagout device on 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.

"Tagout device." 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.

(c)

"General" -

(c)(1)

"Energy control program." The employer shall establish a program consisting of energy control procedures, employee training and to periodic inspections to ensure that before any employee performs any servicing or maintenance on a machine or equipment where the unexpected energizing, startup or release of stored energy could occur and cause injury, the machine or equipment shall be isolated from the energy source and rendered inoperative.

(c)(2)

"Lockout/tagout."

(c)(2)(i)

If an energy isolating device is not capable of being locked out, the employer's energy control program under paragraph (c)(1) of this section shall utilize a tagout system.

(c)(2)(ii)

If an energy isolating device is capable of being locked out, the employer's energy control program under paragraph (c)(1) of this section shall utilize lockout, unless the employer can demonstrate that the utilization of a tagout system will provide full employee protection as set forth in paragraph (c)(3) of this section.

(c)(2)(iii)

After January 2, 1990, whenever replacement or major repair, renovation or modification of a machine or equipment is performed, and whenever new machines or equipment are installed, energy isolating devices for such machine or equipment shall be designed to accept a lockout device.

(c)(3)

"Full employee protection."

(c)(3)(i)

When a tagout device is used on an energy isolating device which is capable of being locked out, the tagout device shall be attached at the same location that the lockout device would have been attached, and the employer shall demonstrate that the tagout program will provide a level of safety equivalent to that obtained by using a lockout program.

(c)(3)(ii)

In demonstrating that a level of safety is achieved in the tagout program which is equivalent to the level of safety obtained by using a lockout program, the employer shall demonstrate full compliance with all tagout-related provisions of this standard together with such additional elements as are necessary to provide the equivalent safety available from the use of a lockout device. Additional means to be considered as part of the demonstration of full employee protection shall include the implementation of additional safety measures such as the removal of an isolating circuit element, blocking of a controlling switch, opening of an extra disconnecting device, or the removal of a valve handle to reduce the likelihood of inadvertent energization.

(c)(4)

"Energy control procedure."

(c)(4)(i)

Procedures shall be developed, documented and utilized for the control of potentially hazardous energy when employees are engaged in the activities covered by this section.

Note: "Exception:" The employer need not document the required procedure for a particular machine or equipment, when all of the following elements exist: [1] The machine or equipment has no potential for stored or residual energy or reaccumulation of stored energy after shut down which could endanger employees: [2] the machine or equipment has a single energy source which can be readily identified and isolated: [3] the isolation and locking out of that energy source will completely deenergize and deactivate the machine or equipment: [4] the machine or equipment is isolated from that energy source and locked out during servicing or maintenance: [5] a single lockout device will achieve a locker-out condition: [6] the lockout device is under the exclusive control of the authorized employee performing the servicing or maintenance: [7] the servicing or maintenance does not create hazards for other employees; and [8] the employer, in utilizing this exception, has had no accidents involving the unexpected activation or reenergization of the machine or equipment during servicing or maintenance.

(c)(4)(ii)

The procedures shall clearly and specifically outline the scope, purpose, authorization, rules, and techniques to be utilized for the control of hazardous energy, and the means to enforce compliance including, but not limited to, the following:

(c)(4)(ii)(A)

A specific statement of the intended use of the procedure;

(c)(4)(ii)(B)

Specific procedural steps for shutting down, isolating, blocking and securing machines or equipment to control hazardous energy;

(c)(4)(ii)(C)

Specific procedural steps for the placement, removal and transfer of lockout devices or tagout devices and the responsibility for them; and

(c)(4)(ii)(D)

Specific requirements for testing a machine or equipment to determine and verify the effectiveness of lockout devices, tagout devices, and other energy control measures.

(c)(5)

"Protective materials and hardware."

(c)(5)(i)

Locks, tags, chains, wedges, key blocks, adapter pins, self-locking fasteners, or other hardware shall be provided by the employer for isolating, securing or blocking of machines or equipment from energy sources.

(c)(5)(ii)

Lockout devices and tagout devices shall be singularly identified; shall be the only device(s) used for controlling energy; shall not be used for other purposes; and shall meet the following requirements:

(c)(5)(ii)(A)

"Durable."

(c)(5)(ii)(A)(1)

Lockout and tagout devices shall be capable of withstanding the environment to which they are exposed for the maximum period of time that exposure is expected.

(c)(5)(ii)(A)(2)

Tagout devices shall be constructed and printed so that exposure to weather conditions or wet and damp locations will not cause the tag to deteriorate or the message on the tag to become illegible.

(c)(5)(ii)(A)(3)

Tags shall not deteriorate when used in corrosive environments such as areas where acid and alkali chemicals are handled and stored.

(c)(5)(ii)(B)

"Standardized." Lockout and tagout devices shall be standardized within the facility in at least one of the following criteria: Color; shape; or size; and additionally, in the case of tagout devices, print and format shall be standardized.

(c)(5)(ii)(C)

"Substantial" -

(c)(5)(ii)(C)(1)

"Lockout devices." Lockout devices shall be substantial enough to prevent removal without the use of excessive force or unusual techniques, such as with the use of bolt cutters or other metal cutting tools.

(c)(5)(ii)(C)(2)

"Tagout devices." Tagout devices, including their means of attachment, shall be substantial enough to prevent inadvertent or accidental removal. Tagout device attachment means shall be of a non-reusable type, attachable by hand, self-locking, and non-releasable with a minimum unlocking strength of no less than 50 pounds and having the general design and basic characteristics of being at least equivalent to a one-piece, all environment-tolerant nylon cable tie.

(c)(5)(ii)(D)

"Identifiable." Lockout devices and tagout devices shall indicate the identify of the employee applying the device(s).

(c)(5)(iii)

Tagout devices shall warn against hazardous conditions if the machine or equipment is energized and shall include a legend such as the following: "Do Not Start. Do Not Open. Do Not Close. Do Not Energize. Do Not Operate."

(c)(6)

"Periodic inspection."

(c)(6)(i)

The employer shall conduct a periodic inspection of the energy control procedure at least annually to ensure that the procedure and the requirements of this standard are being followed.

(c)(6)(i)(A)

The periodic inspection shall be performed by an authorized employee other than the one(s) utilizing the energy control procedure being inspected.

(c)(6)(i)(B)

The periodic inspection shall be conducted to correct any deviations or inadequacies identified.

(c)(6)(i)(C)

Where lockout is used for energy control, the periodic inspection shall include a review, between the inspector and each authorized employee, of that employee's responsibilities under the energy control procedure being inspected.

(c)(6)(i)(D)

Where tagout is used for energy control, the periodic inspection shall include a review, between the inspector and each authorized and affected employee, of that employee's responsibilities under the energy control procedure being inspected, and the elements set forth in paragraph (c)(7)(ii) of this section.

(c)(6)(ii)

The employer shall certify that the periodic inspections have been performed. The certification shall identify the machine or equipment on which the energy control procedure was being utilized, the date of the inspection, the employees included in the inspection, and the person performing the inspection.

(c)(7)

"Training and communication."

(c)(7)(i)

The employer shall provide training to ensure that the purpose and function of the energy control program are understood by employees and that the knowledge and skills required for the safe application, usage, and removal of the energy controls are acquired by employees. The training shall include the following:

(c)(7)(i)(A)

Each authorized employee shall receive training in the recognition of applicable hazardous energy sources, the type and magnitude of the energy available in the workplace, and the methods and means necessary for energy isolation and control.

(c)(7)(i)(B)

Each affected employee shall be instructed in the purpose and use of the energy control procedure.

(c)(7)(i)(C)

All other employees whose work operations are or may be in an area where energy control procedures may be utilized, shall be instructed about the procedure, and about the prohibition relating to attempts to restart or reenergize machines or equipment which are locked out or tagged out.

(c)(7)(ii)

When tagout systems are used, employees shall also be trained in the following limitations of tags:

(c)(7)(ii)(A)

Tags are essentially warning devices affixed to energy isolating devices, and do not provide the physical restraint on those devices that is provided by a lock.

(c)(7)(ii)(B)

when a tag is attached to an energy isolating means, it is not to be removed without authorization of the authorized person responsible for it, and it is never to be bypassed, ignored, or otherwise defeated.

(c)(7)(ii)(C)

Tags must be legible and understandable by all authorized employees, affected employees, and all other employees whose work operations are or may be in the area, in order to be effective.

(c)(7)(ii)(D)

Tags and their means of attachment must be made of materials which will withstand the environmental conditions encountered in the workplace.

(c)(7)(ii)(E)

Tags may evoke a false sense of security, and their meaning needs to be understood as part of the overall energy control program.

(c)(7)(ii)(F)

Tags must be securely attached to energy isolating devices so that they cannot be inadvertently or accidentally detached during use.

(c)(7)(iii)

Employee retraining.

(c)(7)(iii)(A)

Retraining shall be provided for all authorized and affected employees whenever there is a change in their job assignments, a change in machines, equipment or processes that present a new hazard, or when there is a change in the energy control procedures.

(c)(7)(iii)(B)

Additional retraining shall also be conducted whenever a periodic inspection under paragraph (c)(6) of this section reveals, or whenever the employer has reason to believe that there are deviations from or inadequacies in the employee's knowledge or use of the energy control procedures.

(c)(7)(iii)(C)

The retraining shall reestablish employee proficiency and introduce new or revised control methods and procedures, as necessary.

(c)(7)(iv)

The employer shall certify that employee training has been accomplished and is being kept up to date. The certification shall contain each employee's name and dates of training.

(c)(8)

"Energy isolation." Lockout or tagout shall be performed only by the authorized employees who are performing the servicing or maintenance.

(c)(9)

"Notification of employees." Affected employees shall be notified by the employer or authorized employee of the application and removal of lockout devices or tagout devices. Notification shall be given before the controls are applied, and after they are removed from the machine or equipment.

(d)

"Application of control." The established procedures for the application of energy control (the lockout or tagout procedures) shall cover the following elements and actions and shall be done in the following sequence:

(d)(1)

"Preparation for shutdown." Before an authorized or affected employee turns off a machine or equipment, the authorized employee shall have knowledge of the type and magnitude of the energy, the hazards of the energy to be controlled, and the method or means to control the energy.

(d)(2)

"Machine or equipment shutdown." The machine or equipment shall be turned off or shut down using the procedures established for the machine or equipment. An orderly shutdown must be utilized to avoid any additional or increased hazard(s) to employees as a result of the equipment stoppage.

(d)(3)

"Machine or equipment isolation." All energy isolating devices that are needed to control the energy to the machine or equipment shall be physically located and operated in such a manner as to isolate the machine or equipment from the energy source(s).

(d)(4)

"Lockout or tagout device application."

(d)(4)(i)

Lockout or tagout devices shall be affixed to each energy isolating device by authorized employees.

(d)(4)(ii)

Lockout devices, where used, shall be affixed in a manner to that will hold the energy isolating devices in a "safe" or "off" position.

(d)(4)(iii)

Tagout devices, where used, shall be affixed in such a manner as will clearly indicate that the operation or movement of energy isolating devices from the "safe" or "off" position is prohibited.

(d)(4)(iii)(A)

Where tagout devices are used with energy isolating devices designed with the capability of being locked, the tag attachment shall be fastened at the same point at which the lock would have been attached.

(d)(4)(iii)(B)

Where a tag cannot be affixed directly to the energy isolating device, the tag shall be located as close as safely possible to the device, in a position that will be immediately obvious to anyone attempting to operate the device.

(d)(5)

"Stored energy."

(d)(5)(i)

Following the application of logout or tagout devices to energy isolating devices, all potentially hazardous stored or residual energy shall be relieved, disconnected, restrained, and otherwise rendered safe.

(d)(5)(ii)

If there is a possibility of reaccumulation of stored energy to a hazardous level, verification of isolation shall be continued until the servicing or maintenance is completed, or until the possibility of such accumulation no longer exists.

(d)(6)

"Verification of isolation." Prior to starting work on machines or equipment that have been locked out or tagged out, the authorized employee shall verify that isolation and deenergization of the machine or equipment have been accomplished.

(e)

"Release from lockout or tagout." Before lockout or tagout devices are removed and energy is restored to the machine or equipment, procedures shall be followed and actions taken by the authorized employee(s) to ensure the following:

(e)(1)

"The machine or equipment." The work area shall be inspected to ensure that nonessential items have been removed and to ensure that machine or equipment components are operationally intact.

(e)(2)

"Employees."

(e)(2)(i)

The work area shall be checked to ensure that all employees have been safely positioned or removed.

(e)(2)(ii)

After lockout or tagout devices have been removed and before a machine or equipment is started, affected employees shall be notified that the lockout or tagout device(s) have been removed.

(e)(3)

"Lockout or tagout devices removal." Each lockout or tagout device shall be removed from each energy isolating device by the employee who applied the device. Exception to paragraph (e)(3). When the authorized employee who applied the lockout or tagout device is not available to remove it, that device may be removed under the direction of the employer, provided that specific procedures and training for such removal have been developed, documented and incorporated into the employer's energy control program. The employer shall demonstrate that the specific procedure shall include at least the following elements:

(e)(3)(i)

Verification by the employer that the authorized employee who applied the device is not at the facility:

(e)(3)(ii)

Making all reasonable efforts to contact the authorized employee to inform him/her that his/her lockout or tagout device has been removed; and

(e)(3)(iii)

Ensuring that the authorized employee has this knowledge before he/she resumes work at that facility.

(f)

"Additional requirements."

(f)(1)

"Testing or positioning of machines, equipment or components thereof." In situations in which lockout or tagout devices must be temporarily removed from the energy isolating device and the machine or equipment energized to test or position the machine, equipment or component thereof, the following sequence of actions shall be followed:

(f)(1)(i)

Clear the machine or equipment of tools and materials in accordance with paragraph (e)(1) of this section;

(f)(1)(ii)

Remove employees from the machine or equipment area in accordance with paragraph (e)(2) of this section;

(f)(1)(iii)

Remove the lockout or tagout devices as specified in paragraph (e)(3) of this section;

(f)(1)(iv)

Energize and proceed with testing or positioning;

(f)(1)(v)

Deenergize all systems and reapply energy control measures in accordance with paragraph (d) of this section to continue the servicing and/or maintenance.

(f)(2)

"Outside personnel (contractors, etc.)."

(f)(2)(i)

Whenever outside servicing personnel are to be engaged in activities covered by the scope and application of this standard, the on-site employer and the outside employer shall inform each other of their respective lockout or tagout procedures.

(f)(2)(ii)

The on-site employer shall ensure that his/her employees understand and comply with the restrictions and prohibitions of the outside employer's energy control program.

(f)(3)

"Group lockout or tagout."

(f)(3)(i)

When servicing and/or maintenance is performed by a crew, craft, department or other group, they shall utilize a procedure which affords the employees a level of protection equivalent to that provided by the implementation of a personal lockout or tagout device.

(f)(3)(ii)

Group lockout or tagout devices shall be used in accordance with the procedures required by paragraph (c)(4) of this section including, but not necessarily limited to, the following specific requirements:

(f)(3)(ii)(A)

Primary responsibility is vested in an authorized employee for a set number of employees working under the protection of a group lockout or tagout device (such as an operations lock);

(f)(3)(ii)(B)

Provision for the authorized employee to ascertain the exposure status of individual group members with regard to the lockout or tagout of the machine or equipment and

(f)(3)(ii)(C)

When more than one crew, craft, department, etc. is involved, assignment of overall job-associated lockout or tagout control responsibility to an authorized employee designated to coordinate affected work forces and ensure continuity of protection; and

(f)(3)(ii)(D)

Each authorized employee shall affix a personal lockout or tagout device to the group lockout device, group lockbox, or comparable mechanism when he or she begins work, and shall remove those devices when he or she stops working on the machine or equipment being serviced or maintained.

(f)(4)

"Shift or personnel changes." Specific procedures shall be utilized during shift or personnel changes to ensure the continuity of lockout or tagout protection, including provision for the orderly transfer of lockout or tagout device protection between off-going and oncoming employees, to minimize exposure to hazards from the unexpected energization or start-up of the machine or equipment, or the release of stored energy.

Note: The following Appendix to 1910.147 services as a non-mandatory guideline to assist employers and employees in complying with the requirements of this section, as well as to provide other helpful information. Nothing in the appendix adds to or detracts from any of the requirements of this section.

[61 FR 5507, Feb. 13, 1996]

OSHA Regulations (Standards - 29 CFR)
Typical minimal lockout procedures - 1910.147 App A

- **Standard Number:** 1910.147 App A
- **Standard Title:** Typical minimal lockout procedures
- **SubPart Number:** J

General

The following simple lockout procedure is provided to assist employers in developing their procedures so they meet the requirements of this standard. When the energy isolating devices are not lockable, tagout may be used, provided the employer complies with the provisions of the standard which require additional training and more rigorous periodic inspections. When tagout is used and the energy isolating devices are lockable, the employer must provide full employee protection (see paragraph (c)(3)) and additional training and more rigorous periodic inspections are required. For more complex systems, more comprehensive procedures may need to be developed, documented, and utilized.

Lockout Procedure

Lockout Procedure for

_____

(Name of Company for single procedure or identification of equipment if multiple procedures are used).

Purpose

This procedure establishes the minimum requirements for the lockout of energy isolating devices whenever maintenance or servicing is done on machines or equipment. It shall be used to ensure that the machine or equipment is stopped, isolated from all potentially hazardous energy sources and locked out before employees perform any servicing or maintenance where the unexpected energization or start-up of the machine or equipment or release of stored energy could cause injury.

Compliance With This Program

All employees are required to comply with the restrictions and limitations imposed upon them during the use of lockout. The authorized employees are required to perform the lockout in accordance with this procedure. All employees, upon observing a machine or piece of equipment which is locked out to perform servicing or maintenance shall not attempt to start, energize, or use that machine or equipment.

_____

Type of compliance enforcement to be taken for violation of the above.

Sequence of Lockout

(1) Notify all affected employees that servicing or maintenance is required on a machine or equipment and that the machine or equipment must be shut down and locked out to perform the servicing or maintenance.

_____

Name(s)/Job Title(s) of affected employees and how to notify.

(2) The authorized employee shall refer to the company procedure to identify the type and magnitude of the energy that the machine or equipment utilizes, shall understand the hazards of the energy, and shall know the methods to control the energy.

_____

Type(s) and magnitude(s) of energy, its hazards and the methods to control the energy.

(3) If the machine or equipment is operating, shut it down by the normal stopping procedure (depress the stop button, open switch, close valve, etc.).

_____

Type(s) and location(s) of machine or equipment operating controls.

(4) De-activate the energy isolating device(s) so that the machine or equipment is isolated from the energy source(s).

_____

Type(s) and location(s) of energy isolating devices.

(5) Lock out the energy isolating device(s) with assigned individual lock(s).

(6) Stored or residual energy (such as that in capacitors, springs, elevated machine members, rotating flywheels, hydraulic systems, and air, gas, steam, or water pressure, etc.) must be dissipated or restrained by methods such as grounding, repositioning, blocking, bleeding down, etc.

_____

Type(s) of stored energy - methods to dissipate or restrain.

(7) Ensure that the equipment is disconnected from the energy source(s) by first checking that no personnel are exposed, then verify the isolation of the equipment by operating the push button or other normal operating control(s) or by testing to make certain the equipment will not operate. Caution: Return operating control(s) to neutral or "off" position after verifying the isolation of the equipment.

_____

Method of verifying the isolation of the equipment.

(8) The machine or equipment is now locked out.

I.

II. Restoring Equipment to Service

When the servicing or maintenance is completed and the machine or equipment is ready to return to normal operating condition, the following steps shall be taken.
(1) Check the machine or equipment and the immediate area around the machine to ensure that nonessential items have been removed and that the machine or equipment components are operationally intact.
(2) Check the work area to ensure that all employees have been safely positioned or removed from the area.
(3) Verify that the controls are in neutral.
(4) Remove the lockout devices and reenergize the machine or equipment. Note: The removal of some forms of blocking may require reenergization of the machine before safe removal.
(5) Notify affected employees that the servicing or maintenance is completed and the machine or equipment is ready for used.

[54 FR 36687, Sept. 1, 1989 as amended at 54 FR 42498, Oct. 17, 1989; 55 FR 38685, Sept. 20, 1990; 61 FR 5507, Feb. 13, 1996]

Sample Program

Hazardous Energy Control Procedures
Lockout

I. Purpose and Scope

Effective hazardous energy control procedures will protect employees during machine and equipment servicing and maintenance where the unexpected energization, start up or release of stored energy could occur and cause injury, as well as while working on or near exposed deenergized electrical conductors and parts of electrical equipment. Hazards being guard against include being caught in, being crushed by, being struck by, being thrown from, or contacting live electrical circuits/parts.

The procedure herein established (III - VIII) will insure that machines and equipment are properly isolated from hazardous or potentially hazardous energy sources during servicing and maintenance and properly protect against reenergization as required by 29 CFR 1910.147.

While any employee is exposed to contact with parts of fixed electrical equipment or circuits which have been deenergized, the circuits energizing the parts shall be locked out and tagged in accordance with the requirements of 29 CFR 1910.333 (b) (2). SEE THIS OSHA STANDARD.

Only when disconnecting means or other devices are incapable of being locked out, and until lockout capability is provided, will a tagout procedure (without lockout), be utilized. SEE APPENDIX A.

II. Enforcement

Any employee who fails to follow these procedures will face disciplinary action in accordance with those listed in the company handbook.

III. Definitions

Authorized employee - a person who locks out machines or equipment in order to perform servicing or maintenance on that machine or equipment. An affected employee becomes an authorized employee when that employee's duties include performing servicing or maintenance which exposes him/her to potentially hazardous energy.

Affected employee - an employee whose job requires him/her to operate /use a machine or equipment or work in an area in which servicing or maintenance is being performed under lockout.

Energy isolating device - a mechanical device that physically prevents the transmission or release of energy, including but not limited to the following: A manually operated electrical circuit breaker; a disconnect switch; a manually operated switch by which the conductors of a circuit can be disconnected from all ungrounded supply conductors, and in addition, no pole can be operated independently; a line valve; a block; and any similar device used to block or isolate energy. Push buttons, selectors switches, and other control circuit type devices are not energy isolating devices.

Other employee - an employee whose work operations are or may be in an area where energy control procedures may be utilized.

For additional definitions see 29 CFR 1910.147 (b).

IV. Authorization / Responsibility

Appropriate employees will be instructed in the safety significance of the lockout procedures. Appendix B is a list of employees authorized to lockout. Appendices C and D are a list of job titles for affected and other employees.

V. Rules

A. Locks, chains, wedges, or other hardware which meet the requirements defined in 1910.147 (c) (5) (ii) shall be provided by the company.

B. Lockout devices shall be singularly identified. They shall be the only devices used for controlling energy and shall not be used for other purposes.

C. The lockout devices shall indicate the identity of the employee applying the devices.

D. All machines/equipment shall be locked out to protect against accidental or inadvertent operation when such operation could cause injury to

personnel. Lockout will also apply when working on or near exposed deenergized electrical circuits / parts.

E. No employee shall attempt to operate any switch, valve, or other energy isolating device which is locked out.

F. Each lockout device shall only be removed by the employee who applied the device. (Exception: see VII. B. 2.)

VI. Lockout Procedures and Techniques

A. Preparation for Shutdown.

1. In preparation for lockout, an initial survey must be made to locate and identify all energy isolating devices to be certain which switch, valve, or other energy isolating devices apply to the machine / equipment to be locked out. (See Appendix E for Energy Source Evaluation) More than one energy source (electrical, hydraulic, pneumatic, chemical, thermal, or others) may be involved.

2. Before an authorized or affected employee turns off a machine or piece of equipment, the authorized employee must have knowledge of the type and magnitude of the energy to be controlled, and the methods or means to control the energy (see Appendix F for Specific Energy Control Procedures).

Note: If work to be performed involves employees working on or near exposed deenergized electrical parts. *(See 29 CFR 1910.333).*

B. Machine or Equipment Shutdown.

1. All affected employees shall be notified that a lockout system is going to be utilized and the reason for it, before the controls are applied.

2. If the machine or equipment is operating, shut it down by normal stopping procedure. (Depress stop button, open toggle switch, etc.)

C. Machine or Equipment Isolation.

Physically locate and operate the switch, valve, or other energy isolating devices so that the equipment is isolated from its energy sources and apply adequate hardware.

D. Lockout Device Application.

1. Authorized employees shall lockout the energy isolating devices with assigned individual locks.

2. Lockout devices shall be applied so that they will hold the energy isolating devices in a “Neutral” or “Off” position.

E. Stored Energy.

All stored or residual energy in rams, flywheels, springs, pneumatic, or hydraulic systems, etc. shall be blocked or dissipated. If there is a possibility of reaccumulation of stored energy, verification of isolation must be continued until servicing or maintenance is completed.

F. Verification Of Isolation.

Prior to starting work on machines or equipment that have been locked and after ensuring that no personnel are exposed, the authorized employee shall operate the push button or normal operating controls to verify that the appropriate equipment or machine has been deenergized and make certain it will not operate.

CAUTION: Return Operating Controls to the “Neutral” or “Off” Position After the Test.

The machine / equipment is now locked out. Servicing or maintenance may now occur.

VII. Removal Of Lockout Devices

A. After the servicing and / or maintenance is completed and before the lockout devices are removed and energy is restored, the sequence of activities in Appendix F shall be completed by the authorized employee(s).

B. If the authorized employee who applied the lock is not available, the supervisor shall take the following steps:

1. Clear the machine or equipment of tools and materials.

2. Remove employees from the machine or equipment.

3. Remove the lockout device.

4. Energize and proceed with testing or positioning.

5. Deenergize all systems and reapply energy control measures in accordance with procedures set forth under SECTION VI.

VIII. Additional Requirements

A. In the preceding steps, if more than one individual is required to lockout machines / equipment (group lockout), the following procedures shall be implemented to provide protection to all employees.

1. A primary authorized employee will be designated and responsible for the number of people working under the protection of the group lockout device. The primary authorized employee will ascertain the exposure status of the individual member participating in the group lockout to ensure continuity of protection for each individual. In addition, this primary authorized employee will be responsible for notifying affected employees before and after lockout procedures are performed.

2. Each authorized employee will place his/her own personal lockout device on the energy isolating device(s).

3. When an energy isolating device cannot accept multiple locks, a multiple lockout system must be used. Specific group lockout procedures are outline in Appendix F.

B. **Shift or Personnel Changes** - If a lockout procedure will extend into the following shift, the authorized employee who originally placed the lock will remove it and it will immediately be replaced with the lock of the authorized employee who is to continue the repair or maintenance on that equipment or machine for the following shift.

C. **Cord and Plug Connected Equipment** - If servicing or maintenance is performed on cord and plug connected equipment the following procedure shall be performed to protect employees.

1. Unplug equipment from its electrical socket.

2. Place a lockable cover over the plug and a lock on the plug cover during machine / equipment servicing or maintenance.

D. **Outside Contractors** - If outside contractors perform servicing or maintenance that requires lockout, the Safety Director shall take the following steps.

1. Inform the outside contractor of out company's lockout procedures and supply them with a copy.

2. Obtain and review a copy of the outside contractor's lockout procedures.

3. Ensure that our employees understand and comply with the responsibilities and prohibitions of the outside contractor's lockout procedure.

E. Training

1. Authorized employees shall receive training covering:

   a) Recognition of hazardous energy sources.

   b) Types and magnitude of hazardous energy in the workplace.

   c) Methods, devices, and procedures used to lockout, verify lockout, and otherwise control hazardous energy on all pieces or types of equipment (including cord and plug connected equipment).

   d) Procedures for removing locks and returning a machine or piece of equipment to operation.

   e) Transfer of lockout responsibilities.

   f) Group lockout procedures.

2. Affected and all "other" employees shall receive training so that they are able to:

   a) Recognize when energy control procedures are being implemented, and

   b) Understanding the purpose of the procedures and the importance of not attempting to start up or use the machine / equipment that has been locked out.

   Note: All training will be certified (See Appendix G).

F. Retraining - Authorized and affected employees shall receive retraining in proper application of lockout procedures when there is a change in:

1. Job assignment(s) that expose an authorized employee to new hazards or lockout procedures.

2. Machines, equipment, or processes that present a new hazard or require modified lockout procedures.

3. Energy control procedures for a piece or type of equipment.

4. Or when it becomes known that an employee incorrectly performs lockout procedures.

Retraining will re-establish employee proficiency in lockout, and ensure that employees are knowledgeable of new or revised procedures. All retraining will be certified (see Appendix G).

G. Periodic Inspections

1. An inspection of the energy control procedures will be conducted annually and will be certified (see Appendix H).

2. Energy control procedures for each machine or type of machine must be inspected.

3. The inspection shall include a review of lockout responsibilities with each individual authorized to lockout the machine / equipment.

4. The person who performs the inspection must be authorized to perform the lockout procedures being inspected. The inspector cannot, however, review his/her own use of lockout procedures.

5. Any deviations or inadequacies identified shall be immediately addressed.

APPENDIX A

TAGOUT PROCEDURES

A. When a disconnecting means or other energy isolating device is incapable of being locked out, a tagout system shall be utilized. A tag used without a lock, shall be supplemented by at least on additional safety measure that provides a level of safety equivalent to that obtained by use of a lock such as opening an additional disconnecting device, removal of an isolating circuit element, blocking of a controlling switch or the removal of a valve handle to reduce the likelihood of inadvertent energization.

B. Only tags furnished by the company which meet the requirements of 1910.147 (c) (5) (ii) and (iii) shall be used.

C. All employees shall be trained in the use and limitations of tags as described in 1910.147 (c) (7) (ii) and (d) (4) (iii).

D. **All** employees must be able to understand the hazard warning written on the tags such as: **DO NOT START, DO NOT OPEN, DO NOT CLOSE, DO NOT ENERGIZE, DO NOT OPERATE.**

E. On machines and equipment where tagout is used in lieu of lockout, the Periodic Inspection required by 1910.147 (c) (6) shall include the affected as well as the authorized employee(s). The periodic inspection shall be certified on appendix H.

F. If tagout is used all other lockout rules and procedures apply.

NOTE: Should the machine / equipment required upgrade or modification, it will have lockable switches, fittings, valves, etc. added so that it becomes possible to lockout.

APPENDIX B

LIST OF AUTHORIZED LOCKOUT INDIVIDUALS

NAME	JOB TITLE	MEANS USED TO I.D. LOCKS

DATE: _____/_____/_____

APPENDIX C

LIST OF AFFECTED EMPLOYEES BY JOB TITLES

JOB TITLES	MACHINERY, EQUIPMENT, OR PROCESS

DATE: _____/_____/_____

APPENDIX D

LIST OF "OTHER" EMPLOYEES BY JOB TITLES

JOB TITLES	MACHINERY, EQUIPMENT, OR PROCESS

APPENDIX E

ENERGY SOURCE EVALUATION

DATE: _____/____/_____ CONDUCTED BY: _____

In order to determine all energy sources for each piece or type of machine or equipment, fill in the following table.

Location: _____ Work Center: _____

Equipment Name: _____

Model: _____ Serial #: _____

Lockout Procedure Number: _____

ENERGY SOURCE \ * MAGNITUDE	**LOCATION OF ISOLATING DEVICE**	**MEANS OF ISOLATION**
ELECTRICAL		
ENGINE		
SPRING		
COUNTER WEIGHT		
FLYWHEEL		
HYDRAULIC		
PNEUMATIC		
CHEMICAL		
THERMAL		
OTHER _____		

*** MAGNITUDE EXAMPLE - Electrical = 480v three phase**
Pneumatic = 125 p.s.i.

APPENDIX F

SPECIFIC ENERGY CONTROL PROCEDURES FOR EACH PIECE OR TYPE OF MACHINE OR EQUIPMENT

PROCEDURE NUMBER: _____

DATE: _____/_____/_____ **COMPLETED BY:** _____

MACHINES OR EQUIPMENT UTILIZING THIS PROCEDURE:

_____ _____

PROCEDURE FOR CONTROLLING HAZARDOUS ENERGY

1. Be familiar with the sources of hazardous energy for the machine or equipment that will be serviced. **See Appendix F (Energy Source Evaluation)**

SOURCES OF HAZARDOUS ENERGY

☐ Electrical	☐ Engine	☐ Spring
☐ Counter Weight	☐ Flywheel	☐ Hydraulic
☐ Pneumatic	☐ Chemical	☐ Thermal
☐ Other _____		

2. Notify affected employees that the machine is about to be shut down and locked out.
Specific Instructions:

_____

_____

_____

3. Shut down the machine using normal stopping procedures.
Specific Instructions:

_____

_____

_____

4. Isolate all energy sources listed above.
Specific Instructions:

_____

_____

APPENDIX F

5. A. Apply locks to all isolation devices operated in step four.

Specific Instructions:

B. If a tag is used in lieu of a lock when the energy isolating device is incapable of lockout (see Appendix A), the following additional safety precaution(s) shall be taken:

6. Block or dissipate all stored energy in rams, flywheels, springs, pneumatic or hydraulic systems, etc.
Specific Instructions:

7. Verify that the machine is locked out by testing the machine operating controls. RETURN ALL CONTROLS TO THE "**NEUTRAL" OR "OFF" POSITION AFTER TESTING.**
Specific Instructions:

PROCEDURES FOR REMOVING LOCKS / TAGS

1. Check the machine to be sure it is operationally intact, tools have been removed, and guards have been replaced.
Specific Instructions:

2. Check to be sure all employees are safely positioned.
Specific Instructions:

APPENDIX F

3. Notify all affected employees that locks / tags are going to be removed and the machine is ready for operation.
   Specific Instructions:

4. Remove all locks, blocks, or other energy restraints.
   Specific Instructions:

5. Restore all energy to the machine.
   Specific Instructions:

OTHER COMMENTS :

APPENDIX G-1

"Authorized" Employee Training Certification

DATE OF TRAINING: _____/_____/_____

INSTRUCTOR: _____

SIGNATURE: _____

The following employees have received "Authorized" employee training on lockout / tagout procedures.

EMPLOYEE NAME (Please Print)	**EMPLOYEE SIGNATURE**

APPENDIX G-2

"Affected" Employee Training Certification

DATE OF TRAINING: _____/_____/_____

INSTRUCTOR: _____

SIGNATURE: _____

The following employees have received "Affected" employee training on lockout / tagout procedures.

EMPLOYEE NAME (Please Print)	**EMPLOYEE SIGNATURE**

APPENDIX G-3

"Other" Employee Training Certification

DATE OF TRAINING: _____/_____/_____

INSTRUCTOR: _____

SIGNATURE: _____

The following employees have received "Other" employee training on lockout / tagout procedures.

EMPLOYEE NAME (Please Print)	**EMPLOYEE SIGNATURE**

APPENDIX H

Periodic Inspection Certification

DATE OF TRAINING: _____/_____/_____

INSTRUCTOR: _____

SIGNATURE: _____

Machine or equipment on which lockout / tagout procedures were performed;

Employee(s) performing the lockout / tagout procedures:

EMPLOYEE NAME (Please Print)	**EMPLOYEE SIGNATURE**

Were all the lockout / tagout procedures performed correctly? YES NO

Comments on improper Lockout / Tagout Procedures being used (ex. List of improper procedures being used which require retraining for the employee or modification of procedures.) :

HAZARDOUS ENERGY CONTROL PROCEDURES

Name of employee exposed to the hazard: _____

Machine / Equipment on which the task is being performed:

_____

Servicing / Maintenance task being performed:

_____

Frequency in which the employee performs the task: _____ **times per** _____

Duration for which the employee has performed the task: _____ **hour/day/week**

Hazard to which the employee is exposed when performing this task:

_____ caught in _____

_____ crushed by _____

_____ struck by _____

_____ thrown from _____

_____ contact with _____

_____ other _____

Energy source which exposes the employee to a hazard:

☐ Electrical ☐ Engine ☐ Spring
☐ Counter Weight ☐ Flywheel ☐ Hydraulic
☐ Pneumatic ☐ Chemical ☐ Thermal
☐ Other _____

Magnitude of the energy source:

☐Volts ☐Phase ☐PSI ☐Degree F ☐Tons

Potential Injury associated with the improper isolation of energy:

☐Crushed ☐Fractured ☐Amputated ☐Lacerated ☐Punctured ☐Burns
☐Air Embolism ☐Death ☐Electric Shock
☐Other _____

Means of Isolating the Energy Source (Procedures Used):
[If tagout is used see 1910.147 (c) (3) (ii)]

Location: _____ Method: _____

If machine / equipment is not capable of lockout when was it installed, renovated, modified, or repaired (major)? After 1/02/90 ____/____/____

If Electrical, cord / plug (circle one); YES NO

Hazards discussed with exposed employee Mr. / Ms.

Remarks/Signed Statement (if documenting past exposure)

THE CONTROL OF HAZARDOUS ENERGY (LOCKOUT / TAGOUT) 1910.147 WRITTEN PROCEDURES EVALUATION

YES	NO	
____	____	**Do the written procedures contain the following elements:**
		A definition of the purpose and scope of lockout and/or tagout procedures.
_____	_____	Basic lockout / tagout rules and authorization.
_____	_____	Means of enforcing compliance.
_____	_____	
		Specific procedures for:
		Shutting down machines and/or equipment.
_____	_____	Isolating, blocking, and securing machines and/or equipment.
_____	_____	Placement of lockout / tagout devices.
_____	_____	Releasing stored energy.
_____	_____	Testing a machine and/or equipment to verify the effectiveness of the lockout / tagout devices.
_____	_____	Removal of lockout / tagout devices.
_____	_____	Transfer of lockout/tagout devices during group lockout/tagout. [If Applicable].
_____	_____	Responsibility for lockout/tagout devices during group lockout/tagout [If Applicable].
_____	_____	Group Lockout/Tagout [If Applicable].
_____	_____	Additional measures taken if a tag is used in lieu of a lock.
_____	_____	
		The employer must comply with the following items, however they do not have to be included in the written procedures:
		Provide energy control devices which meet the requirements defined in 1910.147 (c) (5).
_____	_____	Inform outside contractors of your lockout/tagout program and notify your employees of the contractor's energy control program.
_____	_____	Certification of a periodic inspection conducted at least annually.
_____	_____	Certification of training and retraining for authorized, affected, and other employees.
_____	_____	Handling cord and plug connected equipment 1910.147 (a)(2)(iii) (A).
_____	_____	

Appendix I
Audit Checklist

Review the standard, 29 CFR 1910.147, before beginning. Logout/Tagout violations are among the most common citations made by OSHA.

As a quick gauge of where your program stands in terms of compliance and employee safety, evaluate the following items. Even better, have your employees evaluate the program. They may identify weaknesses you have never thought of.

☐ Yes ☐ No Is a copy of 29 CFR 1910.147 open and available to employees and supervisors for reference as needed? This can be very helpful as to requirements with unusual processes or operations.

☐ Yes ☐ No Has comprehensive training been conducted with all employees who will utilize LOTO?

☐ Yes ☐ No Were supervisors and plant management also trained to a pre-determined level of competence?

☐ Yes ☐ No Were management/supervision made aware of specific liability and potential damages of noncompliance of LOTO?

☐ Yes ☐ No Is training conducted as needed to update employees/management on new procedures or operations?

☐ Yes ☐ No Has the LOTO program been evaluated by an outside source to ensure compliance with your company policy? Sometimes it is difficult to judge your own compliance.

☐ Yes ☐ No Has the program been evaluated by your insurance/workers' compensation representative for compliance?

☐ Yes ☐ No Is all machinery or equipment capable of movement required to be de-energized or disengaged and blocked or locked out during cleaning, servicing, adjusting, or setting up operation?

☐ Yes ☐ No Where the power disconnect equipment does not disconnect the electrical control circuit, are the appropriate electrical enclosures identified?

☐ Yes ☐ No Where the power disconnect equipment does not disconnect the electrical control circuit, is a means provided to assure the control circuit can be disconnected and locked out?

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☐ Yes ☐ No Is the locking out of control circuits in lieu of locking out main power disconnects prohibited?

☐ Yes ☐ No Are all the equipment control valve handles provided with a means for locking out?

☐ Yes ☐ No Are appropriate employees provided with individually keyed personal safety locks?

☐ Yes ☐ No Can you observe wear and use on the locks, or are they still in showroom-new condition?

☐ Yes ☐ No Are the employees required to keep personal control of their keys while they have safety locks in use?

☐ Yes ☐ No Is it required that only the employee exposed to the hazard install or remove the safety lock?

☐ Yes ☐ No Is it required that employees check the safety lockout by attempting a startup after making sure no one is exposed?

☐ Yes ☐ No After the safety is checked, is the switch again placed in the "off" position?

☐ Yes ☐ No Are employees instructed to always push the control circuit stop button before re-energizing the main power switch?

☐ Yes ☐ No Is there a way to identify any or all employees who are working on locked out equipment by their logs or accompanying tags?

☐ Yes ☐ No Are enough accident prevention signs, tags, and safety padlocks provided for any reasonably foreseeable repair emergency?

☐ Yes ☐ No When machine operation, configuration, or size requires the operator to leave his or her control station to install tools or perform other operations, and if part of the machine could move if accidentally activated, is such an element required to be separately locked or tagged out?

☐ Yes ☐ No If the equipment or lines cannot be shut down, locked out, and tagged, is a safe job procedure established and rigidly followed?

☐ Yes ☐ No Have employees been trained not to start machinery or equipment if it is locked out or tagged out?

☐ Yes ☐ No Are all workers notified when the machinery or equipment they usually use is shut down and locked out for maintenance or servicing purposes?

☐ Yes ☐ No After maintenance is completed, is the machinery checked to ensure non-essential items have been removed and the machine is operationally intact?

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☐ Yes ☐ No Before the machinery is activated, are employees removed from possible danger?

☐ Yes ☐ No When the machinery is fully operational, are employees notified?

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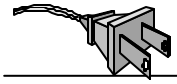


ELECTRICAL SAFETY-RELATED WORK PRACTICES

Qualified Persons

Those people that have training in avoiding electrical hazards while working on or near exposed energized parts.

Unqualified Persons

Those people with little or no training in avoiding electrical hazards while working on or near exposed energized parts

Additional Training for Qualified Persons

- **The skills and techniques necessary to distinguish exposed live parts from other parts of electrical equipment**
- **The skills and techniques necessary to determine the nominal voltage of exposed live parts**
- **The clearance distance specified in 1910.333(c) and the corresponding voltages to which the qualified person will be exposed**

Approach Distances 1910.333(C)

Voltage range (phase to phase)	Minimum approach distance
300V and less	Avoid Contact
Over 300V. not over 750V	1 ft. 0 in. (30.5 cm).
Over 750V. not over 2kV	1 ft. 6 in. (46 cm).
Over 2kV. not over 15kV	2 ft. 0 in. (61 cm).
Over 15kV. not over 37kV	3 ft. 0 in. (91 cm).
Over 37kV. not over 87.5kV	3 ft. 6 in. (107 cm).
Over 87.5kV. not over 121kV	4 ft. 0 in. (122 cm).
Over 121kV. not over 140kV	4 ft. 6 in. (137 cm).

Types of Training

Section 1910.332 requires that instruction utilize either a classroom lecture or on-the-job training strategy. The degree of training provided is determined by the amount of risk to the employee

Safety Related Work Practices to which the Standard Does Not Apply

- **Generation, transmission and distribution installations**
- **Communications installations**
- **Installations in vehicles (i.e., ships, watercraft, railway, aircraft or automotive vehicles)**
- **Railway installations**
- **Less than 50 volts to ground**
- **If de-energized, all Lockout/Tagout procedures apply**

Employer Responsibilities

- **Safety related work practices to prevent electrical shock**
- **A written maintained copy of the procedures outlined in paragraph (b)(2) - Lockout and tagging written program**
- **Proper equipment for working around or near energized parts:**
- **Portable ladders, non-conductive siderails**

Employer Responsibilities

(continued)

- **Method to prevent any conductive materials or equipment from making contact with live electrical**
- **Method of making conductive apparel, such as jewelry, non-conductive**
- **Clothing such as wool, cotton or better**
- **Cleaning materials such as steel wool and conductive liquids from coming into contact with live electrical**

Employer Responsibilities

(continued)

A visual inspection of all flexible cord sets (extension cords) and portable cord and plug connected equipment

Proper illumination in confined or enclosed work spaces

Providing appropriate insulated tools

Tools must be tested annually

Personal Protective Equipment

- Hard Hat - Type 'B'
- Rubber Gloves
- ASTM Label on Glove
- Testing and Maintaining Gloves
- If possible damage to rubber glove, then protective outer glove (leather glove)

Note: Leather gloves alone are not recommended.

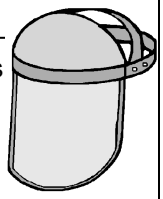
Personal Protective Equipment

Class Of Gloves:

(1) 10,000 Volts - Type 1
(2) 20,000 Volts - Type 2
(3) 30,000 Volts - Type 3
(4) 40,000 Volts - Type 4
(5) 1,000 Volts - Type 0 *
(6) 500 Volts - Type 00 *

* (leather glove required over the top)

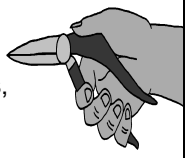
Personal Protective Equipment



- Face Shield or Safety Glasses
- Flying particles
- Face Shield - electric arcs, flashes resulting from electrical explosion.

Protective Tools & Equipment

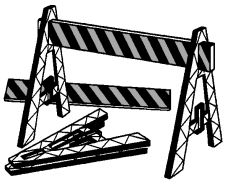
1. Insulated tools, handling equipment
   If equipment comes into contact with energized parts.



2. Protective shields, Barriers, Insulating materials.

Alerting Techniques

- **Signs**
- **Symbols**
- **Tags**
- **Barricades**
- **Attendants**



Preventing Shock

- Safety Planning before Starting the Work
  - Determine location of work
  - Determine voltage
  - Determine Fire - Explosion Hazard

Preventing Shock

- Personal Qualification
  - Have you received the necessary training to do the job?
  - Do you feel good about the work assignment?
  - Are you familiar with the equipment?

Preventing Shock

- Personal Qualification (continued)
  - Do you understand exactly how to get the job done safely?
  - Do you have all the necessary parts, tools and PPE?
  - Have you studied the work to be done and thought it through?
  - Can you deenergize?

Preventing Shock

- Never take the work of another employee.
- Is the lockout labeled correctly?
- Were the prints and drawing correct?
- Can I guard the electrical parts?
- Have I checked and tested my PPE?
- Is my PPE the correct type for the work?

6

OSHA Regulations (Standards - 29 CFR)
Scope - 1910.331

- **Standard Number:** 1910.331
- **Standard Title:** Scope
- **SubPart Number:** S
- **SubPart Title:** Electrical - Safety-Related Work Practices

(a)

Covered work by both qualified and unqualified persons. The provisions of 1910.331 through 1910.335 cover electrical safety work practices for both qualified persons (those who have training in avoiding the electrical hazards of working on or near exposed energized parts) and unqualified persons (those with little or no such training) working on, near, or with the following installations:

(a)(1)

Premises wiring. Installations of electric conductors and equipment within or on buildings or other structures, and on other premises such as yards, carnival, parking, and other lots, and industrial substations;

(a)(2)

Wiring for connection to supply. Installations of conductors that connect to the supply of electricity; and

(a)(3)

Other wiring. Installations of other outside conductors on the premises.

(a)(4)

Optical fiber cable. Installations of optical fiber cable where such installations are made along with electric conductors.
Note: See 1910.399 for the definition of "qualified person." See 1910.332 for training requirements that apply to qualified and unqualified persons.

(b)

Other covered work by unqualified persons. The provisions of 1910.331 through 1910.335 also cover work performed by unqualified persons on, near, or with the installations listed in paragraphs (c)(1) through (c)(4) of this section.

(c)

Excluded work by qualified persons. The provisions of 1910.331 through 1910.335 do not apply to work performed by qualified persons on or directly associated with the following installations:

(c)(1)

Generation, transmission, and distribution of electric energy (including communication and metering) located in buildings used for such purposes or located outdoors.

Note 1: Work on or directly associated with installations of utilization equipment used for purposes other than generating, transmitting, or distributing electric energy (such as installations which are in office buildings, warehouses, garages, machine shops, or recreational buildings, or other utilization installations which are not an integral part of a generating installation, substation, or control center) is covered under paragraph (a)(1) of this section.

Note 2: For work on or directly associated with utilization installations, an employer who complies with the work practices of 1910.269 (electric power generation, transmission, and distribution) will be deemed to be in compliance with 1910.333(c) and 1910.335. However, the requirements of 1910.332, 1910.333(a), 1910.333(b), and 1910.334 apply to all work on or directly associated with utilization installations, regardless of whether the work is performed by qualified or unqualified persons.

Note 3: Work on or directly associated with generation, transmission, or distribution installations includes:

{1} Work performed directly on such installations, such as repairing overhead or underground distribution lines or repairing a feed-water pump for the boiler in a generating plant.

{2} Work directly associated with such installations, such as line-clearance tree trimming and replacing utility poles.

{3} Work on electric utilization circuits in a generating plant provided that:

{A} Such circuits are commingled with installations of power generation equipment or circuits, and

{B} The generation equipment or circuits present greater electrical hazards than those posed by the utilization equipment or circuits (such as exposure to higher voltages or lack of overcurrent protection).

This work is covered by 1910.269 of this Part.

(c)(2)

Communications installations. Installations of communication equipment to the extent that the work is covered under 1910.268.

(c)(3)

Installations in vehicles. Installations in ships, watercraft, railway rolling stock, aircraft or automotive vehicles other than mobile homes and recreational vehicles.

(c)(4)

Railway installations. Installations of railways for generation, transformation, transmission, or distribution of power used exclusively for operation of rolling stock or installations of railways used exclusively for signaling and communication purposes.

[55 FR 32016, Aug. 6, 1990; 59 FR 4476, Jan. 31, 1994]

OSHA Regulations (Standards - 29 CFR)
Training - 1910.332

- Standard Number: 1910.332
- Standard Title: Training
- SubPart Number: S
- SubPart Title: Electrical - Safety-Related Work Practices

(a)

Scope. The training requirements contained in this section apply to employees who face a risk of electric shock that is not reduced to a safe level by the electrical installation requirements of 1910.303 through 1910.308.

Note: Employees in occupations listed in Table S-4 face such a risk and are required to be trained. Other employees who also may reasonably be expected to face comparable risk of injury due to electric shock or other electrical hazards must also be trained.

(b)

Content of training.

(b)(1)

Practices addressed in this standard. Employees shall be trained in and familiar with the safety-related work practices required by 1910.331 through 1910.335 that pertain to their respective job assignments.

(b)(2)

Additional requirements for unqualified persons. Employees who are covered by paragraph (a) of this section but who are not qualified persons shall also be trained in and familiar with any electrically related safety practices not specifically addressed by 1910.331 through 1910.335 but which are necessary for their safety.

(b)(3)

Additional requirements for qualified persons. Qualified persons (i.e. those permitted to work on or near exposed energized parts) shall, at a minimum, be trained in and familiar with the following:

(b)(3)(i)

The skills and techniques necessary to distinguish exposed live parts from other parts of electric equipment.

(b)(3)(ii)

The skills and techniques necessary to determine the nominal voltage of exposed live parts, and

(b)(3)(iii)

The clearance distances specified in 1910.333(c) and the corresponding voltages to which the qualified person will be exposed.

Note 1: For the purposes of 1910.331 through 1910.335, a person must have the training required by paragraph (b)(3) of this section in order to be considered a qualified person.

Note 2: Qualified persons whose work on energized equipment involves either direct contact or contact by means of tools or materials must also have the training needed to meet 1910.333(C)(2).

(c)

Type of training. The training required by this section shall be of the classroom or on-the-job type. The degree of training provided shall be determined by the risk to the employee.

TABLE S-4. -- Typical Occupational Categories of Employees Facing a Higher Than Normal Risk of Electrical Accident

Occupation
Blue collar supervisors (1)
Electrical and electronic engineers (1)
Electrical and electronic equipment assemblers (1)
Electrical and electronic technicians (1)
Electricians
Industrial machine operators (1)
Material handling equipment operators (1)
Mechanics and repairers (1)
Painters (1)
Riggers and roustabouts (1)
Stationary engineers (1)
Welders

Footnote (1)
Workers in these groups do not need to be trained if their work or the work of those they supervise does not bring them or the employees the supervise close enough to exposed parts of electric circuits operating at 50 volts or more to ground for a hazard to exist.

[55 FR 32016, Aug. 6, 1990]

OSHA Regulations (Standards - 29 CFR)
Selection and use of work practices - 1910.333

- **Standard Number:** 1910.333
- **Standard Title:** Selection and use of work practices
- **SubPart Number:** S
- **SubPart Title:** Electrical - Safety-Related Work Practices

(a)

"General." Safety-related work practices shall be employed to prevent electric shock or other injuries resulting from either direct or indirect electrical contacts, when work is performed near or on equipment or circuits which are or may be energized. The specific safety-related work practices shall be consistent with the nature and extent of the associated electrical hazards.

(a)(1)

"Deenergized parts." Live parts to which an employee may be exposed shall be deenergized before the employee works on or near them, unless the employer can demonstrate that deenergizing introduces additional or increased hazards or is infeasible due to equipment design or operational limitations. Live parts that operate at less than 50 volts to ground need not be deenergized if there will be no increased exposure to electrical burns or to explosion due to electric arcs.

Note 1: Examples of increased or additional hazards include interruption of life support equipment, deactivation of emergency alarm systems, shutdown of hazardous location ventilation equipment, or removal of illumination for an area.

Note 2: Examples of work that may be performed on or near energized circuit parts because of infeasibility due to equipment design or operational limitations include testing of electric circuits that can only be performed with the circuit energized and work on circuits that form an integral part of a continuous industrial process in a chemical plant that would otherwise need to be completely shut down in order to permit work on one circuit or piece of equipment.

Note 3: Work on or near deenergized parts is covered by paragraph (b) of this section.

(a)(2)

"Energized parts." If the exposed live parts are not deenergized (i.e., for reasons of increased or additional hazards or infeasibility), other safety-related work practices shall be used to protect employees who may be exposed to the electrical hazards involved. Such work practices shall protect employees against contact with energized circuit parts directly with any part of their body or indirectly through some other conductive object.

The work practices that are used shall be suitable for the conditions under which the work is to be performed and for the voltage level of the exposed electric conductors or circuit parts. Specific work practice requirements are detailed in paragraph (c) of this section.

(b)

"Working on or near exposed deenergized parts."

(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.

(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.

(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.

(b)(2)(ii)

"Deenergizing equipment."

(b)(2)(ii)(A)

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

(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.

(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.

(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.

(b)(2)(iii)

"Application of locks and tags."

(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.

(b)(2)(iii)(B)

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

(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.

(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.

(b)(2)(iii)(E)

A lock may be placed without a tag only under the following conditions:

(b)(2)(iii)(E)(1)

IX. Only one circuit or piece of equipment is deenergized, and

(b)(2)(iii)(E)(2)

X. The lockout period does not extend beyond the work shift, and

(b)(2)(iii)(E)(3)

Employees exposed to the hazards associated with reenergizing the circuit or equipment are familiar with this procedure.

(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.

(b)(2)(iv)(A)

A qualified person shall operate the equipment operating controls or otherwise verify that the equipment cannot be restarted.

(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.

(b)(2)(v)

"Reenergizing equipment." These requirements shall be met, in the order given, before circuits or equipment are reenergized, even temporarily.

(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.

(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.

(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:

(b)(2)(v)(C)(1)

The employer ensures that the employee who applied the lock or tag is not available at the workplace, and

(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.

(b)(2)(v)(D)

There shall be a visual determination that all employees are clear of the circuits and equipment.

(c)

"Working on or near exposed energized parts."

(c)(1)

"Application." This paragraph applies to work performed on exposed live parts (involving either direct contact or by means of tools or materials) or near enough to them for employees to be exposed to any hazard they present.

(c)(2)

"Work on energized equipment." Only qualified persons may work on electric circuit parts or equipment that have not been deenergized under the procedures of paragraph (b) of this section. Such persons shall be capable of working safely on energized circuits and shall be familiar with the proper use of special precautionary techniques, personal protective equipment, insulating and shielding materials, and insulated tools.

(c)(3)

"Overhead lines." if work is to be performed near overhead lines, the lines shall be deenergized and grounded, or other protective measures shall be provided before work is started. If the lines are to be deenergized, arrangements shall be made with the person or organization that operates or controls the electric circuits involved to deenergize and ground them. If protective measures, such as guarding, isolating, or insulating, are provided, these precautions shall prevent employees from contacting such lines directly with any part of their body or indirectly through conductive materials, tools, or equipment.

Note: The work practices used by qualified persons installing insulating devices on overhead power transmission or distribution lines are covered by 1910.269 of this Part, not by 1910.332 through 1910.335 of this Part. Under paragraph (c)(2) of this section, unqualified persons are prohibited from performing this type of work.

(c)(3)(i)

"Unqualified persons."

(c)(3)(i)(A)

When an unqualified person is working in an elevated position near overhead lines, the location shall be such that the person and the longest conductive object he or she may contact cannot come closer to any unguarded, energized overhead line than the following distances:

(c)(3)(i)(A)(1)

For voltages to ground 50kV or below - 10 feet (305 cm);

(c)(3)(i)(A)(2)

For voltages to ground over 50kV - 10 feet (305 cm) plus 4 inches (10 cm) for every 10kV over 50kV.

(c)(3)(i)(B)

When an unqualified person is working on the ground in the vicinity of overhead lines, the person may not bring any conductive object closer to unguarded, energized overhead lines than the distances given in paragraph (c)(3)(i)(A) of this section.

Note: For voltages normally encountered with overhead power line, objects which do not have an insulating rating for the voltage involved are considered to be conductive.

(c)(3)(ii)

"Qualified persons." When a qualified person is working in the vicinity of overhead lines, whether in an elevated position or on the ground, the person may not approach or take any conductive object without an approved insulating handle closer to exposed energized parts than shown in Table S-5 unless:

(c)(3)(ii)(A)

The person is insulated from the energized part (gloves, with sleeves if necessary, rated for the voltage involved are considered to be insulation of the person from the energized part on which work is performed), or

(c)(3)(ii)(B)

The energized part is insulated both from all other conductive objects at a different potential and from the person, or

(c)(3)(ii)(C)

The person is insulated from all conductive objects at a potential different from that of the energized part.

TABLE S-5 - APPROACH DISTANCES FOR QUALIFIED EMPLOYEES - ALTERNATING CURRENT

Voltage range (phase to phase)	Minimum approach distance
300V and less	Avoid Contact
Over 300V, not over 750V	1 ft. 0 in. (30.5 cm).
Over 750V, not over 2kV	1 ft. 6 in. (46 cm).
Over 2kV, not over 15kV	2 ft. 0 in. (61 cm).
Over 15kV, not over 37kV	3 ft. 0 in. (91 cm).
Over 37kV, not over 87.5kV	3 ft. 6 in. (107 cm).
Over 87.5kV, not over 121kV	4 ft. 0 in. (122 cm).
Over 121kV, not over 140kV	4 ft. 6 in. (137 cm).

(c)(3)(iii)

"Vehicular and mechanical equipment."

(c)(3)(iii)(A)

Any vehicle or mechanical equipment capable of having parts of its structure elevated near energized overhead lines shall be operated so that a clearance of 10 ft. (305 cm) is maintained. If the voltage is higher than 50kV, the clearance shall be increased 4 in. (10 cm) for every 10kV over that voltage. However, under any of the following conditions, the clearance may be reduced:

(c)(3)(iii)(A)(1)

If the vehicle is in transit with its structure lowered, the clearance may be reduced to 4 ft. (122 cm). If the voltage is higher than 50kV, the clearance shall be increased 4 in. (10 cm) for every 10 kV over that voltage.

(c)(3)(iii)(A)(2)

If insulating barriers are installed to prevent contact with the lines, and if the barriers are rated for the voltage of the line being guarded and are not a part of or an attachment to the vehicle or its raised structure, the clearance may be reduced to a distance within the designed working dimensions of the insulating barrier.

(c)(3)(iii)(A)(3)

If the equipment is an aerial lift insulated for the voltage involved, and if the work is performed by a qualified person, the clearance (between the uninsulated portion of the aerial lift and the power line) may be reduced to the distance given in Table S-5.

(c)(3)(iii)(B)

Employees standing on the ground may not contact the vehicle or mechanical equipment or any of its attachments, unless:

(c)(3)(iii)(B)(1)

The employee is using protective equipment rated for the voltage; or

(c)(3)(iii)(B)(2)

The equipment is located so that no uninsulated part of its structure (that portion of the structure that provides a conductive path to employees on the ground) can come closer to the line than permitted in paragraph (c)(3)(iii) of this section.

(c)(3)(iii)(C)

If any vehicle or mechanical equipment capable of having parts of its structure elevated near energized overhead lines is intentionally grounded, employees working on the ground near the point of grounding may not stand at the grounding location whenever there is a possibility of overhead line contact. Additional precautions, such as the use of barricades or insulation, shall be taken to protect employees from hazardous ground potentials, depending on earth resistivity and fault currents, which can develop within the first few feet or more outward from the grounding point.

(c)(4)

"Illumination."

(c)(4)(i)

Employees may not enter spaces containing exposed energized parts, unless illumination is provided that enables the employees to perform the work safely.

(c)(4)(ii)

Where lack of illumination or an obstruction precludes observation of the work to be performed, employees may not perform tasks near exposed energized parts. Employees may not reach blindly into areas which may contain energized parts.

(c)(5)

"Confined or enclosed work spaces." When an employee works in a confined or enclosed space (such as a manhole or vault) that contains exposed energized parts, the employer shall provide, and the employee shall use, protective shields, protective barriers, or insulating materials as necessary to avoid inadvertent contact with these parts. Doors, hinged panels, and the like shall be secured to prevent their swinging into an employee and causing the employee to contact exposed energized parts.

(c)(6)

"Conductive materials and equipment." Conductive materials and equipment that are in contact with any part of an employee's body shall be handled in a manner that will prevent them from contacting exposed energized conductors or circuit parts. If an employee must handle long dimensional conductive objects (such as ducts and pipes) in areas with exposed live parts, the employer shall institute work practices (such as the use of insulation, guarding, and material handling techniques) which will minimize the hazard.

(c)(7)

"Portable ladders." Portable ladders shall have nonconductive siderails if they are used where the employee or the ladder could contact exposed energized parts.

(c)(8)

"Conductive apparel." Conductive articles of jewelry and clothing (such a watch bands, bracelets, rings, key chains, necklaces, metalized aprons, cloth with conductive thread, or metal headgear) may not be worn if they might contact exposed energized parts. However, such articles may be worn if they are rendered nonconductive by covering, wrapping, or other insulating means.

(c)(9)

"Housekeeping duties." Where live parts present an electrical contact hazard, employees may not perform housekeeping duties at such close distances to the parts that there is a possibility of contact, unless adequate safeguards (such as insulating equipment or barriers) are provided. Electrically conductive cleaning materials (including conductive solids such as steel wool, metalized cloth, and silicon carbide, as well as conductive liquid solutions) may not be used in proximity to energized parts unless procedures are followed which will prevent electrical contact.

(c)(10)

"Interlocks." Only a qualified person following the requirements of paragraph (c) of this section may defeat an electrical safety interlock, and then only temporarily while he or she is working on the equipment. The interlock system shall be returned to its operable condition when this work is completed.

[55 FR 32016, Aug. 6, 1990; 55 FR 42053, Nov. 1, 1990; as amended at 59 FR 4476, Jan. 31, 1994]

United States OSHA Occupational Safety & Health Administration U.S. Department of Labor

OSHA Standards Interpretation and Compliance Letters

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[12/06/1991] Use of automatic equipment for the machining of connecting rods, crankshafts, cylinder heads and engine blocks.

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OSHA Standards Interpretation and Compliance Letters

05/01/1990 - Concerning the new lockout/tagout standard.

- **Record Type:** Interpretation
- **Standard Number:** 1910.147
- **Subject:** Concerning the new lockout/tagout standard.
- **Information Date:** 05/01/1990

May 1, 1990

Mr. Chuck Mullen, Jr. Corporate Safety Coordinator Precision Twist Drill Company 301 Industrial Avenue Crystal Lake, Illinois 60014

Dear Mr. Mullen:

Thank you for your letter of February 21, addressed to Secretary of Labor Elizabeth Dole, concerning the new lockout/tagout standard, 29 CFR 1910.147. Please excuse the delay in our response.

Normal production operations, such as tool changes, cleaning, unjamming, servicing and making adjustments to machines, which are routine, repetitive and integral to the use of the equipment for production are not covered by the requirements of 29 CFR 1910.147, if the work is performed using alternative protective measures which ensure employee safety. Lockout or tagout is not required by this standard if the employer can demonstrate that the alternative means enable employees to service the machine without being exposed to unexpected activation of the equipment or release of stored energy. Production safeguards conforming to the requirements of 29 CFR 1910, Subpart O, and the applicable American National Standards Institute (ANSI) standard which provide for control of, or safeguarding from, hazardous energy release(s) and which are not bypassed or rendered ineffective are acceptable alternative means of protection. Typical ANSI standards which contain such provisions are listed in the enclosure, which is not all inclusive.

29 CFR 1910.147 specifically addresses practices and procedures that are necessary to disable machinery or equipment to prevent the release of potentially hazardous energy while maintenance and servicing activities are being performed by employees. Servicing and maintenance functions, normally conducted by the machine or process equipment operator and for which safeguarding provisions in compliance with Subpart O ensure hazardous energy control, are regulated by 29 CFR 1910.147 whenever the normal machine safeguarding is ineffective or rendered ineffective.

It is not apparent, from the information provided with your letter, that your normal operator machine safety guards and/or devices provide for protection of set-up persons from the inadvertent energization of machine components. If the normal operator safety

guards and/or devices assure employee protection from unexpected machine component energization during set-up procedures, the standard at 29 CFR 1910.147 would not be applicable. However, if such protection is not assured and it is your intent to provide for compliance with the lockout/tagout standard through implementation of the enclosed set-up procedure, our review identified serious deficiencies. In order to provide further guidance regarding your obligations under the new lockout/tagout standard we offer the following information.

The standard at 29 CFR 1910.147(c)(4) requires that procedures be developed, documented and utilized for the control of potentially hazardous energy. The procedures must clearly outline the scope, purpose, authorization, rules and techniques to be used. The procedures must identify each specific equipment and it's unique energy isolation requirements. (Generic procedures are permitted for similar equipment.) Energy isolation devices must be identified as well as the procedures for shut-down, lockout/tagout and deenergization verification. Operators who are required and/or permitted to engage in maintenance/servicing functions requiring lockout/tagout are designated as "authorized employees" and must receive comprehensive training regarding the mandatory procedures for lockout/tagout as required at 29 CFR 1910.147(c)(7).

Prior to beginning maintenance/servicing operations, the equipment must be deenergized and locked-out or tagged-out as required at 29 CFR 1910.147(c)(5), (c)(7), and (d). All potentially hazardous energy sources must be deenergized, therefore all pressurized air supplies (air lines), or other energy sources, must also be controlled.

In the event that a tagout procedure is to be used, the standard requires more extensive procedures than those required if lockout is used. Please refer to 29 CFR 1910.147(c)(2),(c)(3),(c)(5), and (d)(4).

A copy of the standard is enclosed. If we may be of further assistance please contact us.

Sincerely,

Gerard F. Scannell Assistant Secretary

Enclosures

United States OSHA Occupational Safety & Health Administration U.S. Department of Labor

OSHA Standards Interpretation and Compliance Letters

03/08/1991 - The obligations and responsibilities of machine manufacturers under the lockout/tagout standard.

- **Record Type:** Interpretation
- **Standard Number:** 1910.147
- **Subject:** The obligations and responsibilities of machine manufacturers under the lockout/tagout standard.
- **Information Date:** 03/08/1991

March 8, 1991

Mr. A. R. Grif
Chief Draftsman
Production and Machinery Corporation
P. O. Box 898
Mentor, Ohio 44060

Dear Mr. Grif:

This is in further response to your letter of December 17, 1990, concerning the obligations and responsibilities of machine manufacturers under the Occupational Safety and Health Administration's standard entitled "the Control of Hazardous Energy Sources (Lockout/Tagout)," (29 CFR 1910.147).

29 CFR 1910.147(c)(2)(iii) states, "After January 2, 1990, whenever major replacement, repair, renovation or modification of machines or equipment is performed, and whenever new machines or equipment are installed, energy isolating devices for such machines or equipment shall be designed to accept a lockout device." This standard requires energy isolation devices for the described machines or equipment to be designed to accept a lockout device. We believe that this standard may be enforced by OSHA against both the owner/operator and the designer/manufacturer, all of whom would therefore be subject to citations and proposed penalties. However, OSHA has not yet established a policy or procedure to enforce the standard against the designer/manufacturer.

As a builder and supplier of coil strip processing machinery, you are of course obligated to provide protection for your own employees as required in the lockout/tagout Standard. Copies of pages 36644 through 36696 of the Federal Register Volume 54, No. 169, are enclosed per your request. In addition, we are enclosing the corrections and amendments to this standard, publishing on September 20, 1990.

Your interest in workplace safety and health is appreciated.

Sincerely,

Gerard F. Scannell
Assistant Secretary

OSHA Standards Interpretation and Compliance Letters

07/31/1991 - Confirmation on lockout/tagout, specifically with the standard covering periodic inspections.

- **Record Type:** Interpretation
- **Standard Number:** 1910.147
- **Subject:** Confirmation on lockout/tagout, specifically with the standard covering periodic inspections.
- **Information Date:** 07/31/1991

July 31, 1991

Mr. David J. McGuan
Safety Engineering Supervisor
Champion International Corporation
Publication Papers
P.O. Box 1200
Bucksport, Maine 04416

Dear Mr. McGuan:

This is in response to your letter of March 27, in which you requested written confirmation on 29 CFR 1910.147 (lockout/tagout), following a verbal interpretation from Mr. Rolland Stroup, of my staff. Specifically, you were concerned with the section of the standard covering periodic inspections. Please accept our apology for the delay in this response.

The section of the standard on periodic inspections requires that at least annually, the employer shall ensure that an authorized employee other than the one(s) utilizing the energy control procedure being inspected, is required to inspect and verify the effectiveness of the company energy control procedures. These inspections shall at least provide for a demonstration of the procedures and may be implemented through random audits and planned visual observations. These inspections are intended to ensure that the energy control procedures are being properly implemented and to provide an essential check on the continued utilization of the procedures.

When lockout is used, the inspection shall include a review with all authorized employees for the procedure being inspected, of their responsibilities under that procedure. Group meetings between the authorized employee who is performing the inspection and all authorized employees who implement the procedure would constitute compliance with this requirement. When tagout is used, this review must be performed

with all affected employees, as defined in the standard, as well as with all authorized employees, for the procedure being inspected.

Periodic inspections must provide for and ensure effective correction of identified deficiencies. Finally, the employer is required to certify that the prescribed periodic inspections have been performed.

We hope this helps to clarify your concerns.

Your interest in workplace safety and health is appreciated.

Sincerely,

Patricia K. Clark, Director
Directorate of Compliance Programs

OSHA Standards Interpretation and Compliance Letters

08/30/1991 - Lockout/Tagout for circuit breaker blocking and locking devices.

- **Record Type:** Interpretation
- **Standard Number:** 1910.147
- **Subject:** Lockout/Tagout for circuit breaker blocking and locking devices.
- **Information Date:** 08/30/1991

August 30, 1991

Mr. Steven J. Benda
President
Block-Out Products, Inc.
P.O. Box 782
Cokato, Minnesota 55321

Dear Mr. Benda:

This is in response to your letter of July 1, in which you request an opinion regarding compliance with 29 CFR 1910.147 (Lockout/Tagout) for your circuit breaker blocking and locking devices. You enclosed literature on both your single pole model and multi-pole device, as well as your explanation of the products. We apologize for the delay in responding.

A review of the literature and your explanation of the products revealed the following concern. It was noticed on the multi-pole device that a standard electrical tie wrap is being used as part of a lockout device. This does not meet the intent of 1910.147(c)(1) which states, "Lockout devices shall be substantial enough to prevent removal without the use of excessive force or unusual techniques, such as with the use of bolt cutters or other metal cutting tools." We do not feel that a standard electrical tie wrap meets this criteria.

Due to constraints placed on OSHA we can neither endorse nor approve products in advance that are to be used in industry, since through improper installation or misuse, the products may not protect employees as intended.

Your interest in workplace safety and health is appreciated.

Sincerely,

Patricia K. Clark, Director
Directorate of Compliance Programs

OSHA Standards Interpretation and Compliance Letters

06/30/1993 - Cord and plug connected electric equipment.

- **Record Type:** Interpretation
- **Standard Number:** 1910.147
- **Subject:** Cord and plug connected electric equipment.
- **Information Date:** 06/30/1993

June 30, 1993

Ms. Cheryl A. Hansen,
Librarian Engineering Systems, Inc.
3851 Exchange Avenue
Aurora, Illinois 60504

Dear Ms. Hansen:

This is in response to your April 7 letter which requested an interpretation of 29 CFR 1910.147(a)(2)(iii)(a) as to what "under the exclusive control of the employee" means with respect to cord and plug connected electric equipment.

"Under the exclusive control of the employee" means that the authorized employee would be able to prevent the equipment from becoming reenergized during his or her servicing or maintenance of that equipment. The plug is under the exclusive control of the employee if it is physically in the possession of the employee, or within arms reach and in line of sight of the employee, or if the employee has affixed a lockout/tagout device on the plug in compliance with the 29 CFR 1910.147.

Thank you for your interest in occupational safety and health. If we can be of further assistance, please contact us.

Sincerely,

Roger A. Clark, Director
Directorate of Compliance Programs

United States OSHA Occupational Safety & Health Administration U.S. Department of Labor

OSHA Standards Interpretation and Compliance Letters

10/19/1995 - An interpretation of the periodic inspection requirements of the control of hazardous energy (lockout/tagout) standard.

- **Record Type:** Interpretation
- **Standard Number:** 1910.147
- **Subject:** An interpretation of the periodic inspection requirements of the control of hazardous energy (lockout/tagout) standard.
- **Information Date:** 10/19/1995

October 19, 1995

Mr. Stuart Charlson
Krukowski & Costello, S.C.
Attorneys at Law
7111 West Edgerton Avenue
P.O. Box 28999
Milwaukee, WI 53220

Dear Mr. Charlson:

This is in response to your August 21 letter requesting interpretation of the periodic inspection requirements under paragraph 1910.147(c)(6) of the control of hazardous energy (lockout/tagout) standard. Please accept our apology for the delay in responding.

Enclosed is a copy of the Occupational Safety and Health Administration letter dated September 19 to the Law Offices of Keller and Hechman (Mr. Lawrence P. Halprin) which includes periodic inspection clarifications as requested in your letter. This was confirmed by an October 6 telecon between you and Mr. Ronald Davies of my staff subsequent to your review of a copy of the Halprin letter telefaxed previously by Mr. Davies.

We appreciate your interest in occupational safety and health. If we can be of further assistance, please do not hesitate to contact the Office of General Industry Compliance Assistance, Mr. Davies, telephone (202) 219-8031, extension 110.

Sincerely,

John B. Miles, Jr., Director
Directorate of Compliance Programs

August 21, 1995

John B. Miles, Jr.
Director, Directorate of
Compliance Programs
U.S. Department of Labor
Occupational Safety and Health Administration
200 Constitution Avenue, NW
Washington, D.C. 20210

Re: **1910.147 Lockout/Tagout Regulation Interpretation**

Dear Mr. Miles:

We recently received a copy of a memorandum from William Wiehrdt, Assistant Regional Administrator in Region V, to Mel Lischefski, Area Director in Appleton, Wisconsin, regarding OSHA's interpretation of the periodic inspection requirements contained in the Lockout/Tagout Standard, 29 CFR Sec. 1910.147(c)(6)(i) (copy of memorandum attached). According to OSHA's analysis of the standard, the preamble to the lockout/tagout standard and OSHA Instruction STD 1-7.3, OSHA reached two conclusions:

1. All authorized employees must be given at least annually an inspection of their hazardous energy-controlled maintenance work; and

2. A sampling program which inspects the performance of selected authorized employees does **not** comply with the periodic inspection provisions of the lockout/tagout standard.

Based on the issues discussed in that Memorandum and the conclusions made by the agency, we request further interpretation of this standard.

Question: Can an employer meet the requirements of 1910.147(c)(6)(i) by conducting group meetings with all authorized employees?

Sec. 1910.147(c)(6)(i) states that if lockout is used for energy control, the periodic inspection "must include a **review**, between the inspector and each authorized employee, of that employee's responsibilities under the energy control procedure being inspected." (emphasis added). The employer's certification of inspection must identify the machine or equipment on which the energy control procedure was being utilized, the date of the inspection, the employees included in the inspection and the person performing the inspection. According to OSHA Instruction STD 1-7.3(5)(a), the inspection must include a demonstration of the procedures and a review of the responsibilities of each authorized employee implementing the procedure. Furthermore, it states that "group meetings between the authorized employee who is performing the inspection and all authorized employees who implement the procedure would constitute compliance with this requirement."

The previously mentioned OSHA memorandum, dated March 6, 1995, indicates that OSHA interprets this standard to mean that each and every authorized employee's work must be **inspected** at least annually by the inspector. This interpretation appears to

contradict the guidance provided in OSHA's Instruction STD 1-7.3 which clearly states that group meetings with all authorized employees constitutes compliance with the standard. If the standard and the instructional guidance are to be consistent, then group meetings between an inspector and all authorized employees comply with 1910.147(c)(6)(i), provided the inspection includes a review of the responsibilities of each authorized employee and a demonstration of the energy control procedures.

Question: Does 1910.147(c)(6)(i) require that all authorized employee **demonstrate** energy control procedures during the periodic inspection?

As stated above, the lockout/tagout standard requires that the periodic inspection include a "review" of the employee's responsibilities under the energy control procedures. Generally, an inspector who observes deficiencies in authorized employees understanding of the lockout/tagout program during the period inspection will counsel the employees on the correct energy control procedures. If several employees are performing maintenance on a particular machine, the inspector may request that one employee demonstrate the energy control procedures utilized on that machine, while the other employees observe. The inspector will then review the responsibilities of each authorized employee under the energy control procedure being inspected. Likewise, the inspector may assemble several authorized employees and request that one employee demonstrate the lockout procedures while the others observe. In each case, all employees are participating in a lockout demonstration and receive feedback on the correct procedures.

In the OSHA Memorandum, dated March 6, 1995, Mr. Wiehrdt indicates that such a group meeting of employees will not comply with 1910.147(c)(6)(i), since each authorized employee in the group does not individually demonstrate the energy control procedures for the inspector. Our readings of the regulation and the interpretive guidance provided by the National office indicates that OSHA does not require that every employee demonstrate lockout/tagout procedures during the periodic inspection.

Based on our questions, we request that your office provide additional interpretation of the periodic inspection requirements contained in the Lockout/Tagout Standard.

Attached to this letter is the Memorandum dated March 6, 1995 from William Wiehrdt to Mel Lischefski. If you have any questions regarding our request, please feel free to call. Your cooperation is appreciated.

Very truly yours,

KRUKOWSKI & COSTELLO, S.C.

Stuart Charlson

OSHA Standards Interpretation and Compliance Letters

01/05/1998 - Interpretation/variance with the energy isolation device requirements.

- **Record Type:** Interpretation
- **Standard Number:** 1910.147;1910.147(b);1910.147(c)(1)
- **Subject:** Interpretation/variance with the energy isolation device requirements.
- **Information Date:** 01/05/1998

January 5, 1998

Mr. Richard J. Hackman
The Proctor & Gamble Company
Ivorydale Technical Center
5299 Spring Grove Avenue
Cincinnati, Ohio 45217-1087

Dear Mr. Hackman:

This is in response to your November 8, 1996 letter and enclosure, requesting interpretation/variance with the energy isolation device requirements of 29 CFR 1910.147. Please accept our apology for the delay in responding.

In your letter you described a safety disconnect system ("system") which protects directly wired load circuits to (functionally interconnected) process machines from being energized by an electrical source. Also, you stated that this system is intended for use with process machines where it is impractical to provide manually-operated disconnects at every point of access. Further, you disclosed that direct power interruption on the large drives of these process machines is infeasible because the disconnects require a significant effort to operate, are difficult to position in the (production) line layout, and are not constructed for frequent use.

As noted in your letter, the safety disconnect system includes the following four basic, component groups: a power contractor, a control power transformer and fuses, voltage sensing relays, and a safety lockout switch with verification light. An optional component is used to establish a required neutral point for the voltage sensing relays, if the power being monitored is derived from an ungrounded system.

The following system safety features are noted relative to the results of the failure analysis included in your letter:

- The system measures and ensures no motive force to the drive system.
- The system provides fail-safe verification, that is, defaults to the safe position.

- Verification is provided by a system which actively confirms zero-energy state to the drives before the verification light comes on.
- When an individual initiates the lockout sequence by opening the system switch and placing a lock on it, then the verification light will come on, if the machine is at a zero-energy state.
- If the light goes out due to bulb failure while an authorized employee is performing servicing and maintenance on the machine, the system remains safe because the switch is open and locked out.
- The system is designed such that failure of any component in the system will not result in the light coming on when the machine is in an unsafe mode.
- The system is contained in sealed, protected box.
- The equipment used is certified by a nationally recognized testing laboratory.
- An independent laboratory did a system risk analysis and determined the proposed system presented the lowest risk to the operator.

Based on the information enclosed in your letter, your "safety disconnect system" has been evaluated as an inherently fail-safe system which performs the same function as an energy isolating device identified in paragraph 1910.147(b). When used as an energy isolating device, this "safety system" must be addressed in the energy control program required in §1910.147(c)(1).

Of particular concern is other hazardous energy sources which are not isolated by the safety disconnect system. For example, the machine glue heaters are directly connected (on the supply side of the safety disconnect system) to the hazardous electrical energy source. Potential employee exposure to glue heater hazardous electrical and thermal energy during servicing and maintenance of machines must be addressed in the energy control program.

We appreciate your interest in employee safety and health. If we can be of further assistance, please contact the Office of Safety Compliance Assistance, Mr. Ronald J. Davies, telephone (202) 219-8031, extension 110.

Sincerely,

John B. Miles, Jr., Director
Directorate of Compliance Programs

OSHA Standards Interpretation and Compliance Letters

10/20/1998 - Application of 1910.147 to the change out of a grinding wheel.

- **Record Type:** Interpretation
- **Standard Number:** 1910.147(a)(2)(ii);1910.147(a)(2)(iii)(A)
- **Subject:** Application of 1910.147 to the change out of a grinding wheel.
- **Information Date:** 10/20/1998

October 20, 1998

Mr. Bob Eggleston
General Electric Company
P.O. Box 156301, Mail Drop T-165
One Neumann Way
Cincinnati, OH 45215-6301

Dear Mr. Eggleston:

This is in response to your March 19, 1998 letter requesting interpretation of the 29 CFR 1910.147 Control of hazardous energy (lockout/tagout) standard with respect to the operator change out of a grinding wheel on a tool room size surface grinder. Please accept our apology for the delay in responding. Your scenario, question and our response follows.

Scenario:

> To change the grinding wheel, the operator shuts down the surface grinder with the controls on the front of the machine, removes the wheel guard (usually two hand knurled nuts) and proceeds to loosen the wheel retainer nut. The operator then removes the wheel and replaces it with another grade of wheel to finish the job. This change out task, which is limited to the front of the machine, is performed by a skilled toolmaker 3 to 5 times per day depending upon the job task at hand.
>
> The operator is the only individual involved in the grinding wheel change out and the guards (some of which are side hinged) are approximately 6 x 8 inches in size. The operator has the stop button within his/her reach and immediate control during the change out operation. The start button is recessed and requires deliberate finger push activation to start up. If the operator were to energize the machine, he or she would be immediately aware of it.

Question:

> Would interlocking the wheel guard with the grinding wheel motor so that the motor could not start up while the guard is removed preclude the need for locking/tagging out during grinding wheel change out?

Reply:

> No. The use of interlocked guards to prevent activation of the machine while the guard is not in place, in lieu of lockout or tagout, is permissible only for minor servicing activities which take place during normal production operations. In your scenario, the wheel change takes place outside of the normal production process: the machine is turned off, grinding operations stop, a guard is removed, and the wheel retainer nut is loosened and removed. Therefore, the 1910.147(a)(2)(ii) minor servicing exception does not apply and interlocked guards are no substitute for implementing the lockout or tagout devices according to this standard. We recognize that the energy source for the grinder is under the immediate control of the person performing the service. Although this would limit the risk of an unexpected activation of the grinder, it cannot remove it entirely.

In the event your grinder's power source is a flexible cord, then the lockout or tagout of the grinders is not required if the provisions of 1910.147(a)(2)(iii)(A) are met for cord and plug connected equipment. The exemption is predicated on the assumption that the use of the flexible cord is approved and suitable for the conditions of use and location as detailed in 1910.305(g).

We appreciate your interest in worker safety and health. If we can be of further assistance, please contact the Office of General Industry Compliance Assistance, Mr. Walter R. Siegfried, CSP, on (202) 219-8031, extension 115.

Sincerely,

Richard Fairfax, Acting Director
Directorate of Compliance Programs

The following document is reproduced with permission of the International Union, United Automobile, Aerospace & Agricultural Implement Workers of America—UAW. The page numbers are the same as those in the original document. The UAW document also includes a copy of the OSHA Lockout Standard 29 CFR 1910.147, found in Tab 2 of this manual.

machinery lockout procedure

for the 90's

WHY THIS LOCKOUT IMPLEMENTATION KIT

Lockout is the most important single safety program in UAW-represented worksites. From 1973 to this writing, 94 members have been killed by incidents which full application of lockout would have prevented. About 1.000.000 injuries could have been prevented. The training provisions of the standard give us an opportunity to improve safety at the same time as we reach our membership with a positive union message.

The OSHA Lockout Standard was published in August 1989 to become effective in January 1990. However, there was little enforcement of the new rule because OSHA had not published its compliance directive explaining to inspectors how to enforce the standard. In addition to the delay in implementation, there is currently no parallel standard for Lockout enforceable by the Michigan Department of Labor (MIOSHA) or other state regulatory agencies (state OSHA plans).

On September 14**,** 1990, OSHA finally published corrections to the standard, changes in the explanation of the standard, and the final compliance directive. The UAW filed suit against OSHA, seeking improvements in the standard. Unfortunately, the lawsuit was unsuccessful.

The OSHA lockout standard contains some requirements not necessarily found in advanced lockout programs. The standard requires written lockout procedures for each piece of equipment in a facility, as well as periodic employer self inspections to determine compliance with the procedures. In addition to these new features, the standard requires the general approach to lockout and training of the nature implemented in many major facilities.

Unfortunately, the standard also contains some substantial deficiencies. The standard permits tags to be used instead of locks in some circumstances; it permits employers to delay modifying equipment to be locked out until replacement or major renovation, and it accepts group lockout procedures other than one person-one lock. In addition, the standard does not require the worker and union participation in devising lockout procedures and training, which have been shown necessary in advanced programs.

The lockout/tagout standard is now fully in effect, and OSHA enforcement is now going on, with frequent citations being issued. Therefore, all local unions should meet with management to review the standard, and determine how the employer intends to implement the program. The review is also an opportunity to negotiate = some of the potential problems with implementation, and negotiate in union involvement and other improvements.

This kit includes extensive explanatory materials. In addition, it has a "fill-in-the-blanks" lockout compliance program. Your employer is required to have a written lockout program and keep records on its implementation. The fill-in-the-blanks document covers all the issues required by the lockout standard. The draft program also specifies how certain procedures should be carded out and provides recordkeeping forms. Most important, it fills in the holes left in the standard, including specifying the union involvement needed to make the program work. Existing lockout programs should be compared to this draft program, and management should be asked to adopt this program, with the blanks filled in, as its own.

Questions about this compliance plan may be addressed to:

Health & Safety Department,
International Union, U.A.W.
8000 East Jefferson,
Detroit, Michigan 48214.

(telephone (313) 926-5566)
(fax (313) 824-4473)

DATES	MILESTONES	LOCKOUT RELATED FATAL (cumulative total)
Jan. '73	UAW begins collecting data	5
Fall '76	UAW negotiates with Auto industry for effective lockout programs.	16
May '79	UAW petitions OSHA for standard.	22
June '79	UAW petitions OSHA second time.	23
Fall '79	UAW again negotiates with Auto industry for effective lockout.	34
August '80	UAW writes to OSHA Docket Officer.	34
1981/1982	Collapse of OSHA enforcement activities.	34
Mar. '82	ANSI Lockout Standard (Z244.1) published.	41
Sept. '82	UAW letter to OSHA (Auchter)	47
July '83	OSHA develops preproposal draft standard.	49
June '84	UAW letter to OSHA (Tyson)	54
1984/1985	UAW negotiates with Auto industry for health & safety training funds.	62
April '88	OSHA publishes proposed standard.	72
Oct. '88	UAW testifies at OSHA hearings	74
Aug. '89	OSHA Standard (1910.147) promulgated.	83
Oct. '89	Effective date of standard stayed until January 1990.	83
June '92	TOTAL LOCKOUT-RELATED FATALS TO DATE	94

LOCKOUT STANDARD CHRONOLOGY

February 191-3 - American National Standards Institute (ANSI) Committee on Lockout convenes with Frank Rapp of UAW as chairperson.

February 1976 - UAW Skilled Trades Conference in Detroit targeted fatality prevention and lockout.

March 1978 - ANSI began formal adoption of its lockout standard.

May 1 7. 191'9 - UAW petitioned OSHA for an Emergency Temporary Standard for lockout, citing 22 reported fatalities since 1973.

June 17, 1980- OSHA published an advanced notice of proposed rulemaking.

March 8. 1982 - ANSI lockout/tagout standard issued: this industry-dominated standard covers all sectors, but didn't include "one worker, one key, one lock," and permitted tags as equivalent to locks.

July 1983 - OSHA issued a preproposal draft of lockout standard, based on the ANSI standard: Unions criticized standard but called for hearings to resolve issues.

April 18-20, 1988 - Senate Labor Committee OSHA oversight hearings, lead by Senators Kennedy and Metzenbaum, highlighted absence of progress on lockout standard; UAW testimony cited 68 fatalities, including 46 reported since the original petition.

April 29, 1988 - Under public pressure, OSHA issued a proposed lockout standard; the proposal was a step back from the ANSI standard and the 1 982 preproposal draft.

September 22-23, 1988 - OSHA lockout hearings in Houston; UAW Vice-President Marc Stepp keynoted UAW presentation involving 10 witnesses.

February 6, 1989 - Record closed; joint labor brief drafted by UAW and AFL-CIO Health and Safety Department summarized overwhelming evidence for protective standard.

August 28, 1989 - Lockout Standard, 29 CFR 1910.147, issued.

September 8, 1989 - UAW filed lawsuit with D.C. Court of Appeals, challenging loopholes in protections.

October 31, 1989 - Original effective date for all provisions; requirements for written procedures, training and communication are stayed by OMB.

November 6, 1989 - OSHA extended effective date from October 31, 1989 to January 2, 1990.

January 2, 1990 - Effective date for all requirements of standards. No final compliance instruction issued because of objections to a circulated draft.

September 11, 1990 - OSHA issued Compliance Instruction STD 1-7.3 Inspection Procedures and Interpretive Guidance document to all OSHA offices. Compliance Instruction generates additional UAW concerns.

October 9, 1990 - UAW filed final brief petitioning court to review standard. National Association of Manufacturers (NAM) and Motor Vehicle Manufacturers (MVMA) challenge standard as too strict, American Petroleum Institute (API) and Dow Chemical support OSHNs position.

July 12, 1991 - D.C. Court of Appeals affirms lockout standard as written, but requires OSHA to conduct additional economic analyses.

September 16, 1991 - D.C. Court of Appeals directs OSHA to submit status reports at 60-day intervals.

February 4, 1992- OSHA filed first status report; could not specify when it would complete the analyses.

April 6, 1992- OSHA filed second status report; still no completion date specified.

ANALYSIS OF OSHA LOCKOUT STANDARD (1910.147)

Requirements and Shortcomings

(prepared by UAW Health and Safety Department)

Strengths

1. Requires lockout (or tagout) protection for most industrial workers exposed to the hazards of unexpected start up during servicing and maintenance of machines and equipment.

2. Covered operations are broadly defined to include lubrication, cleaning, unjamming, adjustments and tool changes if the worker is exposed to the hazard. Lockout is required except for minor activities which are safeguarded consistent with machine guarding standards.

3. Requires employers to establish an energy control program with specific procedures for controlling energy and training workers.

4. Requires that each worker exposed to the hazard shall secure such energy source with a personal lockout device at the start of each repair, and remove that device at the end.

5. Requires lockout where energy controlling devices are capable of being locked, unless an employer can meet certain strict conditions for the use of a tagout system.

6. Tagout programs must include additional elements in order to be accepted as equally protective as lockout. Individually applied tagout devices and durable equipment are required. Simple cardboard tags attached by string or wire are not permitted.

7. Requires that new equipment be capable of being locked out, and that existing equipment be refitted whenever major modifications are performed.

8. Energy control procedures must be specific and include commonly accepted steps of notification, shutdown, securing energy sources, release of stored energy, verification of lockout, and in most cases documented.

9. Initial training must be given to workers who lock out, and to other workers whose safety is impacted by lockout procedures. Retraining must be conducted when hazards change or employer self-inspections show defects in procedures.

10. Employer self-inspections, including a review of procedures with all employees who lock out, must be conducted annually and documented.

Weaknesses

1. Group lockout requirements are confusing and misleading, and may be interpreted to permit one person (using a master lock or tag) to lockout/tagout hazardous energy when more than one crew, craft, department, etc., is involved in servicing/maintenance.

2. Language is confusing and may be interpreted to say lockout is not required for routine maintenance tasks by claims that these are part of servicing during normal production operations.

3. Permitting tagout under certain circumstances may provide a loophole.

4. Worker participation elements which are needed for an effective program were not included. For example, union representatives are not guaranteed the right to observe employer conducted inspections, access to documents is not specified, and consultation with exposed workers in procedure development is not required.

5. Lockout protection against electrocution hazards is not required. This is covered by new standard rules (1910.331 through 1910.399) which in themselves have serious weaknesses.

6. Industry sectors, such as construction are left out of coverage. Certain activities performed by UAW members may be designated construction and omitted from protection.

7. Language excluding plug and cord type equipment, and "minor servicing" may tempt employers to exempt these from lockout protection.

8. Employers can delay refitting equipment to be lockable for years while waiting for a renovation they consider major.

9. Energy control procedures don't have to be posted on equipment.

10. Content and manner of periodic employer conducted self-inspections is not defined.

11. No time interval for retraining is specified, leaving this to employer discretion based on employer conducted self-inspections.

12. Employers may escape requirements for retraining by relying on informal "reviews" during the self-inspections.

ENERGY CONTROL PROGRAM

1. COMPANY NAME_____

2. PLANT ADDRESS_____

_____

3. *Purpose.*

a. This program document describes the procedures and methods at _____ *[Fill in Name of Company and Facilities]* to protect employees from energization or start up of machinery and equipment, or the release of stored energy which could cause injury during servicing and maintenance. This Energy Control Program document is intended to *commit to writing all* aspects of the program and to collect all records in one place so that they can be reviewed and understood. This program is also intended to establish compliance with the OSHA Standard on Control of Hazardous Energy [29 CFR 1910.147].

b. Servicing and maintenance activities include constructing, installing, setting up, adjusting, inspecting, modifying and maintaining and/or servicing machines or equipment. Other activities include lubrication, cleaning, or unjamming of machines or equipment and making adjustments or tool changes.

****NOTE: The OSHA Standard allows minor tool changes. adjustments, and other minor servicing activities which take place during normal production operations to be completed without lockout,* ***if there is no employee exposed to hazardous movement or energy because of guarding or alternative measures which provide equal protection.*** The UAWs accident analyses shows that employee protection can only *be achieved by a zero energy state assured by lockout, and that the use of control circuit devices is unacceptable.*

****COMMENT: The OSHA lockout standard doesn't cover electrocution hazards. This program is written to cover electrocution dangers as well as all other hazardous forms of energy.*

c. The OSHA standard states that: “lockout applies whenever an employee performing servicing or maintenance is:”

1. "Required to remove or bypass a guard or other safety device; or"

2. "Required to place any part of his or her body into a point of operation [an area on a machine or piece of equipment where work is actually being performed on the material being processed] or where an associated danger zone exists during a machine operating cycle."

****COMMENT: This paragraph is exact language from the lockout standard.*

d. This program will be based on the principle of one person-one energy source--one lock--one key. Each employee (including management) exposed to the hazards above will secure each energy source with his or her individually assigned lock. (e.g. six people-six locks) Tags shall be used only for identification or informational purposes. Tags are not required if locks are otherwise indelibly marked so as to identify the person(s) to whom they belong.

e. A written procedure will be developed for each specific equipment situation which exposes employees to the hazards of uncontrolled energy. Specific lockout procedures will be developed in consultation with employees who perform those procedures.

****COMMENT: Where equipment or lockout requirements are exactly the same - no differences at all - one written procedure covering several of the same conditions may be acceptable.*

****NOTE: While OSHA does not require the posting of these procedures at the equipment site, the UAW believes that they can best be utilized at the equipment site. Employees work on or service many pieces of equipment. and cannot be expected to consult an office file before starting work.*

f. Each element of this program will be developed jointly with union representatives and employees. All documents will be available for examination and copying to all union representatives and all affected employees. Plant wide procedures will be developed by the Plant Safety Committee. A union representative will participate in training selection, development and delivery. Specific lockout procedures will be developed in consultation with employees who perform those procedures.

g. The Energy Control Program will be reviewed with the Union Shop Committee before implementation, at least annually thereafter, after major modifications, and on local unions request.

4. *Plant Safety Director. (Management Lockout Coordinator)*

****COMMENT: An identified management representative must be responsible for all the phases of the lockout program. In most cases, the management lockout coordinator will be the plant safety director. The management coordinator should have the knowledge to design the program, and the authority to correct deficiencies.*

The management lockout coordinator for this facility is identified at the end of this document. (page 11)

Responsibilities of the lockout coordinator shall include:

a. The maintenance, revision and updating of the Energy Control Program document;

b. Development of equipment and task specific energy control procedures;

c. Oversight of inspections;

d. Coordination of employee lockout training;

e. Maintenance of records.

5. *Facility Lockout Committee.(Local Joint Health and Safety Committee)*

****COMMENT.- In many cases the Facility Lockout Committee may be the same as the Joint Health and Safety Committee; it is especially desirable to have a skilled trades representative or a union representative who is a skilled tradesperson participate in the committee.*

These might include engineering disciplines involved in designing workstations; a member of the Local Union Bargaining Committee; machine operators; a worker involved in clean-up operations, or others with an interest in lockout.

The Lockout Committee shall consist of equal numbers of union and management representatives.

The management members of the committee are identified at the end of this document. (page 11)

The union members of the committee are identified at the end of this document. (page 11)

The duties of the lockout committee shall be:

a. Review the overall energy control program;

b. Participate in. or assure the development of equipment specific procedures;

c. Assure the selection, development and implementation of and where appropriate participate in training;

d. Review training completeness and effectiveness;

e. Review inspection reports;

f. Assure retraining is accomplished as required.

6. General Lockout Procedure.

****COMMENT: The following general procedure is a shortened version of an actual corporate procedure. The principles of this procedure apply to the development of the specific procedures for particular pieces of equipment and tasks. Procedures shall be updated whenever changes to equipment or processes are made.*

a. Employees whose duties require them to installs service or repair machinery, equipment, machine tools, facility services or any process system shall be provided with sufficient locks to lockout all energy sources in order to safely perform their job. The guidelines below shall be followed during the neutralizing of energy sources.

b. Before installing, servicing or repairing any of the areas mentioned above, where a body part may possibly be exposed to a point of operation, the employee(s) shall completely neutralize the energy and lockout all energy sources.

c. In general, lockout will be accomplished according to a specific procedure developed and written for each piece of equipment. Procedures will be posted on the machine/equipment/ process as close as possible to the controls.

d. Employees whose duties require them to lockout a machine, systems, facilities or equipment shall do so after prior notification to operating personnel.

e. Prior to engaging in any repair, service or installation work, the assigned employee(s) shall neutralize and lockout the energy sources, and check to assure that there is no energy at the area where the job is to be performed.

f. The neutralizing of energy sources may be accomplished by one or more of the following: opening circuits and locking switchboxes, panel disconnects, etc-, closing, bleeding and padlocking valves; discharging electrical capacitors; mechanically blocking any load or machine part before working in, on, or under it.

****COMMENT: OSHA does not consider pushbuttons, selector switches, and other control circuit type devices to be "Energy Isolating Devices****"; therefore, locking emergency stop buttons (E-stops), electrical interlock plugs, or similar control circuit devices does not meet lockout standard requirements****.*

g. If a control system cannot be neutralized because it is damaged, it shall be repaired so that energy neutralization can be accomplished *before* any further work can be performed, or alternate energy controls which provide equal protection shall be implemented.

h. Locks shall be attached to each lockout point. Only the employee who affixed the lock to the lockout point has the authority to remove that lock. If the individual is not available to remove the individual lock (s), the established plant procedure for removing abandoned locks shall be followed. (See Section 15) An established procedure for shift or crew change will be followed.

i. If two or more employees are assigned to assist on the same job, employees shall place their lock(s) on the lockout point(s) so that the controls cannot be operated until all the locks are removed. If the controls are designed or located so that only one lock can be accommodated, a multiple lock device shall be provided.

j. Prior to re-energizing the energy sources, appropriate production workers shall be notified, all tools, equipment and supplies shall be removed and all other personnel shall be clear from the hazards that could result from the initial activation or reactivation of the energy source(s).

7. *Identification of activities which require lockout protection.*

The Lockout Committee will inspect the plant; consult with employees and supervisors assigned to servicing and maintenance activities; and prepare a list of equipment and energy sources for which lockout protection is necessary.

This list will be updated as new exposures are identified. It is anticipated that such exposures will be identified through employee reports, accident reports and lockout inspection reports. The list of covered activities will be reviewed by the Lockout Committee every _____ *[Fill in interval appropriate for facility]* months.

8. *Equipment/activity specific procedures.*

a. General.

(1) A specific written procedure for energy control will be developed for each piece of equipment and energy source which has the potential to expose employees to the hazard of unexpected start up or energization. The Plant Safety Director, in conjunction with the Engineering Department, will be responsible for the maintenance of these procedures. The list of procedures will be used to schedule and conduct inspections, and in equipment specific training.

(2) Written procedures may be grouped, listing the equipment and energy sources to which they apply.

(3) Where the Lockout Committee agrees that a specific written procedure is not required, and the operation meets the exclusion criteria of the lockout standard, the equipment and energy source will be listed and the lockout point will be labeled.

(4) Procedures will be regularly reviewed and updated by the Lockout Committee, particularly whenever machinery/equipment/process modifications affect the lockout process.

b. Method of Procedure Development,

(1) Equipment and energy sources which may pose a hazard will be identified, using a form similar to Form No. 1 in Appendix A.

(2) Blue prints and plans will be assembled, brought up to date in the shortest time possible, and consulted.

(3) Tasks, hazards, means and methods of energy control will be reviewed with exposed employees and supervision by the Lockout Committee.

(4) Exposed and affected employees and supervisors will be identified through this review.

(5) A procedure will be written, including the elements below.

(6) Exposed employees and supervision will be given opportunity to comment on the procedure prior to being made final.

c. Content of Written Procedures.

Written procedures will be recorded on a form similar to Form No. 2 in Appendix A.

****COMMENT- The OSHA standard recommends that the written procedure address each of the following issues:*

1. Identification of equipment and tasks;
2. Types(s) and Magnitude(s) of energy and hazards;
3. Name(s) and/or Job Title(s) of employees authorized to lockout.
4. Name(s) and/or Job Title(s) of affected employees and how to notify;
5. Type(s) and Location of energy isolating means;
6. Type(s) of Stored Energy – Methods to dissipate or restrain;
7. Method(s) Selected – i.e., locks, additional safety measures, etc;
8. Type(s) of Equipment checked to ensure disconnections;
9. Name(s) and/or Job Title(s) of employees authorized for group lockout.

9. *Posting of Procedures*

a. After written procedures are completed, the Plant Safety Director will produce a version for posting on the equipment, and verify that it is posted. The posted procedure will show the location of the energy control devices and identify the means of energy control (for example, locks, blocks, pins).

b. Posted lockout procedures must be securely placed at the main or individual control panel of the machine/equipment or process that is to be controlled. In addition each lockout device and the type of energy it controls must be identified by labeling the energy control device.

c. Posted procedures will be evaluated by inspections by the Local Joint Health and Safety Committee using a form similar to Form No. 3 in Appendix A.

d. Copies of posted procedures shall be retained by the Local Joint Health and Safety Committee and made available to employees upon request.

e. A plan will be written to update posted procedures due to equipment modifications.

10. *Training and Retraining.*

(a) General. The Local Joint Health and Safety Committee will identify exposed and affected employees who will receive training; select the training material to be used for each group; select instructors and assure that they are trained, and oversee and evaluate the total program.

****COMMENT: The facility energy control program must identify the source of training materials, the trainers and ail other details of the program. This is a matter of negotiations. The UAW recommends that one of the three Auto industry jointly developed lockout programs be used. If management uses a vendor or its own course, that must be specified in the program document.*

(b) Each authorized and affected employee will receive initial training of not less than _____hours (specify) on implementation of this program, or prior to first assignment in a job involving exposure. Materials suitable for class room instruction will be delivered in an appropriate setting off the plant floor.

(c) All other employees whose work operations are or may be in an area where energy control procedures may be utilized, shall be instructed about this procedure, and about the prohibition relating to attempts to restart or re-energize machines or equipment which are locked out.

Training records such as attendance sheets, will be filled out by the instructor. Employees shall not be required to sign documentation of training.

1. Initial Training,

   Initial training will use: *[Identify the training course. materials. source, vendor]*

   Class size will be _____*[Fill in number of employees.]*

   Class length will be _____*[Fill in target class length.]*

   Off the plant floor instruction will be carried out in _____*[Fill-in identity of rooms].*

   Names/identification of instructors are shown at the end of this document. (page 11)

2. Repeat Training.

   A first round of refresher training will be given within one year of the initial training. This first round will include the contents of the OSHA lockout standard, the facility lockout program, the specific procedures applicable to employees job assignment. Refresher training will also inform employees of results of facility inspections.

   Refresher training will be the means of compliance with the program review requirements of the inspections described below.

   Class length will be _____(hours).

   Names/Identification of instructors are shown at the end of this document. (page 11)

11. . *Facility Self-Inspection.*

****COMMENT: The facility self-inspection requirements of the Lockout Standard are the first safety procedure audit requirements of an OSHA standard. The following language meets the objectives of Identifying problems, through a representative sampling scheme, without requiring an observation of each employee doing each procedure on each piece of equipment each year. This section requires extensive discussion locally.*

A. General

   (1) Inspections will be conducted by plant safety department staff or by a knowledgeable management employee such as a lockout training discussion leader, or a management person involved in lockout program development.

   Direct supervisors of exposed and authorized employees will not be inspectors, since the performance of supervisors is one of the elements to be evaluated.

   The currently authorized inspectors are listed at the end of this document. (page 11)

   (2) Designated union representatives will be notified of inspections, and will be able to be present during inspections and receive reports. These representatives will be the Health and Safety

Representative, Bargaining Committee Chairperson and Skilled Trades Representatives. The current union observers are listed at the end of this document. (page 11)

(3) Inspections will not be announced to exposed employees. affected employees. or supervisors subject to inspection.

a. Inspections will be planned based on a review of the specific equipment/task procedures The plan shall include enough observations to be representative of performance of authorized and exposed employees performing each aspect of lockout procedures each year, and frequent or high risk equipment/task procedure.

b. The performance of employees of each supervisor performing a representative number of tasks will be observed each quarter. Deficiencies in performance will trigger retraining for all employees of that supervisor. as well as other necessary corrective action. Reinspection of employees of that supervisor will occur within one month of corrective action. Re-inspections triggered in response to deficiencies shall satisfy the quarterly inspection requirements.

c. An inspection of a specific equipment/task procedure implementation will be observed promptly on request.

d. The inspection plan will be reviewed with the union bargaining committee prior to implementation.

e. The progress and results of the inspection program will be reviewed at least quarterly with union representatives, and necessary adjustments made.

(4) Results of inspections will be recorded on the inspection report form. *(See Sample Forms No. 4 and No. 5 in Appendix A).*

(5) No discipline will result from observations made during energy control inspections required under the program. Those found in violation should be stopped and counseled.

(6) Employees will not be required to sign documentation of inspections.

(7) A listing of corrective actions recommended and completed will be maintained and made available to the union and to authorized and affected employees.

B. Duties Of Inspectors

The Local Joint Health and Safety Committee shall provide direction to inspectors regarding the scope, frequency and duration of inspections of lockout application and/or lockout removal procedures.

Inspections should be random, and of sufficient number and distribution to assess the need for changes in procedures or for the provision of additional training.

Completed forms shall be forwarded to the Local Joint Health and Safety Committee for review, necessary action, and retention.

12. *Refitting of equipment to be capable of being locked out*

(a) All machinery, equipment and processes must be capable of being locked out. Where machinery, equipment and processes are not equipped with conveniently located disconnects capable of accepting lockout devices, they must be refitted. In the meantime, special procedures should be developed, posted and communicated to the appropriate workers.

(b) Machinery equipment processes should be reviewed for this requirement at the time of initial survey of the plant, by the Local Joint Health and Safety Committee. Sample Form No. 1 in Appendix A should be used to record the observations.

(c) Recommendations for changes in equipment to facilitate lockout will be made by the Local Joint Health & Safety Committee based on information during development of lockout procedures, comments during training, and observations during inspections. An example of such a change would be the relocation of disconnects to make lockout more convenient and time efficient.

(d) Minor alterations of equipment to make it lockable, such as fitting electrical boxes with disconnects, or modifying valves to accept locks, will be accomplished as soon as possible but no later than 6 months from the implementation of this program.

(e) Management must schedule completion of the necessary corrective work.

(f) The Local Joint Health and Safety Committee shall, at least _____ (specify period), review the status of all necessary corrective work, to determine its completion in a timely manner.

****COMMENT: The frequency of review will depend on the volume of changes required, and the size of the facility.*

13. Lockout devices and equipment.

Locks and lockout devices shall be issued by the employer, at no cost, to all employees who could be endangered by the activation of the equipment while maintenance, set-up, repair, service, cleaning or other work is being performed.

The locks provided shall not have duplicate keys, and the supplier must be capable of furnishing the lock with at least 500 key changes to reduce duplication. Each lock shall have only one key.

****COMMENT: Control of Lock and Key When new locks and keys are received, the locks and key should be numbered starting with number one and continuing numerically. The lock and key should then be forwarded to the crib supervisor and put in the non-productive stores crib. Additional purchase of locks will continue consecutive numbering. The locks should be issued by crib upon receipt of a proper requisition and the attendant must enter the name of the recipient in a log which will identify the numbered lock and its user. An employee who normally is required to lock out additional sources of energy should draw out a sufficient quantity of locks. Additional locks may be requisitioned as necessary to achieve total lockout for specific equipment*

Alternative systems should assure: (a) Employee identification; (b) Easy access to sufficient locks to accomplish lockout.

14. Departmental Locks

A group of numbered locks should be designated as departmental safety locks and should be assigned to using departments. The departmental lock shall meet the requirements of the safety lock and be used as follows:

Major work that will not be completed during the shift in which it was started shall have a departmental lock applied to the main disconnect in place of individual employee's lock. The purpose of this lock is to avoid an unlocked piece of equipment at shift change time. The key to this lock shall be controlled by the supervisor of the department applying it.

15. Removal of abandoned locks.

****COMMENT: Where the employee who applied a lockout device is unable to remove the device(s), for whatever reason, the employer must develop specific written procedures for removal of the device(s), and provide training to all authorized and affected employees to ensure compliance.*

1. General. An abandoned lockout device may be removed only if this procedure is followed. *An Abandoned Lockout Device Removal Permit* must be completed by a qualified management *representative and the employee's immediate supervisor (See* Appendix A *for sample* Permit Form 6). These permits will be reviewed periodically by the Local Joint Committee and will be retained for one year from the date of issuance.

2. The qualified management representative for each shift is identified at the end of this document. (page 11)
(These entries shall change whenever the identity of the qualified management representative(s) changes.)

3. When- it is necessary to remove an apparently abandoned lockout device, the following procedure will be initiated. The qualified management representative and the immediate supervisor shall verify that the employee whose lockout device(s) has not been removed has left the facility. The management representative and the immediate supervisor shall:

   (a) Visually inspect the area, machine, equipment or process to ensure that the employee has left the facility.

   (b) If the employee is not in the facility, the management representative shall:

      (i) Check time card, or other record, to determine if employee has left the facility.

      (ii) If time card, or other record, indicates employee has NOT left the facility, the following steps shall be taken:

         (A) Contact fellow workers; use available communication means (pagers, plant phones, loudspeakers, etc.) to determine whether the employee is still in the facility.

         (B) Physically attempt to locate employee.

         (C) Attempt to contact employee at home (by telephone, etc.) until positive contact can be established.

      (iii) If the management representative and the immediate supervisor have determined that the employee has left the facility, they shall:

         (A) Attempt to contact employee at home (by telephone, etc.) until positive contact has been established.

         (B) Upon positive contact, notify employee that lockout device(s) is to be removed and give the reasons for the removal.

         (C) Where positive contact has not been made:

         ** the management representative and immediate supervisor shall notify the authorized local union representative on that shift that the lockout device(s) is to be removed, and be given the opportunity to be present at the removal of the lockout device(s). In addition, review with the representative the steps that have been taken to locate the individual(s).

         ** the management representative and immediate supervisor shall continue efforts to make contact and inform the employee of the lockout device(s) removal.

         ** if contact has not been established before the start of the employee's next scheduled shift, the employee shall receive immediate notification upon reporting to the facility for the next scheduled shift. The employee shall not be permitted to undertake any lockout task until such notification has been given.

(iv) Prior to lockout device removal, the management representative and the immediate supervisor shall reinspect the work area to ensure that the employee has not returned. If employee absence is again verified, and no other employee is exposed to a hazard, lockout device(s) may be removed, and the remaining steps of the established lockout removal and reenergization procedure followed.

16. Signature of Management Representative

_____ [name]

_____ [plant manager, plant safety director].

_____ [date]

TO BE COMPLETED UPON INITIAL ASSIGNMENT AND CHANGED WHENEVER THE IDENTITY/IDENTITIES OF THE PERSON(S) CHANGE

1. The management lockout coordinator for this facility is: (fill in name and/or title)

   _____

2. The management members of the lockout committee are:

   a. _____

   (fill in name and/or title of management lockout coordinator)

   b. _____

   (fill in name and/or title of skilled trades supervisor)

   c. _____

   (fill in name of plant safety director, if different from (a) above.

3. The union members of the lockout committee are:

   a. _____

   (fill in name of Health and Safety or other appropriate union representative)

   b. _____

   (fill in name of Skilled Trades representative)

   c. Additional members (fill in names and/or titles as necessary)

   _____

   _____

   _____

4. a. INITIAL TRAINING instructors are: (fill in name and/or title)

   _____

   _____

   _____

   b. REPEAT TRAINING, instructors are: (fill in name and/or title)

   _____

   _____

   _____

5. AUTHORIZED INSPECTOR are:

   a. Management: (fill in name and/or title)

   _____

   _____

   _____

   b. Union observers are: (fill in name and/or title)

   _____

   _____

   _____

6. Qualified management representatives for Lockout Device Removal Permit (Appendix A - Form #6) are:

   Shift 1 _____(name and/or title)

   Shift 2 _____(name and/or title)

   Shift 3 _____(name and/or title)

APPENDIX A – SAMPLE FORMS

Form No. 1 – Energy Control Device Survey

Form No. 2 – Written Procedure Elements

Form No. 3 – Posted Procedure Checklist

Form No. 4 – Lockout Application Inspection Checklist

Form No. 5 – Lockout Removal Inspection Checklist

Form No. 6 – Abandoned Lockout Devise Removal Permit

Form No.1

ENERGY CONTROL DEVICE SURVEY

Name/number identification of machine/process/equipment _____

Location of machine/process/equipment _____

List every energy control device NOT CAPABLE of accepting lockout devices: _____

_____ _____

_____ _____

_____ _____

List alternate control measures/methods used: _____

_____ _____

_____ _____

_____ _____

Specify corrective action required for each energy control device listed above: _____

_____ _____

_____ _____

_____ _____

_____ _____

Name of person responsible for corrective action _____

_____

Date and time notified _____

Date and time Local Joint Committee notified _____

(THIS FORM MUST BE RETAINED BY _____ (name of responsible member of management) FOR A PERIOD OF ONE YEAR FROM THE DATE OF COMPLETION).

Signature of person performing survey _____

Name and title in full _____

Date and time of survey _____

Form No.2

WRITTEN PROCEDURE ELEMENTS

Name/number/identification of machine, process or equipment _____

_____ _____ _____ _____

Type(s), magnitude(s) and hazard(s) of energy present. _____

_____ _____ _____ _____

Name(s) and/or Job title(s) of employee(s) authorized to lockout _____

_____ _____ _____ _____

Type(s) and location(s) of energy isolating means _____

_____ _____ _____ _____

Type(s) of stored energy and methods to dissipate or restrain _____

_____ _____ _____ _____

Means/Methods selected (specify locks/additional measures) _____

_____ _____ _____ _____

Specify tools, test/measuring or other devices used to ensure effectiveness of disconnect _____

_____ _____ _____ _____

_____ _____ _____ _____

At Time of Group Lockout specify Name(s) and Job Title(s) of employee(s) covered by group lockout____

_____ _____ _____ _____

_____ _____ _____ _____

[Copies of Posted Procedures Shall Be Retained by the Local Joint Health and Safety Committee, and made available to employees upon request.]

Form No.3

POSTED PROCEDURE CHECKLIST

Name/number/identification of machine, process or equipment

_____

_____

Location of machine, process or equipment _____

_____

_____

Is procedure in written form - state location _____

_____

_____

Is procedure in diagram form - state location _____

_____

_____

Are ALL energy sources identified? _____ Yes _____ No _____

Are locations/points of lockout identified? _____ Yes _____ No_____

Does posted procedure list required lockout devices? _____ Yes _____No _____

(List deficiencies and corrective action required)

_____

_____

Are sequences/methods specified for lockout of all energy sources?

Yes._____ No._____

(List deficiencies and corrective action required)

_____

_____

List alternate energy control methods used _____

_____

- over -

Are alternate energy control methods identified in posted procedure?

Yes _____ No _____

IF ANY "NO" ANSWERS ARE SHOWN, THE LOCAL JOINT COMMITTEE MUST BE NOTIFIED TO ENSURE THE NECESSARY CORRECTIVE ACTION HAS BEEN TAKEN.

Signature of person performing survey: _____

Name and title in full _____

Date and time of survey: _____

Date referred to Local Joint Committee _____

(THIS FORM MUST BE RETAINED BY THE LOCAL JOINT COMMITTEE FOR A PERIOD OF ONE YEAR FROM THE DATE OF COMPLETION)

Form No. 4

LOCKOUT APPLICATION INSPECTION CHECKLIST

Name of area, equipment task where lockout required _____

Date shift time of lockout application _____

Scheduled/Unscheduled lockout _____

Authorized employee(s), name(s) & i.d. number(s) _____

_____

Have they been trained? Show date(s) of training alongside name.

_____ _____

_____ _____

_____ _____

Affected employee(s) - names & i.d. number(s) _____

_____

Have they been trained? Show date(s) of training alongside name.

_____ _____

_____ _____

_____ _____

Have all authorized/affected employees been notified of lockout? _____

If so, by whom _____

Name(s) of authorized/affected employee supervisor(s) _____

_____

Written job procedure available? (If so, state where located) _____

_____

Is job procedure being followed? (If not, state elements not followed)

_____

_____

Is procedure posted? _____ Is procedure in diagram form? _____

- over -

Is procedure adequate? _____

Has lockout been effected by all persons involved? _____

Did lockout follow procedure? _____

If not, what additional employee lockout required _____

Name tools, test/measuring or other devices, proper to effect lockout _____

_____

Are these tools, test/measuring or other devices, proper to effect lockout _____

_____

Name all required energy isolating devices _____

_____

Can energy isolating devices be locked out? _____

Name deficiencies requiring corrective action _____

_____

Were deficiencies a result of inadequate/improper training? _____

State deficiencies in detail _____

_____

Did each authorized/affected employee lockout all required energy sources? _____

If not, what action taken _____

Did each authorized/affected employee verify lockout? _____

If not, what changes needed _____

CORRECTIVE ACTION(S) REQUIRED _____

_____

_____

INSPECTION PERFORMED BY _____

DATE & TIME OF INSPECTION _____

(THIS FORM MUST BE RETAINED BY THE LOCAL JOINT COMMITTEE FOR A PERIOD OF ONE YEAR FROM DATE OF COMPLETION)

Form No. 5

LOCKOUT REMOVAL INSPECTION CHECKLIST

Name of area, equipment/task where lockout removal is taking place _____

_____

Date/shift/time of lockout removal _____

Scheduled/Emergency (abandoned lock) Removal _____

IF ABANDONED LOCK REMOVAL, HAS PERMIT BEEN ISSUED _____

Authorized employees involved (names & i.d. numbers) _____

Have they been trained? Show date(s) of training alongside name(s)

_____ _____

_____ _____

_____ _____

Affected employees involved (names & i.d. numbers) _____

_____

Have they been trained? Show date(s) of training alongside name(s)

_____ _____

_____ _____

_____ _____

Have all authorized/affected employees been notified of impending lockout removal and start-up? ____

_____

If so, by whom _____

Name(s) of authorized affected employee supervisor(s) _____

_____

Written job procedure available? (If so, state where located) _____

_____

- over -

Is job procedure for removal being followed? (If not state elements not followed) _____

_____

Is procedure posted? _____ Is procedure In diagram form? _____

Is procedure adequate? _____

Have all personnel, tools, equipment/supplies been removed from task/work area? _____

Is this Tryout/Release to Production? _____

Have guards etc. been replaced? _____

Have all other safety devices been reactivated? _____

Have all repairs etc. been effected? _____ Is machine/equipment process ready to be released from lockout? _____

If so, by whom, and when _____

Have those employees who applied lockout devices removed ONLY their own devices? _____

_____

Are there any other lockout devices requiring removal (if so specify), for example contractor's devices?

_____

Who has been contacted to remove these devices? (name) _____

_____ By whom and when _____

_____

What action is required to correct any deficiencies noted? _____

_____

Who has been notified to correct deficiencies? _____

_____

Date of notification _____

INSPECTION PERFORMED BY _____

DATE AND TIME OF INSPECTION _____

(THIS FORM MUST BE RETAINED BY THE LOCAL JOINT HEALTH AND SAFETY COMMITTEE FOR A PERIOD OF ONE YEAR FROM DATE OF COMPLETION)

Form No.6

ABANDONED LOCKOUT DEVICE REMQVAL PERMIT

This permit shall be completed for each abandoned lockout device removal requirement. Removal of abandoned lockout devices SHALL only be undertaken after all procedural requirements have been followed. and all sections of the permit form completed.

1. Name of employee whose lockout device is to be removed _____

_____

2. Clock number: badge number-, department number: _____

_____

3. Name/number/identification of machine, process or equipment involved in lockout _____

_____

4. Number of lockout devices to be removed _____

5. Location and types of lockout devices to be removed _____

_____

6. Has task requiring lockout been completed? _____Yes _____ No _____

7. If task has been completed, can machine, process or equipment be operated without hazard? _____

_____

8. Has machine, equipment or process been visually inspected to ensure employee has left work area?

_____

9. If employee not in work area, has time card (other record) been checked? _____

Left facility _____ Not left facility _____

10. Have coworkers been asked whether employee still in facility? _____

Paged _____Yes _____ No _____

- over -

11. Have attempts been made to contact employee at home? _____Yes _____ No _____

Telephone number called _____

Dates and times of call(s) _____

Name(s) of person(s) spoken to _____

12. Successful employee contact at (location) _____ (date) _____

(time) _____

13. Employee advised that _____(Action taken to remove lock) _____

_____

14.Authorized employee representative (name) _____

notified _____ (date) _____ (time) _____

15. Was machine, process or equipment reinspected prior to lockout device removal? _____

Yes _____No _____

16. Name and title of person authorizing removing lockout device _____

_____

17. Was employee notified of removal prior to start of next scheduled shift ____Yes _____ No _____

If yes, by whom? (name) _____

Date and Time of Issuance _____

Signature of Management Representative _____

Print Name in Full _____

Signature of employee's immediate supervisor _____

Print Name in Full _____

(THIS FORM IS TO BE RETAINED FOR ONE YEAR FROM THE DATE OF ISSUANCE BY _____

_____ *(name of responsible management representative)).*

APPENDIX B – TRAINING PROGRAM SUGGESTIONS

Document No. 1 – Planning Training Implementation

Document No. 2 – Suggested Training Program Language

Document No. 3 – Suggested Training Program Specifics

Document No- 1

PLANNING FOR TRAINING IMPLEMENTATION

To schedule the training sessions for your facility, the following questions should be answered:

1. How many sessions per day will be taught?

2. How many people in your facility are eligible for training?

3. How many people will attend each session?

4. How much time will each session take?

5. Where will training be conducted?

6. What training material will be required?

7. What training equipment will be required?

8. Who will conduct the training?

9. What recordkeeping is required?

10. Who will train the instructors?

You will need the input from a number of individuals at your facility in order to arrive at the answers

SUGGESTED TRAINING PROGRAM LANGUAGE

1. Training will be conducted jointly by the local union health and safety representative and the plant safety department, or by a knowledgeable union or management employee such as skilled trades worker or a lockout training discussion leader, or a person involved in lockout program development.

   The training will ensure that the purpose and function of the plant's energy control program is understood by the workers: and that the knowledge and skills required for the safe application, usage, and removal of energy controls are required by the workers.

   The training sessions should be held off-the-job and preferably in a classroom atmosphere. The training should be conducted in a minimum of-hours for affected workers, and up to-hours for the authorized workers. The training materials should be identified as to their source and should be applicable to the type of machinery and equipment in the plant.

   Training sessions will be:

   (Identify the location: identify affected/authorized workers by name, etc., identify length of time for the training sessions: identify the source of training materials.)

   Trainers will be:

   (Identify individuals by name and job title)

2. Local Union representatives will be notified of training sessions and will be able to observe and participate. Local Union representatives will be:

   (Identify individuals by name and union office held.)

3. Authorized employees will receive training in the recognition of applicable hazardous energy sources; the type and magnitude of the energy available in the workplace; and the methods and means necessary for energy isolation and control.
4. Each worker who could be affected by the equipment/machinery shut down, isolation, and lockout will receive training in the purpose and use of the energy control procedure.
5. All other employees whose work operations are or may be in an area where energy control procedures may be utilized, shall be instructed about the procedure, and about the prohibition relating to attempts to restart or reenergize machines or equipment which are locked out.
6. Retraining must be provided to all authorized and affected workers whenever there is a change in their job assignment, a change in machines, equipment or process that presents a new hazard; or when there is a change in the energy control program.
7. Additional retraining must be accomplished whenever a periodic inspection reveals, or whenever the employer has reason to believe that there are inadequacies in the employee's knowledge or deviations from the energy control procedures.

- over -

8. The retraining must reestablish employee proficiency and introduce new or revised control methods and procedures, as necessary.
9. The employer shall certify that the employee training has been accomplished -and is being kept up to date. The certification shall contain each employee's name and dates of training.
10. No discipline will result from observations made during the energy control inspection under the program compared to the plant's training program requirements.
11. Workers will not be required to sign reports or other documents from training program sessions. The management representative will note attendance.

SUGGESTED TRAINING PROGRAM SPECIFICS

Training in Equipment Specific Procedures

Should include the following key elements

1. Preparing for Lockout
2. Performing Lockout
3. Removal of Lockout

Preparing for Lockout

- IDENTIFY NATURE OF MACHINE/EQUIPMENTIIPROCESS PROBLEM
  Talk with operator, supervisor, or knowledgeable person.
- CHECK PRINTS, CIRCUIT DIAGRAMS, ETC.
  Match prints to machinery/equipment/process.
  Use latest prints available.
  If any questions or doubts, contact immediate supervisor.
- NOTIFY APPROPRIATE PERSONS OF INTENT TO LOCKOUT
  If production operation, notify production supervisor. Also advise operator that approval has been obtained to shut down equipment for maintenance or other work to be performed.
- CHECK FOR PERSONNEL
  Check for personnel who could be in hazardous locations while machine/equipment/process is being prepared for lockout. Clear all such personnel.
- CYCLE TO START POSITION
  Whenever possible, cycle machine/equipment/process to its START position (first part in cycle), as long as it is not required to leave it in another position to perform repairs or correct malfunctions. Cycling to START minimizes movement when energy is restored to the operation. Cycle to position necessary to effect repairs, etc.
- IDENTIFY ENERGY TO BE CONTROLLED
  Make determination of energy sources to be locked out and/or controlled by blocking, bleeding, pinning, etc. Where safe job procedures are posted, such sources and means of controlling energy should have been identified. Where safe job procedures are not posted, obtain authorization and procedure from immediate supervisor. Supervisor and authorized employee must agree that the method devised to effect lockout is as equally effective. Refer any questions/doubts to your immediate supervisor, or other knowledgeable person.

Performing Lockout

- DISCONNECT/DISSIPATE ENERGY
  Determine method of disconnecting/dissipating energy to the machine/equipment/process to be worked on. For example, electrical disconnects, valves in pipes, switches, couplers, etc. Apply control method (lock, tag, chain, block, pin, etc.) as appropriate, after ensuring that no hazard will be created when disconnecting/dissipating energy.

  Apply appropriate tag to the operator's control console/panel/station, indicating to operator that no attempt should be made to start the machine/equipment/process until approval has been given by the person undertaking the maintenance/service/repair and the tag removed by that person.
- VERIFYING LOCKOUT
  Attempt to start machine/equipment/process. Watch for movement in machine/equipment/process. Check for lights on control panels. Listen for sounds indicating energy may still be present. Depending on nature of work to be performed, use testing equipment, measuring devices, as

-- over –

appropriate, to determine whether energy present. Never rely solely on pressure or other gauges as these may be defective and not give a true reading or indication. indication.

- SHIFT OR JOB CHANGE UNDER LOCKOUT PROCEDURE
  When work cannot be completed within the same shift, or the worker is reassigned to another task, the task requiring lockout will remain locked out by following the practices below:

  (a) Notify immediate supervisor of status of task being worked on, and safety devices you have attached.

  (b) With immediate supervisor present. remove your locks. tags, etc. - DO NOT RE-ENERGIZE. If gravity. being controlled. do not remove blocking, pins. etc

  (c) Immediate supervisor will apply his departmental locks, tags. etc., and secure them to each energy control device. disconnect, valve etc. that has been secured by your devices.

  (d) Where machine/equipment/process logs are used, note should be made that the job assignment was not completed, and the control devices have been changed over to those of the department.

  (e) Upon assignment of another worker to complete the task, steps (a) through (d) should be followed by the supervisor removing his departmental control devices and worker applying his personal control devices as applicable.

  (f) When the changeover has been completed, this should be noted in the appropriate machine/ equipment/process log.

- <u>REMOVAL OF LOCKOUT</u>
  Before removing lockout at the completion of a job assignment, certain steps must be followed before restoring energy to the machine/equipment/process. Such as:

  - Readying the work area
  - Readying the personnel
  - Readying the operation

- READYING THE WORK AREA
  At the completion of the maintenance/repair task, check the work area for tools/machine parts etc, that may have been left where they could interfere with the proper operation of the machine/equipment/process, or present a hazard to personnel.

  Replace safety guards/devices where these were removed to perform the task.

- READYING THE PERSONNEL
  Check work area for any personnel who may be in hazardous locations, and remove them from the area. Inform operator, and all other personnel in the affected area of the intent to re-energize the machine/equipment/process.

- READYING THE OPERATION
  After checking the work area as indicated above, check that all operating controls are in the OFF position. If blocking/pinning was used, and energy is NOT required to remove the same, remove blocking and pinning. Remove your lockout devices, except for the DO NOT START tag at the operator's control console/panel/station. Restore energy to the machine/equipment/process as appropriate.

  As required, contact qualified person (operator etc.) to perform machine specific start-up procedure(s).

  Verify your repairs/task by observing operation through one cycle. Replace any remaining safety guards/devices BEFORE removing the DO NOT START or similar tag from the operator's control console/panel/station.

  Notify operator that task has been completed and that machine/equipment/process has been returned to his control.

ONE HOUR LOCKOUT TAGOUT MODULE

We thank you for your interest in teaching the fundamentals of Lockout Tagout to your employees and promoting self-sufficiency on behalf of the Division of Safety & Hygiene.

A few points to keep in mind while teaching this class to your employees:

- You initially want to review your company's policy clarifying who is responsible to offer the training and who is to receive it.
- You should already have your company's written plan in hand. *If you do not have one, refer to the examples in the Lockout Tagout manual.*

Now it is time for some *critical thinking*.

You want to impress upon your employees a systematic approach to the process of locking and tagging out a piece of equipment.

Enforce the idea of a step by step process that has an **unchangeable** order.

You should use a specific piece of equipment in your company and have an experienced operator assist you with a demonstration if possible.

We have provided you with:

- a disk and copy material to produce transparencies;
- some instructor notes to get you started;
- handouts that you will need.

Therefore you have a variety of ways to present this training.

Remember that you're here to teach your employees to be safe. By training them to recognize the importance of these procedures you can reinforce the main goal:

Prevention of the accident and all the associated pain and grief that is involved.

One Hour Safety Presentation

The main goal of the Division of Safety & Hygiene is the reduction of accidents and illnesses in the workplace. Toward this goal, the *One Hour Safety Presentation* is designed to support the delivery of a presentation to co-workers in your workplace to help them understand and promote safer and healthier work environments. It is recommended that you take the DSH Training Center course as a background for using *One Hour Safety Presentation* to train others at your workplace. Call 1-800-OHIOBWC, option 2, 2, 2 for class dates and locations.

The *One Hour Safety Presentation* contains:

- **Transparency Masters** from which films can be made to use on an overhead projector,
- **Instructor Notes** which gives the instructor suggestions and script notations to use during the presentation, and
- **Student Handouts** which can be copied for those attending the presentation.

Materials are included for a one-hour presentation on each of these topics:

- ✓ Accident Analysis
- ✓ Bloodborne Pathogens
- ✓ Developing an Ergonomics Process
- ✓ Hazard Communication
- ✓ Lockout/Tagout
- ✓ Respiratory Protection
- ✓ Violence in the Workplace

Applications used:

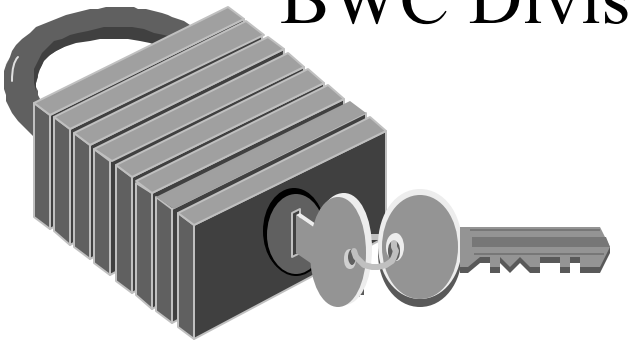
1) Text documents (ending in **.txt**) can be opened with any word processing program.
2) Microsoft PowerPoint slides (ending in **.ppt**) can be opened with the Microsoft PowerPoint program. If you do not have PowerPoint and you do have Windows 95, 98, 2000 or Windows NT operating system, you can view the PowerPoint slides by downloading a free PowerPoint Viewer from the following website: http://office.microsoft.com/downloads/default.aspx?Product=PowerPoint&Version=95|97|98|2000|2002&Type=Converter|Viewer
3) Adobe Reader document (ending in **.pdf**) contains the *One Hour Safety Presentation* in read-only format. It can be opened when you download Adobe Reader, which is available free of charge at the following website: http://www.adobe.com/products/acrobat/readstep2.html

If you have comments or questions about these materials for *One Hour Safety Presentation*, please e-mail us: OCOSHTrng@bwc.state.oh.us

Transparency Masters

Elements of a Lockout/Tagout Program

BWC Division of Safety & Hygiene



Lockout Devices

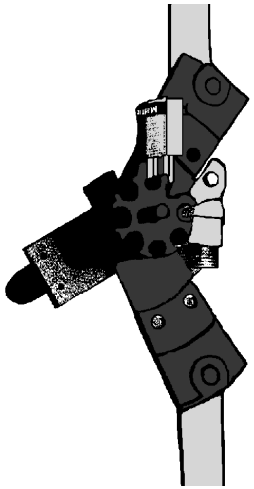
- Standardize All Locks and Tags.
- Identify The User.
- Must Be Durable.
- Used Only For Lockout/Tagout.

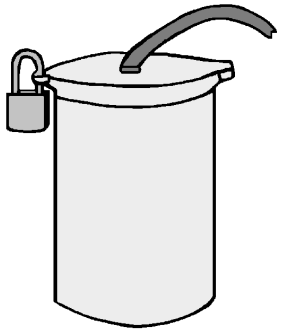
Identify Different Personnel

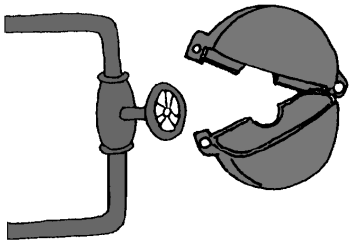
- Authorized
- Affected
- Other

Training Of Authorized Employees

- Types of Energy
- Magnitude Of Energy Sources
- Locations & How to Lockout Energy Sources
- Types of Devices to Be Used







List & Identify all Sources Of Energy

- Electrical
- Hydraulic
- Pneumatic
- Thermal
- Chemical
- Mechanical
- Cord & Plug Equip.
- Other Types

Safe Procedures for Energy Control Program

- Steps for Shutting down all energy sources
- Steps for Placement, Removal & Transfer Of LO/TO Devices
- Steps for testing to verify LO/TO
- Enforcement Policy

Procedures For Each Piece Of Equipment

- Written procedures must be documented for each piece of equipment
- If machinery or pieces of equipment are similar, just one procedure will cover all like pieces

Lockout / Tagout
Energy Source Identification

Machine: Compressor **Date:** 12 - 30 - 97
Location: Auto Shop **Dept.:** Maintenance
Person Identifying Sources: John Doe, Maintenance Supervisor

Type Of Energy	Yes	No	Method, Device or System Selected to De-energize. Quantity of Energy Source (i.e. Voltage, Velocity, PSI, etc.
Electrical	X		Close disconnect on wall behind unit & lockout. Check with tester. 480 Volts.
Hydraulic	X		Close valve on left end. Open pressure release valve below it. Allow pressure to escape(15 minutes). 150 PSI Lockout
Pneumatic (Air)	X		Shut valve on right end and open bleeder valve, lockout, wait 15 minutes for pressure to bleed down. 300 PSI
Chemical		X	
Thermal		X	
Mechanical		X	
Cord & Plug Connected		X	
Engulfment Hazard		X	
Other		X	

Training Affected & Other Employees

- Purpose Of The Energy Control Program.
- Types & How to Identify Lockout Devices
- To Understand That They Should Not Tamper With Any Devices Used In Lockout/Tagout Procedures

Shift & Personnel Changes

- How to transfer locks at the end of shifts
- How to transfer locks when personnel leave

Develop Procedures On How You Will Communicate With Contractors On LO/TO

- Who
- What
- When
- Where
- How

Group Lockout Procedures

Procedures on how you will handle more than one individual working on the same piece of equipment

Miscellaneous Items in Your Program

- Procedures for removal of a lock when that person is not present
- Notifying affected employees when locks are to be applied or removed

Annual Inspection of Your Procedures

- Date of Inspection.
- Machine or Process to review Identified.
- Names of persons involved in LO/TO.
- Name of person doing Inspection.
- Copy of Inspection kept on record.

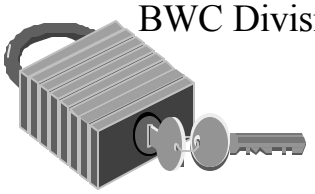
Other Things To Consider

- When do You Retrain Personnel?
- What must you do when you identify problems?
- When do you have to make changes to your written procedures?

Instructor Notes

Elements of a Lockout/Tagout Program

BWC Division of Safety & Hygiene



Initial dialogue to class:

The purpose and scope of this class can best be explained by reading the OSHA regulations (Standards - 29 CFR) Lockout and tagging of circuits - 1926.417 and Electrical - Safety Related Work Practices 1910.331.

I urge you to at least read through these to better understand the value of this training that we are having today.

This training will be about the equipment we use at our company, therefore we will use specific equipment that you use everyday.

I encourage your input and will ask you to participate so I know you understand our company policy along with what we are obligated to comply with in order to have a safe work environment.

In a few moments I will need a volunteer to work through a specific example of what we are about to learn.

(Offer some sort of give-away/ prize to the volunteer *after* they volunteer. This will help you get participation next time you teach a class).

Lockout Devices

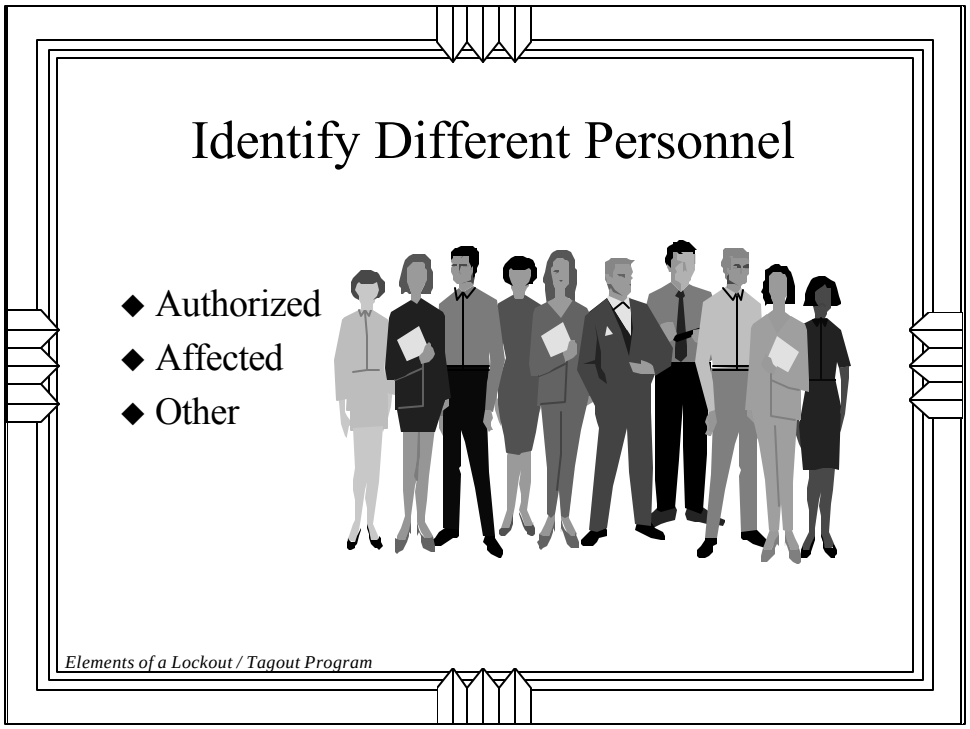
- Standardize All Locks and Tags
- Identify The User
- Must Be Durable
- Used Only For Lockout/Tagout

Elements of a Lockout / Tagout Program

This would be a good time to pass around the specific devices that you use at your company.

Emphasizing the identity of the user, point out the fact of who should have the keys to these locks.

A tag by itself should have a pull strength of 50 lbs.



Authorized:

The person who is trained and responsible for these locks

Who might these folks be?

Maintenance person

Set-up person

Affected:

Who ?

Anyone

Other:

Who?

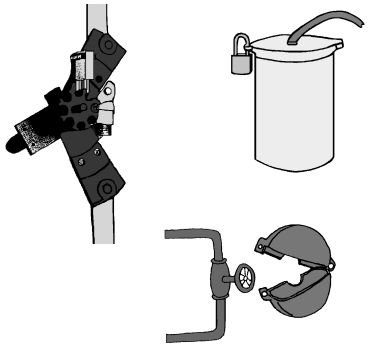
Customer

Vendor

You can refer to the frequently asked question section if you need more information.

Training Of Authorized Employees

- Types of Energy.
- Magnitude Of Energy Sources
- Locations & How to Lockout Energy Sources
- Types of Devices to Be Used



Elements of a Lockout / Tagout Program

Types of energy:

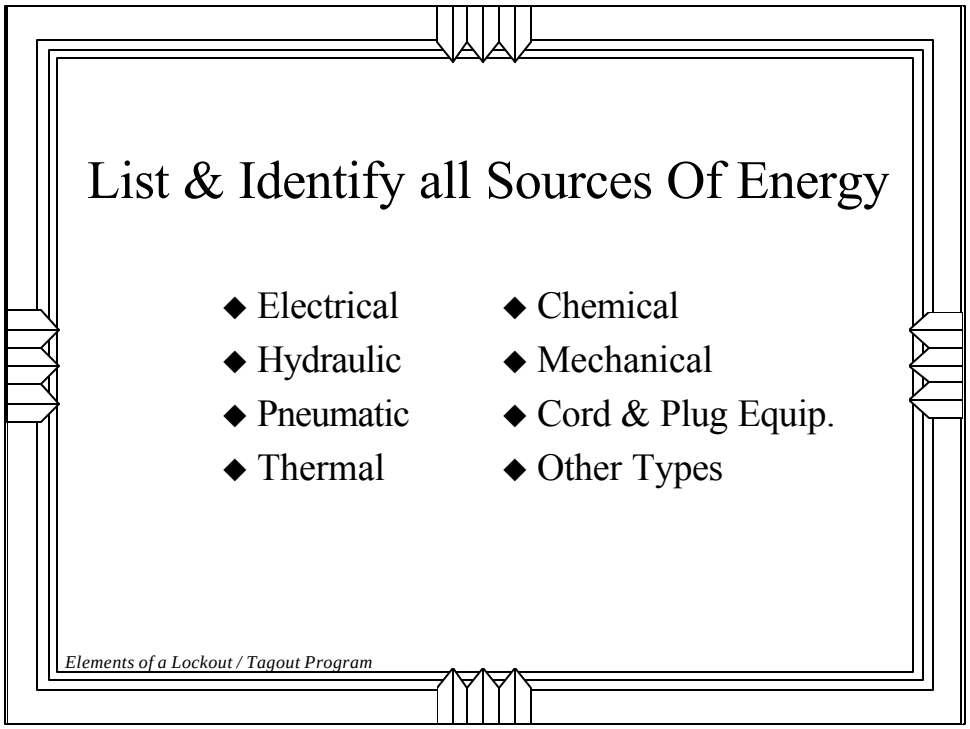
They have to be trained to know all forms of energy that can have an effect on the particular piece of equipment. (on next slide)

All Locations.

Remote sources that include control panels located in a different location other than the piece of equipment itself.

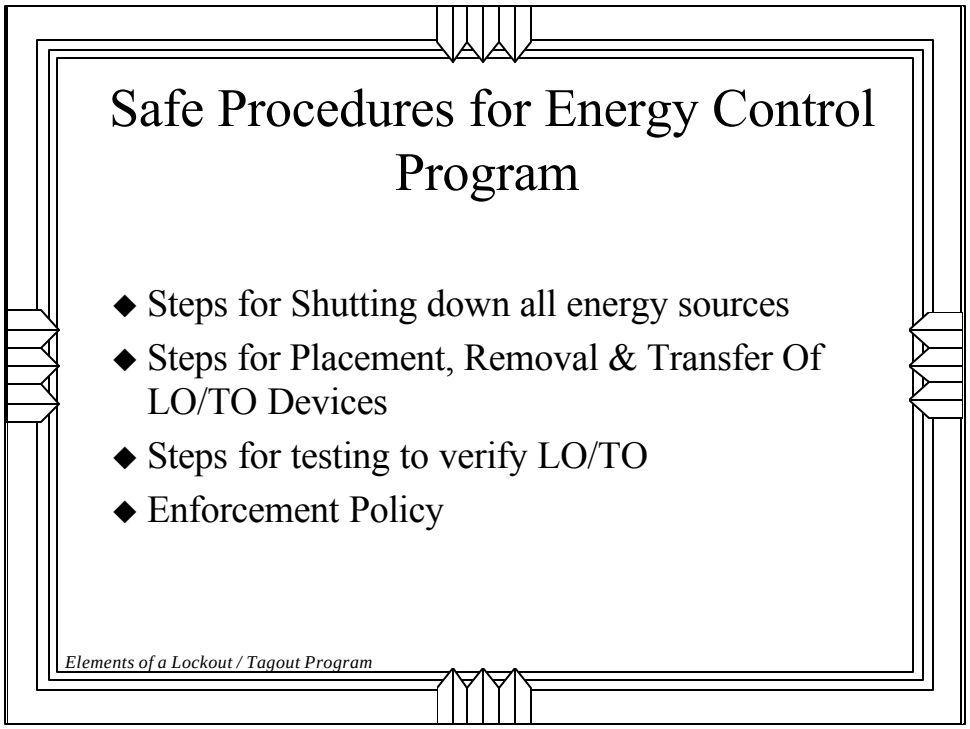
Ask yourself: “Can this be reset from any other location?”

Show the specific lock that is used for the example piece of equipment that you are discussing.



Ask what other sources might have an effect

Gravity ?



Utilize the site specific equipment procedure as an example of this process.

Mention your disciplinary action or means of accountability.

Procedures For Each Piece Of Equipment

- Written procedures must be documented for each piece of equipment
- If machinery or pieces of equipment are similar, just one procedure will cover all like pieces

Elements of a Lockout / Tagout Program

Involve the operator of the equipment

Lockout / Tagout
Energy Source Identification

Machine: Compressor **Date:** 12 - 30 - 97
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Person Identifying Sources: John Doe, Maintenance Supervisor

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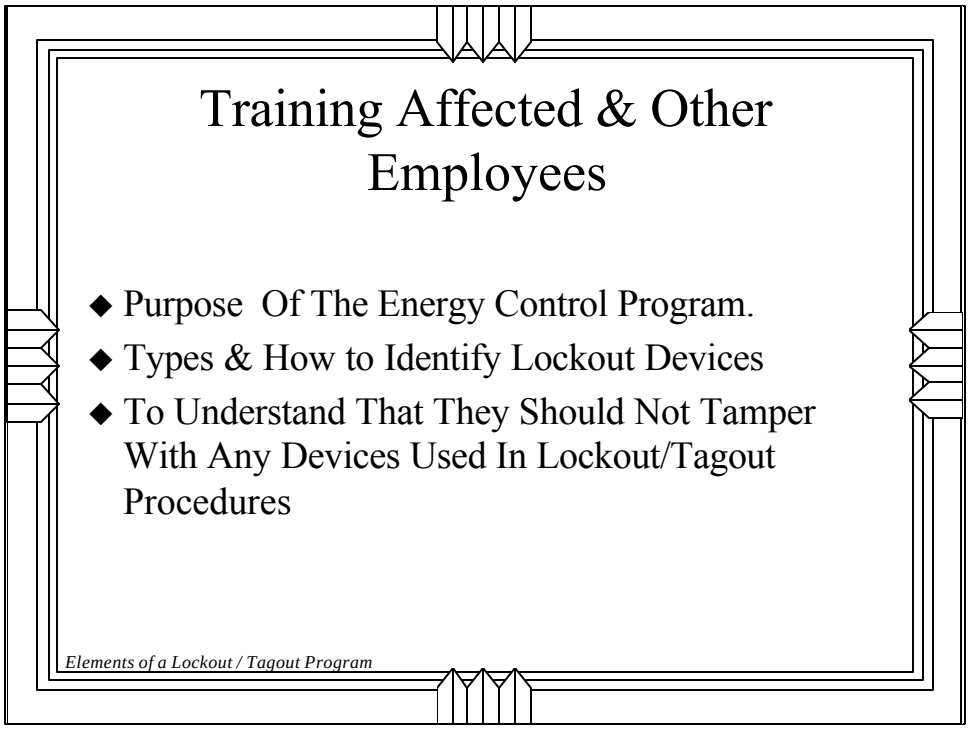
Chemical		X	
Thermal		X	
Mechanical		X	
Cord & Plug Connected		X	
Engulfment Hazard		X	
Other		X	

Elements of a Lockout / Tagout Program

You can use this as a possible handout.



Authorized personnel should be ready to explain any of these above items.

Review who is suppose to remove the locks and how it is done.

Shift & Personnel Changes

- How to transfer locks at the end of shifts.
- How to transfer locks when personnel leave.

Elements of a Lockout / Tagout Program

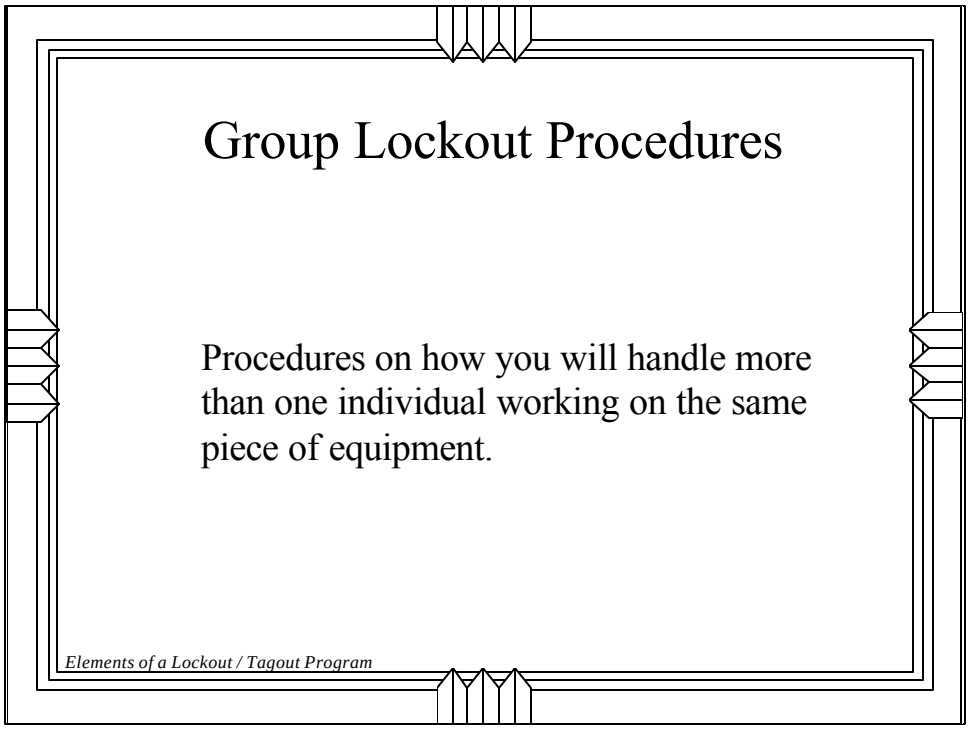
Explain your process of changing the locks upon completion of a shift and or the transfer of responsibility.

Is there transfer of responsibility ?

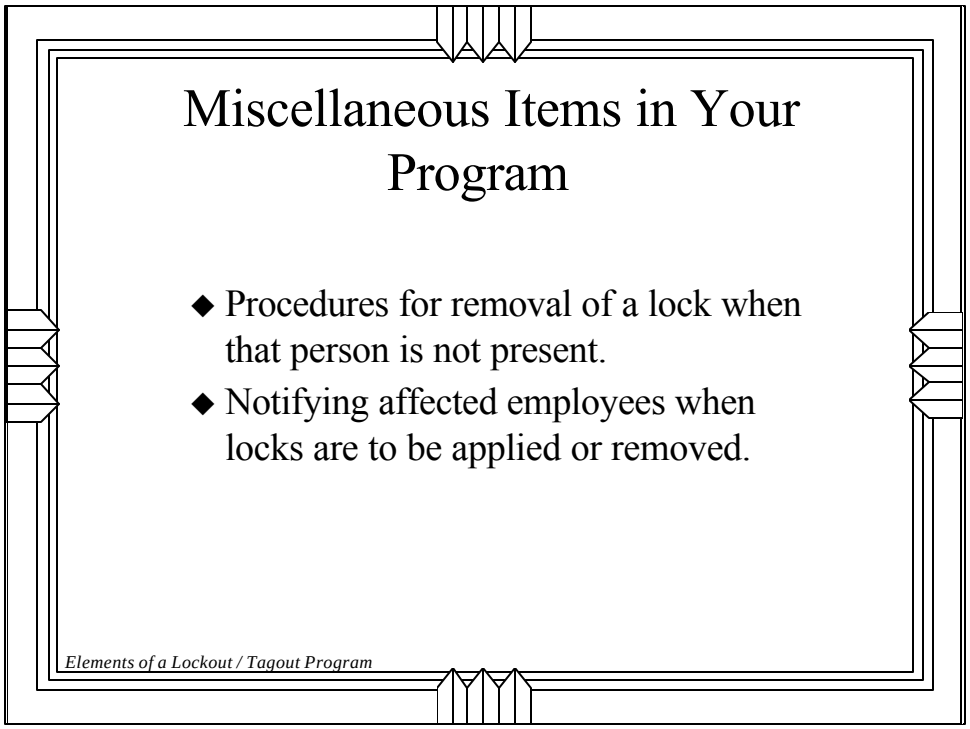
Develop Procedures on how you will Communicate with Contractors on LO/TO.

- Who
- What
- When
- Where
- How

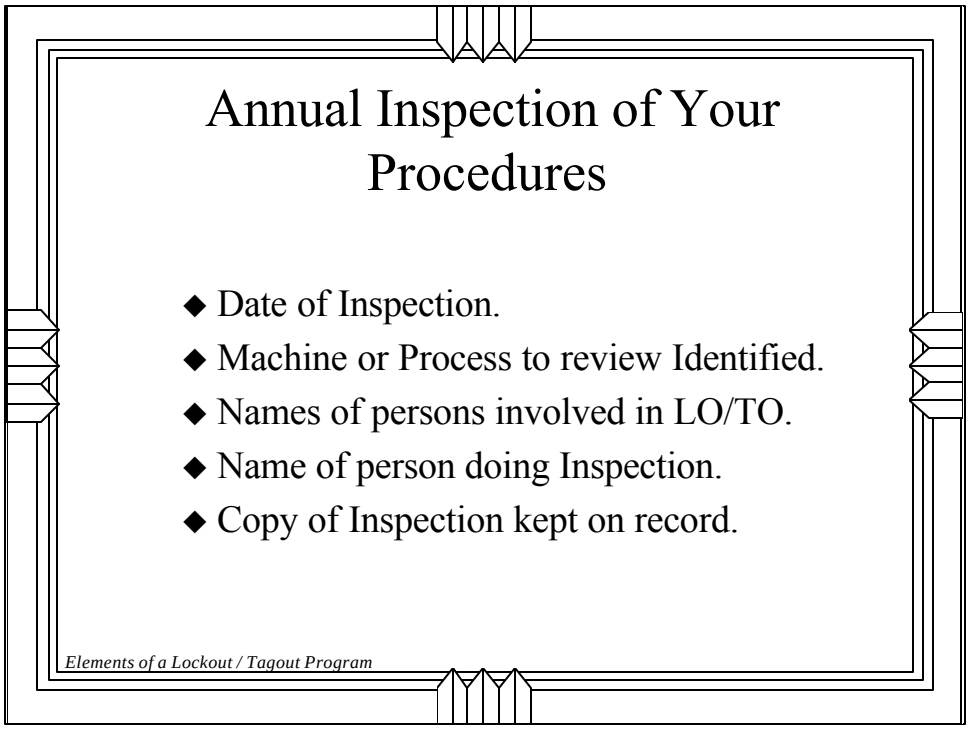
Elements of a Lockout / Tagout Program



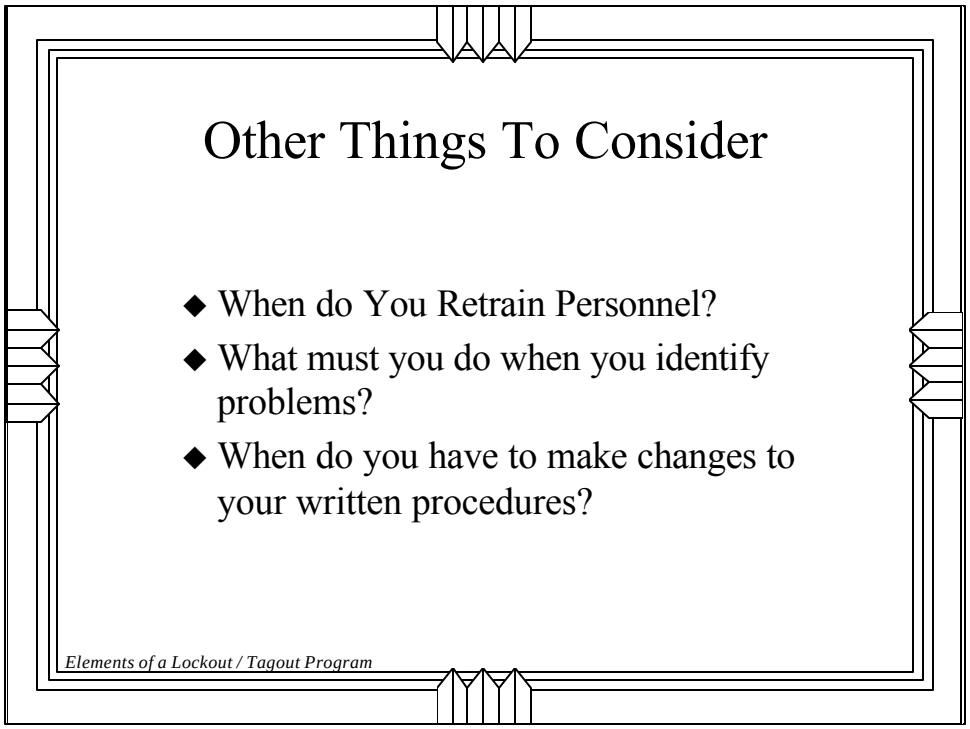
Your Company policy



Your Company policy.



You should use a person to inspect the equipment that is not involved in the Lockout Tagout program of the equipment.



Any time a modification to a piece of equipment is made.

Any time the process has been changed.

Frequently Asked Questions

The standard requires different levels of training for the three categories of employees; what are the differences in the training required for the three categories?

- Authorized employees must receive training on the recognition of applicable hazardous energy sources, the type and magnitude of the energy available in the workplace, and the methods and means necessary for energy isolation and control.
- Affected employees must receive training on the purpose and use of the energy control procedure.
- Other employees (those whose work activities are or may be in an area where energy control procedures may be utilized) must be instructed about the procedure and about the prohibition relating to attempts to restart or reenergize machines or equipment that are locked out or tagged out.

How often must the inspection take place?

At least annually.

Who performs the periodic inspection?

An authorized employee not involved in the energy control procedure being inspected.

What does the periodic inspection entail?

- The employer must identify any deficiencies or deviations and correct them.
  Where lockout is used, the inspector must review each authorized employee's responsibilities under the procedure with that employee (group meetings are acceptable).
- Where tagout is used, the inspector must review **both** the authorized and affected employee's responsibilities with those employees for the energy control procedure being inspected, and the additional training responsibilities of 1910.147(c)(7)(ii).
- The employer must certify that the periodic inspections have been performed.

What must the certification identify?

- Identify machine on which the procedure was utilized.
- Date of inspection.
- Identify the employees included in inspection.
- Identify person who performed the inspection.

If an energy isolating device is not capable of being locked out, can the employer use a tagout system?

Yes, if an energy isolating device is not capable of being locked out, the employer's energy control program must use a tagout system.

If an energy isolating device is capable of being locked out, must the employer use a lock out system?

Yes. Unless the employer can demonstrate that the tagout system will provide full employee protection, as described in paragraph (c)(3) of the standard.

(The employer may choose to use a tagout system as long as the requirements for additional training and periodic inspections are met.)

What procedures must be followed that, when a group is performing servicing and/or maintenance, will offer group employees the same protection that the standard provides to individual employees?

- Protection must be utilized which affords the employees a level of protection equivalent to that provided by the implementation of a personal lockout or tagout device.
- Primary responsibility for a set number of employees working under the protection of a group lockout or tagout device must be vested in a single authorized employee.
- The single authorized employee must determine the exposure status of individual group members.
- If there will be more than one crew, department, or group involved in the activity, a single authorized employee must be designated to coordinate affected workforces and to ensure continuity of protection.
- Each authorized employee must affix a personal lockout or tagout device to the machine or equipment when work begins and remove it when work is completed.

Glossary

Affected employee - An employee who performs the duties of his or her job in an area in which the energy control procedure is implemented and servicing or maintenance operations are performed. An authorized employee and an affected employee may be the same person when the affected employee's duties also involve performing maintenance or service on a machine or equipment that must be locked or a tagout system implemented. An effected employee does not perform servicing or maintenance on machines or equipment and, consequently, is not responsible for implementing the energy control procedure. An affected employee becomes an "authorized" employee whenever he or she performs servicing or maintenance functions on machines or equipment that must be locked or tagged.

Authorized employee - An employee who performs servicing or maintenance on machines and equipment. Lockout or tagout is used by these employees for their self-protection.

Capable of being locked out - An energy-isolating device is considered capable of being locked out if it meets one of the following requirements:

- It is designed with a hasp to which a lock can be attached;

- It is designed with any other integral part through which a lock can be affixed;
- It has a locking mechanism built into it; or
- It can be locked without dismantling, rebuilding, or replacing the energy isolating device or permanently altering its energy control capability.

Energized - Machines and equipment are energized when (1) they are connected to an energy source or (2) they contain residual or stored energy.

Energy-isolating device - Any mechanical device that physically prevents the transmission or release of energy. These include, but are not limited to, manually operated electrical circuit breakers, disconnect switches, line valves, and blocks.

Energy source - Any source of electrical, mechanical, hydraulic, pneumatic, chemical, thermal, or other energy.

Energy control procedure - A written document that contains those items of information an authorized employee needs to know in order to safely control hazardous energy during servicing or maintenance of machines or equipment. (A more comprehensive explanation is provided elsewhere in this booklet.)

Energy control program - A program intended to prevent the unexpected energizing or the release of stored energy in machines or equipment. The program consists of energy control procedure(s), an employee-training program, and periodic inspections.

Lockout - The placement of a lockout device on an energy-isolating device, in accordance with an established procedure, ensuring that the energy-isolating device and the equipment being controlled cannot be operated until the lockout device is removed.

Lockout device - Any device that uses positive means such as a lock, either key or combination type, to hold an energy-isolating device in a safe position, thereby preventing the energizing of machinery or equipment. When properly installed, a blank flange or bolted slip blind are considered equivalent to lockout devices.

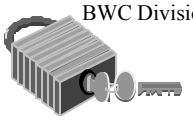
Tagout - The placement of a tagout device on energy-isolating device, in accordance with an established procedure, to indicate that the energy-isolating device and the equipment being controlled may <u>not</u> be operated until the tagout device is removed.

Tagout device - Any prominent warning device, such as tag and a means of attachment, that can be securely fastened to an energy-isolating device in accordance with an established procedure. The tag indicates that the machine or equipment to which it is attached is not to be operated until the tagout device is removed in accordance with the energy control procedure.

Student Handouts

Elements of a Lockout/Tagout Program

BWC Division of Safety & Hygiene



Lockout Devices

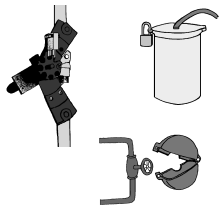
- Standardize All Locks and Tags.
- Identify The User.
- Must Be Durable.
- Used Only For Lockout/Tagout.

Identify Different Personnel

- Authorized
- Affected
- Other

Training Of Authorized Employees.

- Types of Energy.
- Magnitude Of Energy Sources
- Locations & How to Lockout Energy Sources.
- Types of Devices to Be Used.



List & Identify all Sources Of Energy

- Electrical
- Hydraulic
- Pneumatic
- Thermal
- Chemical
- Mechanical
- Cord & Plug Equip.
- Other Types

Safe Procedures for Energy Control Program

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Other Things To Consider

- When do You Retrain Personnel?
- What must you do when you identify problems?
- When do you have to make changes to your written procedures?

Resources Available from the Division of Safety & Hygiene (DSH) Libraries

(800) 644-6292 (614) 466-7388
library@bwc.state.oh.us
www.ohiobwc.com

Safety training:

- Safety talks, outlines and scripts - DSH Safety leader's discussion guide, Training Center's One-hour safety presentations, reference books, web resources
- Videos – hundreds of safety and health topics
- Books and articles on training techniques

Machine and equipment safety:

- Safety standards (ANSI, NFPA, CGA)
- Books and articles on power presses, material handling equipment, lockout/tagout, etc.

Sample written programs:

- DSH program profiles and sample written programs
- Reference books
- Internet resources

Illness and injury statistics:

- Statistics from the U.S. Bureau of Labor Statistics
- National Safety Council's *Injury Facts*
- National Institute of Occupational Safety & Health (NIOSH) studies

Hazard communication and chemical safety:

- Chemical safety information
- Material safety data sheets (MSDSs)
- Sample written programs
- Videos
- Internet resources

Safety standards

- American National Standards Institute (ANSI) standards (including standards for construction, machinery and equipment, personal protective equipment)
- National Fire Protection Association (NFPA) fire codes (including the Life Safety Code and the National Electrical Code)
- Compressed Gas Association (CGA) standards

Other topics of interest (books, articles, magazines, videos and standards):

- Confined spaces
- Electrical safety
- Job safety analysis
- New employee orientation
- Powered industrial trucks
- Respiratory protection
- Safety culture
- Scaffolds

Directories and lists of vendors of safety equipment

Occupational Safety & Health Administration (OSHA) regulations

Manual of Uniform Traffic Control Devices (MUTCD)

Recommendations of useful Internet sites

BWC publications

Additional Resources for Lockout/Tagout

All of these materials are available through the BWC Division of Safety & Hygiene Libraries. Call 800-644-6292 or e-mail library@bwc.state.oh.us.

Books:

- Grund, Edward V., *Lockout/Tagout: The Process of Controlling Hazardous Energy*. National Safety Council, 1995.
- Kelley, Stephen M., *Lockout/Tagout: A Practical Approach*. American Society of Safety Engineers, 2001.

Standards:

ANSI/ASSE Z244.1-2003, *Control of Hazardous Energy—Lockout/Tagout and Alternative Methods*. American Society of Safety Engineers/American National Standards Institute.

Articles:

- Armantrout, Josh, "Modern Methods." *Occupational Health & Safety*, Oct. 2000, 209-212.
- Campbell, Thomas, "LOTO Remains Problematic: Employee Training, Written Procedures Key." *Professional Safety*, March 2003, 48-51.
- Ford, John, "Answers for LOTO Dilemmas." *Occupational Health & Safety*, March 2003, 93-94.
- Kelley, Stephen M., "High-Performance Lockout/Tagout." *Occupational Hazards*, Jan. 2000, 59-61.
- Lippert, Berta and Robert E. Brown, Jr., "A Ten Step LOTO Program." *Occupational Health & Safety*, March 2004, 94-105.
- Mutawe, Abdalla, et al., "OSHA's Lockout/Tagout Standards: A Review of Key Requirements." *Professional Safety*, Feb. 2002, 20-24.

Web Site:

OSHA's lockout/tagout page: http://www.osha.gov/SLTC/controlhazardousenergy/index.html

Videos:

- *Lockout Tagout: Controlling the Beast*. 1998, 20 minutes, No. 670041.
- *Lockout Tagout Compliance*. 1999, 13 minutes, No. 670033.
- *Lockout Tragedy*. 2001, 16 minutes, No. 670049.
- *Lockout/Tagout: When Everyone Knows*. 2002, 7 minutes, 670044.
- *Lockout/Tagout Awareness*. 1998, 10 minutes, No. 670034.

Saving You Time and Research

Requests for copies of OSHA standards, information on starting a safety committee, a video on accident investigation techniques -- these are some of the thousands of inquiries BWC's Division of Safety & Hygiene (DSH) libraries receive each year.

DSH has two libraries to serve you:

- The central library in the William Green Building in downtown Columbus;
- The resource center and video library located at the Ohio Center for Occupational Safety and Health (OCOSH) in Pickerington.

Both libraries are open 8 a.m. to 4:45 p.m., Monday through Friday. Your need for information does not require a visit to the library. You can phone, fax, or e-mail your requests and receive a quick response.

The central library provides free information services on the topics of occupational safety and health, workers' compensation and rehabilitation.

The OCOSH resource center provides similar services for those who visit OCOSH for meetings and training center classes.

The video library offers an extensive collection of videotapes to supplement your organization's safety and health training program. It is a convenient and popular source for Ohio employers to borrow quality occupational safety- and health-related training aids.

Visit our Web site at **www.ohiobwc.com.**

Central library
30 W. Spring St., Third Floor
Columbus OH 43215-2256
1-800-OHIOBWC
(614) 466-7388
(614) 644-9634 (fax)
library@bwc.state.oh.us

OCOSH resource center
13430 Yarmouth Drive
Pickerington OH 43147
1-800-OHIOBWC
Resource center (614) 728-6464
Video library (614) 644-0018

INTERNET WEB SITES
FOR
OCCUPATIONAL SAFETY & HEALTH INFORMATION
April 2005

GENERAL

NATIONAL SAFETY COUNCIL (NSC)
http://www.nsc.org/

The NSC has a user friendly web site for innovative and current information on home, farm and community, on the road and workplace safety and as well statistical data and charts.

NORTH DAKOTA WORKFORCE SAFETY & INSURANCE
http://www.workforcesafety.com/

For workplace safety, North Dakota's WSI site puts forth their "safe operating procedures" page where they give information on accident and near miss reports, substance abuse, material handling and storage, walking and working surfaces, and safety program development and orientation.

OCCUPATIONAL & INDUSTRIAL SAFETY RESOURCES
http://www.khake.com/page59.html

Maintained by a Vocational Information Center, this web site provides links to occupational and industrial safety with lists of directories, national centers, hotlines and help lines as well as specific area coverage such as emergency, disaster and natural hazards, and tool, machine and equipment safety options.

OKLAHOMA STATE UNIVERSITY
http://www.pp.okstate.edu/ehs/

The Department of Environmental Health & Safety at OSU offers an online safety resource library that is constantly being updated with topics from A-Z including specific areas of safety such as fire, construction, HAZCOM and training. Go to the "Links Library" option.

SAFETY DIRECTORY
http://www.safetydirectory.com/

Safety Directory.com is an Internet gateway to occupational health & safety sites. This web site is indexed with information on industry specific topics, training, illness and injury, as well as safety publications and resources.

FEDERAL GOVERNMENT

CENTERS FOR DISEASE CONTROL & PREVENTION (CDC)
http://www.cdc.gov/

The CDC is always a good resource for current medical issues throughout the United States. Health topics from A-Z give an in-depth look at most communicable diseases as well as topics such as safe driving, violence, and air pollution, and workplace safety and health topics.

FEDERAL EMERGENCY MANAGEMENT ASSOCIATION (FEMA)
http://www.fema.gov/

For up-to-date information on active disasters and emergencies nationwide access this web site first. Publications include options for emergency preparedness and prevention, response and recovery, disaster fact sheets, and public awareness information.

NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY & HEALTH (NIOSH)
http://www.cdc.gov/niosh/homepage.html

NIOSH's web site provides current information on many services as well as safety research, including ergonomics programs, respirators, and mining safety. At the chemical page you will find databases and other helpful resources, information on personal protective equipment, as well as government agency web sites of interest.

OCCUPATIONAL SAFETY & HEALTH ADMINISTRATION (OSHA)
http://www.osha.gov

OSHA'S official web site includes media releases, online publications, statistics, standards & directives, "Technical Links," training center courses, "hot topics," and "what's new" as well a very useful A-Z index page.

INTERNATIONAL RESOURCES

HEALTH & SAFETY EXECUTIVE (HSE)
http://www.hse.gov.uk/

The United Kingdom has an international safety web site with a good deal to offer on occupational safety & health. Drop down boxes offer A-Z industry information, health and safety topics, tools, research, as well as publications and statistics.

ERGNET
http://www.sunderland.ac.uk/~ts0gli/ergnet.htm

The University of Sunderland in the UK is an international web site directory of "places for ergonomics and human factors". Featuring lists of sources such as societies, organizations, government bodies, institutes, centers and laboratories, this site also gives links to journals, a research database and other general ergonomic sites.

OHIO

OHIO EPA (OEPA)

http://www.epa.state.oh.us

At the official web site for Ohio's Environmental Protection Agency; use the "Topic Index" to find regulations and information on permits, hazardous waste, pollution prevention, wastewater, wetlands, and much more.

OHIO STATE LIBRARY/OHIOLINK
http://winslo.state.oh.us

At **OhioLink**, a statewide library and information network, you can search the State Library of Ohio's collection for the BWC's Division of Safety & Hygiene library books as well as other Ohio College and university library collections. Also available at this web site are searchable versions of Ohio Administrative laws and rules, electronic databases, and other Ohio library directories.

SPECIFIC (BY SUBJECT)

CONSTRUCTION
http://www.cdc.gov/elcosh/index.html

CDC's **eLCOSH** is a comprehensive library of construction-related safety information presented in both English and Spanish with items listed under trade, hazard, job site, and others. Also see: The Construction Industry Safety Council, a Center to Protect Workers' Rights resource center at ***http://www.buildsafe.org/RSC.htm*** for OSHA publications in PDF and hazard alerts.

ERGONOMICS
http://www.ergoweb.com

ERGOWEB provides current information on ergonomics and human factor science. Offered are: research, case studies, reference material and a forum for questions, answers and discussion.

LABORATORY SAFETY
http://safety.science.tamu.edu/

Texas A&M University College of Science is an optional choice for safety in the laboratory information. From hazard identification to waste disposal this web site offers thorough coverage of laboratory safe practices.

MATERIAL SAFETY SHEETS
http://www.ilpi.com/msds/index.html

This web site offers many solutions for finding MSDS (100 free sites) as well as chemical manufacturers and suppliers, pesticides including fertilizers, government sites, and other miscellaneous locations for chemical data. Also check any toxicological effects at *http://www.atsdr.cdc.gov/toxprofiles/* and health and safety information on household chemical ingredients at *http://householdproducts.nlm.nih.gov/*.

MOTOR CARRIER SAFETY PROGRAMS

http://www.fmcsa.dot.gov/safetyprogs/saftprogs.htm

The Federal Motor Carrier Safety Administration (FMCSA), an administration within the U.S. Department of Transportation, regulates and supports the Nation's interstate commercial carrier industry. The FMCSA web page offers several safety programs in PDF format such as brake safety, fatigue, HAZMAT safety, speed management, sharing the road safely, and other insurance and licensing information.

RADIATION
http://www.physics.isu.edu/radinf/

The Radiation Information Network offers a web site that is in-depth with information on radiation topics and issues. In addition to what's new in the field and general information there are regulatory, organizational and society links as well as research and educational resources available to access.

SAFETY STATISTICS
http://stats.bls.gov/

Occupational health and safety statistics by industry and occupation can be researched for injuries, illnesses, and fatality data at this web site starting with the "Overview of BLS Statistics on Worker Safety and Health" page.

SAFETY BRIEFINGS, MANUALS, PRODUCTS & PROGRAMS

OSHA POWERPOINT SAFETY PRESENTATIONS
http://esf.uvm.edu/sirippt/powerpt.html

An extensive safety PowerPoint presentation library is available at this web site featuring A-Z topics such as accident investigations, bomb threats, chemical spills, construction, electrical, hand tools, emergency response, fire safety, forklifts, JSA, laser, OSHA compliance, PPE, razor knife safety, safe lifting, and many more.

SAFETY PUBLICATIONS & VIDEO RESOURCES
http://www.cbs.state.or.us/external/osha/standards/pub.htm

A valuable resource for safety resources, the Oregon State's Department of Consumer and Business Publications web site is packed with downloadable information. Areas covered are agriculture, asbestos abatement, occupational exposures, HAZCOM, HAZMAT, HAZWOPER, safety practices, writing manuals and programs, tools of the trade, workers' compensation and ergonomics.