Note to Reviewer

1218-0150 – Standard on the Control of Hazardous Energy (Lockout/Tagout) (29 CFR 1910.147)

TERMS OF CLEARANCE:

This information collection request is approved. OMB requests that OSHA continue to work with industry to assist in the development of practical compliance strategy that ensure worker safety while minimizing unnecessary burden on employers. OMB will continue to monitor the implementation of this collection and OSHA should report to OMB on its efforts to minimize burden prior to the next submission of this collection for OMB review.

OSHA's RESPONSE:

OSHA has recently completed an OSHA Instruction (CPL 02-00-147) (see attached excerpts containing paperwork) regarding enforcement policy for its Standards that regulate the control of hazardous energy. The document provides employers with clear information on the Agency's interpretation of the various hazardous energy control Standards, including §1910.147, and how to meet the requirements, including the paperwork provisions of the Standard. Consequently, this instruction may reduce employer's time in determining how to comply with the Standard and the associated paperwork provisions.

Attachment

OSHA INSTRUCTION

U.S. DEPARTMENT OF LABOR — Occupational Safety and Health Administration

DIRECTIVE NUMBER: CPL 02-00-147	EFFECTIVE DATE: 2/11/08

SUBJECT: The Control of Hazardous Energy – Enforcement Policy and Inspection Procedures

ABSTRACT

Purpose: This directive (manual) establishes OSHA's enforcement policy for its standards addressing the control of hazardous energy. It instructs OSHA enforcement personnel on both the agency's interpretations of those standards, and on the procedures for enforcing them. The application of this instruction will further OSHA's goal of uniform enforcement of these standards. However, OSHA personnel should exercise professional judgment consistent with their authority as appropriate when particular circumstances necessitate a deviation from the guidance provided in the instruction in order to effectuate the purposes of the Occupational Safety and Health Act (OSH Act), to utilize resources to effectively administer the OSH Act, or to ensure CSHO safety.

This instruction is not a standard, regulation or any other type of substantive rule. No statement in this instruction should be construed to require the regulated community to adopt any practices, means, methods, operations, or processes beyond those which are already required by the OSH Act or standards and regulations promulgated under the OSH Act.

Scope: This instruction applies OSHA-wide.

References:

1. General Industry Standards, 29 CFR Part 1910.

2. Federal Register, Vol. 54, No. 169, September 1, 1989, pages 36644-36696, *Control of Hazardous Energy Sources (Lockout/Tagout), Final Rule, 29 CFR 1910.147*.

3. Federal Register, Vol. 55, No. 183, September 20, 1990, pages 38677-38687, *Control of Hazardous Energy Sources (Lockout/Tagout), Final Rule, Corrections and Technical Amendments, 29 CFR 1910.147*.

4. Federal Register, Vol. 58, No. 59, March 30, 1993, pages 16612-16623, *Control of Hazardous Energy Sources (Lockout/Tagout), Final Rule, Supplemental Statement of Reasons, 29 CFR 1910.147*.

5. Federal Register, Vol. 65, No. 119, June 20, 2000, pages 38302-38304, *Control of Hazardous Energy Sources (Lockout/Tagout), Notice of the Availability of a Lookback Review Pursuant to the Regulatory Flexibility Act and Executive Order 12866*.

Cancellations: OSHA Instruction, STD 01-05-019 [STD 1-7.3], 29 CFR 1910.147, *The Control of Hazardous Energy (Lockout/Tagout) -- Inspection Procedures and Interpretive Guidance*, September 11, 1990.

As part of the directive revision process, OSHA has removed and archived interpretations from its public web-site that no longer reflect current policy and/or are superseded by this OSHA Instruction.

State Impact: This instruction describes a Federal Program change for which State adoption is not required, but is recommended. (See Chapter 1.VII.)

Action Offices: National, Regional, Area, and State Consultation Offices.

Originating Office: Directorate of Enforcement Programs, Office of General Industry Enforcement

Contact: Directorate of Enforcement Programs (202-693-1850)
Office of General Industry Enforcement
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By and Under the Authority of

Edwin G. Foulke, Jr.
Assistant Secretary

Executive Summary

This directive (manual) provides guidance to OSHA personnel concerning the Occupational Safety and Health Administration's (OSHA's) policy, procedures, and technical interpretations regarding the enforcement of the *Control of hazardous energy (lockout/tagout)* standard, 29 CFR §1910.147, and other related standards. OSHA completed a look-back review of its *Control of hazardous energy (lockout/tagout)* standard, 29 CFR §1910.147, pursuant to Section 610 of the Regulatory Flexibility Act and Section 5 of Executive Order 12866. In response to the look-back review's suggestions, OSHA Instruction STD 01-05-019 [STD 1-7.3], *29 CFR 1910.147, The Control of Hazardous Energy (Lockout/Tagout) – Inspection Procedures and Interpretative Guidance* (dated September 11, 1990) has been cancelled and superseded by this instruction. However, due to the magnitude of this review, a phased approach is planned for the revision of this instruction. Many of the changes contained in this revision are described below, and the second phase will include the incorporation of existing letters of interpretation, including frequently asked questions, into the manual.

Significant Changes

This instruction cancels the September 11, 1990 OSHA Instruction, STD 1-7.3. This manual provides enforcement policy and guidance for OSHA personnel performing inspection activity related to the control of hazardous energy. Significant modifications in this instruction include:

- Changes in the instruction format necessitated by the *OSHA Directive System* (ADM 03-00-003);
- Addition of *Compliance Officer Safety* guidelines;
- Inclusion of *Citation Examples* and additional guidance regarding *Affirmative Defenses;*
- Incorporation of compliance assistance flowcharts;
- Inclusion of additional guidance on the minor servicing exception, specific energy control procedures, periodic inspections, and unexpected energization;
- Inclusion of additional information and guidance on *Alternative Methods to Lockout/Tagout (LOTO)*;
- Inclusion of general reference material for information pertinent to hazardous energy control, including governmental, industry and national consensus standards; and
- Addition of vehicle repair and maintenance standards and practices, including relevant Internet links, to assist employers engaged in these activities with hazardous energy control.

C. Energy Control Program. The 29 CFR 1910.147 standard requires an employer to develop an energy control program that is tailored to the workplace and will protect employees performing servicing and maintenance tasks from the release of hazardous energy. The performance-oriented language allows employers flexibility to design and implement the required energy control procedures, employee training requirements, and inspection requirements to fit the individual conditions present in their workplaces. The selection of the specific method of control must reflect a thorough evaluation of the extent of exposure to the hazard; the risk of injury associated with the particular machine/equipment; and the feasibility of applying a particular method of control.

Due to the nature and unique aspects of vehicle maintenance and servicing activities, the control of hazardous energy final rule's preamble recognizes feasible measures to prevent an engine from being started. OSHA references situations, involving vehicles, such as automobiles, buses, and over-the-road trucks, where the removal of the ignition key ensures that the engine can not be started. However, this simple control step of removing the ignition key may not, in all cases, adequately control other types of vehicle hazardous energy, such as is the case with the positioning of the vehicle or its components (e.g., buckets, blades, vehicle body parts). These and other hazards require careful evaluation and selection of additional hazard-specific control measures. See the LOTO standard's Final Rule, 54 Fed. Reg. 36657 (1989), for details.

NOTE: It should be noted that turning off the engine with and removing the car key is not, strictly speaking, the same as applying a lockout or tagout device to an energy isolating device (EID) because neither the ignition switch, nor the key, are EIDs. See §§ 1910.147(b) and (d)(3) for the energy isolating device definition and application of control provisions. Based upon the above preamble discussion, OSHA allows such alternative vehicle control measures in these limited circumstances only when the key removal fully ensures employee protection.

As mentioned, given the unique circumstances associated with vehicle servicing and maintenance, turning off the engine and removing the ignition key may provide a significant degree of protection in many situations in which an employee is performing vehicle repair or maintenance. The authorized employee performing the repair or maintenance would need to retain sole control of the key (assuming the keyed switch is the only means of vehicle start-up). An additional precaution for the employee retaining the key would be to lock the doors. Although this control practice reasonably protects employees from inadvertent startup of the vehicle's engine, it may not adequately control other energy sources that are independent of the ignition key subsystem.

These exclusive control practices, if incorporated into the energy control program, are feasible measures that significantly reduce the risk of exposure to the

hazardous energy associated with the start-up of an internal combustion vehicle engine in situations in which a single individual is performing the servicing and/or maintenance work. However, although turning off the engine and retaining exclusive control of the ignition key may provide significant protection in some instances, there may be circumstances where there are other keys and/or other employees involved in the work activity. In situations such as these or when the work itself may activate the ignition circuit, additional measures are necessary to protect employees from hazardous energy exposures.

For example, employees have been struck by and even run over by vehicles when the technician "shorted out" the ignition circuit, causing the vehicle to unexpectedly move. In another example, potential unexpected start-up hazards exist with older diesel engines because they could be "jump-started" by putting the vehicle in gear (without setting the brakes) and then simply pushing/rocking ("budging") the vehicle enough to start it (with or without the ignition on). Thus, it is very important that the selected control measure(s) effectively protect exposed employees from all types of hazardous energy.

D. Manufacturers' Servicing and Maintenance Guidelines. It is essential for employers to consult with and incorporate specific vehicle manufacturer servicing and maintenance guidelines (e.g., operating manuals and bulletins) and other relevant materials to establish the hazardous energy control procedures. These manuals and materials often provide specific step-by-step instructions on how to safely perform servicing or maintenance tasks. [Refer to Section IX of this chapter for additional guidance regarding the use of generic energy control procedures and supplemental means, such as checklists and manufacturers' guidelines.] For example, the removal of an ignition key is not sufficient to protect employees from devices that may operate or activate independently of the ignition system. Thus, it may be necessary to disconnect the battery cable for some repair tasks, such as working on some cooling fans, which automatically start up even after the key has been removed. Likewise, air bags may inadvertently deploy and cause employee injury if the system is not properly controlled and residual energy dissipated before servicing or maintenance begins.

NOTE: Employers, who meet manufacturers' servicing and maintenance guidelines, may be cited for a §1910.147 violation(s) if the manufacturer guidelines inadequately control the vehicle's energy sources and employee exposure exists to hazardous energy.

E. "Troubleshooting," Testing, and Component Positioning. There are circumstances when it is necessary to re-energize the vehicle or a component thereof to accomplish a particular task (e.g., diagnostic testing; maintenance troubleshooting; vehicle or component positioning). OSHA allows energization for testing or positioning purposes, as specified in §1910.147(f)(1), only for the limited time during which it is necessary to test or reposition the vehicle or component.

Additionally, the lockout device must be substantial enough to prevent removal without the use of unusual techniques. For example, the use of nylon cable ties would not be an appropriate substitute for more traditional and substantial lockout devices, such as the use of locks and chains to hold a valve in the safe position. While a cable tie is a positive means of holding the energy isolating device in a safe position, nylon ties are generally removable through the use of common cutting tools (e.g., pocket knives, side cutters, or scissors) or by releasing the pawl mechanism with a device such as screwdriver; neither of which constitutes an "unusual technique," as required by the standard.

NOTE: An employer using machines capable of being locked-out could, however, use the cable ties as part of a tagout system consistent with 1910.147(c)(5), as long as the use of the tagout system provided *full employee protection*, (e.g., double-block and bleed arrangement with a tag, using a nylon cable tie as a means of attachment) as set forth in 1910.147(c)(3).

Tag attachments, used to attach the tag, must be non-reusable, self-locking, and non-releasable, with a minimum unlocking strength of 50 pounds. Tags must be attachable by hand, and the device for attaching the tag should be a one-piece nylon cable tie or its equivalent so it can withstand all environments and conditions.

D. Labeling. LOTO devices must be labeled to identify the specific employees who are authorized to apply and remove them. As a result, the authorized employee who is identified will be given greater assurance that other employees know of her involvement in the work activity and that only she will be allowed to remove the device(s). This user identification provision also provides an additional degree of accountability to the overall program. It enables the employer to inspect the application of energy control procedures and to determine which employees are properly implementing the procedure. If lockout and tagout devices are not being properly attached, for example, identification on the devices will enable the employer to locate the non-complying employee(s) and correct the problem promptly.

VI. Energy Isolating Devices. The entire LOTO standard is predicated on the practices and procedures that are necessary to disable and isolate machines or equipment from hazardous energy. The employer's primary tool for providing protection under the standard is the energy isolating device, which is the mechanical device that physically prevents the transmission or release of hazardous energy. [See §1910.147(b) and Chapter 1, Section IX.H for the definition.]

NOTE: With respect to the definition of *Energy isolating devices*, not all line valves effectively and reliably prevent the transmission or release of hazardous energy. Manufacturer valve design information and application recommendations may aid Compliance Safety and Health Officers (CSHOs)

Any additional control measure ("Tags Plus") must be integrated into an energy control program through sound hazard-specific analyses on a case-by-case basis. For example, the blocking of a control switch as an additional measure to tagging an electrical disconnect may be an effective second layer of protection for preventing the mechanical activation of a machine, but this block may be an inadequate "Tags Plus" measure for the same machine's hydraulic or pneumatic hazardous energy sources.

These independent control measures, when effectively incorporated into the employer's energy control program and enforced through regular supervision, provide employees with an independent, redundant control measure. In short, this additional control measure provides the authorized employee using a tagout program with a "second layer of protection" in the event the tagout device for the primary isolating device is defeated.

NOTE: While describing additional protective means similar to those listed in §1910.147(c)(3)(ii), the American National Standard on the *Control of Hazardous energy – Lockout/Tagout And Alternative Methods (ANSI/ASSE Z244.1-2003;* Section 5.3.1*)* requires the user to demonstrate that the TO program provides *an effective level of safety* whereas paragraph (c)(3) requires the employer to *demonstrate that the tagout program will provide a level of safety equivalent to that obtained by using a lockout program* (emphasis added).

VIII. Notification of Affected Employees. Lack of information regarding the status of the machine or equipment could endanger both the servicing or maintenance employees and the employees who re-energize, operate or work around the machines or equipment. Whenever LOTO control might directly affect another employee's work activities, paragraph (c)(9) requires the employer or authorized employee to notify the affected employees prior to applying, and after removing (but before a machine or piece of equipment is started), a lockout or tagout device from a machine or piece of equipment's energy isolating device(s).

Such notification informs affected employees of the impending interruption of the normal production operation and reinforces the importance of the restrictions imposed on them by the energy-control program. In addition, this essential program requirement ensures that employees do not unknowingly attempt to reactivate a machine or piece of equipment after an authorized employee has isolated its energy source and rendered it inoperative. Conversely, employees need to know when control measures have been removed. This notification of employees, after removing a LOTO device from an energy isolating device(s), alerts them that the machine and equipment are capable of being started-up or operated. Without this information, employees might mistakenly believe that a system is safe to continue working around when, in fact, it is not.

IX. Energy Control Procedures. Energy control procedures are the cornerstone of the LOTO standard because they provide employees the guidance necessary to effectively and

safely control hazardous energy when they service or maintain machinery or equipment. The requirement to develop procedures is performance-oriented, but ultimately the procedures must explain what employees must know and state what steps employees must take to effectively and safely control hazardous energy during the servicing/maintenance activities.

It is essential for Compliance Safety and Health Officers (CSHOs) to evaluate an employer's energy control procedures to determine whether each procedure provides enough detailed information and guidance for an authorized employee to understand how to safely and effectively utilize energy control measures when servicing each machine covered by the procedure. If an associated hazard is discovered because the energy control procedure provides insufficient information (e.g., procedure over-generalization), then the CSHO must document the alleged §1910.147 violations in accordance with Chapter 2, Section III of this policy manual. The following policy and guidance are provided to help CSHOs evaluate employers' energy control procedures.

NOTE: Energy control procedures and employee training are distinct and independent elements in an employer's energy control program. Section 1910.147(c)(4)'s minimum requirements for procedural detail and specificity may not be diminished by employee training programs that exceed the requirements of §1910.147(c)(7). In short, additional training does not supplement and correct an inadequate procedure. Regardless of the amount and type of employee training, a procedure must provide sufficient detail and specificity to permit an authorized employee to safely and effectively utilize energy control measures to service/maintain each machine or piece of equipment covered within the scope of the procedure.

Paragraph (c)(4) provides that employers must develop, document, and utilize procedures for the control of potentially hazardous energy, and that the procedures must clearly and specifically outline the steps to be followed, techniques to be used, and measures to be applied by the employer to ensure that the procedure is used.

Specifically, 29 CFR §1910.147(c)(4)(i) states:

> *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.*

A procedure, at a minimum, must contain enough detail for authorized employees to have a clear understanding of the energy control measures so that they may follow the procedural steps associated with a machine LOTO to effectively control all types and forms of hazardous energy. Due to the number of variables in controlling hazardous energy and the need for employees to follow the specified control steps, a documented (written) energy control procedure is necessary in most situations. However, there are limited situations, specified in the paragraph 1910.147(c)(4)(i) exception note, where the procedure documentation is not necessary for a specific machine or piece of equipment. This exception is intended to apply to situations in which the LOTO process can take

place without detailed interactions of energy sources, machines/equipment, and employees.

For example, a motor in a shop may be wired to an electrical disconnect. The authorized employee can isolate the motor from the electric energy source and lock it out, using her personal lockout device on the disconnect switch in accordance with the procedures set forth in the standard. If this scenario meets each of the following elements, which are contained in the documentation exception, the procedure would need to be developed and utilized, but it would not need to be documented:

A. There is a single source of hazardous energy that can be easily identified and isolated, and there is no potential for stored or residual energy in the machine;
B. The isolation and locking out of that single energy source will totally de-energize and deactivate the machine;
C. A full lockout of the energy source is achieved by a single lockout device, which is under the exclusive control of the authorized employee performing the servicing; and
D. The servicing, while the machine is locked out, cannot expose other employees to hazards.

However, procedure documentation becomes necessary if an accident involving hazardous energy occurs (in utilizing this exception) because such an occurrence indicates the need for more formal treatment of the energy control procedure.

NOTE: The *Hazardous energy control procedures* section of the American National Standard on the *Control of Hazardous Energy - Lockout/Tagout And Alternative Methods* (ANSI/ASSE Z244.1-2003; Section 5.3.1.1), which contemplates an exemption from the obligation to develop written energy control procedures, differs from the OSHA exemption [note to §1910.147(c)(4)(i)]. The consensus standard does not affect the requirement that an employer meet each of the eight conditions listed in the note to § 1910.147(c)(4)(i) to take advantage of the exception to document an energy control procedure.

In order to ensure that employers develop energy control procedures with sufficient specificity to permit employees to effectively and safely control hazardous energy, paragraph (c)(4)(ii) of the standard defines the minimum elements for the procedure. The energy control procedures must clearly and specifically outline the scope, purpose, authorization, rules, and techniques that will be used to control hazardous energy sources, as well as the means that will be used to enforce compliance. At a minimum, these procedures must also include the following elements:

A. A specific statement of the intended use of the procedures;

B. The specific procedural steps for shutting down, isolating, blocking and securing machines or equipment to control hazardous energy [See also §§ 1910.147(d)(2), (d)(3) and (d)(5)];

NOTE: It is imperative that the employee who is to perform the servicing (who must utilize the energy control procedure) understands the hazards of the work and knows how to control the hazardous energy. It is for this reason that paragraph (d)(1) requires that, before the machine is even turned off, the authorized employee must have the knowledge of the type and magnitude of energy, the hazards associated with the energy to be controlled, and the method or means to be used to control the energy.

C. The specific procedural steps for the placement, removal (including, if contemplated by the employer and permitted by §1910.147(e)(3), the specific procedure for the LOTO device removal by someone other than the authorized employee who applied it), and transfer of lockout or tagout devices and the responsibility for them [See also §§ 1910.147(d)(4), (e), (f)(3) and (f)(4)]; and

NOTE: Area Directors shall cite the §1910.147(f)(1) sequence of step requirements, and not the paragraph (c)(4) provisions, when an employer fails to develop or utilize procedures to safely test or position machine/equipment component(s) in conjunction with servicing and maintenance activities.

D. The specific requirements for testing a machine to determine and verify the effectiveness of LOTO devices and other control measures [See also §1910.147(d)(6)].

NOTE: The ANSI Z244.1-2003 standard's provisions for hazardous energy control procedures contain procedure element criteria that, while conceptually valuable, do not explicitly mandate all of the minimum requirements that are prescribed in §1910.147(c)(4)(ii). While the consensus standard and annexes provide valuable guidance and tools (e.g., sample energy control procedures; sample lockout/tagout placarding methods) to assist employers in developing specific methods to meet their procedural obligation under the LOTO standard, employers ultimately must develop energy control procedures that conform to the provisions of §1910.147(c)(4)(ii).

OSHA used the word ***specific*** in the standard to describe the elements of the procedure. This was done to emphasize the need for detailed procedures because over-generalization does not provide authorized employees sufficient information to effectively control the hazardous energy to which they are exposed. The amount of detail in an employer's procedure will depend upon the complexity of the machine or piece of equipment and the information that the authorized employee must know to safely control the hazardous energy for the machine throughout the course of the servicing operation.

Thus, a written energy control procedure need not be complicated and detailed, if the system to be controlled is not complex or does not require unusual control measures. For

example, a written procedure could be very simple if there is a machine with a single energy source that must be serviced and the means to shut down and isolate the machine is uncomplicated and apparent – e.g., pushing a stop button, notifying affected employees of the LOTO, opening and locking out an electric switch (which is at the machine), and pressing the start button to verify machine isolation (assuming a residual energy hazard is not present).

NOTE: It should be noted that a small business does not necessarily have simple energy control issues. Complex machinery and equipment can be found in workplaces with few employees, especially in highly-automated operations. From the standpoint of safety, there is no basis for concluding that a small employer is inherently less likely to need a detailed written procedure than a large employer. Thus, the performance oriented requirements for written procedures are appropriate for all employers, regardless of size.

In some instances where control measures are not readily apparent or require specific instruction, the energy control procedure may need to specify the types, location and/or operating instructions for the machine operating controls or it may need to specify the types, location and/or operating instruction for energy isolating devices in order to ensure that employees have the information necessary to safely turn off and effectively de-energize a machine.

NOTE: Any method of identification (e.g., by machine type and location or by machine type and model number) that enables an authorized employee to determine which energy control instructions, operating controls and energy isolating devices apply to a particular machine or piece of equipment is acceptable.

To assist employers and employees in complying with the procedural requirements, OSHA developed a non-mandatory *Typical Minimal Lockout Procedure* guideline in *Appendix A* of the standard. The compliance assistance tool provides employers with guidelines for a simple energy control procedure for use in both lockout and/or tagout applications. This flexible template may be used when there are limited numbers or types of machines or where there is a single power source. The user would simply need to fill in the blanks with the machine-specific data – pursuant to §1910.147(c)(4).

NOTE: Nothing in the appendix adds to or detracts from any of the requirements of the standard.

For more complex systems, a more comprehensive procedure(s) will need to be developed, documented, and utilized. The appendix may be used as a guide to develop a more complex control procedure, and the sample lockout procedure can be applied to many different workplace situations with minor adaptations or changes.

NOTE: OSHA issued a citation to an employer alleging a serious violation of the LOTO standard stating that the employer did not develop energy control procedures meeting the §1910.147(c)(4)(ii) requirements. The employer's

procedure, according to the Occupational Safety and Health Review Commission, appeared to be derived from Appendix A to §1910.147; however, company officials failed to fill in any of the blanks in the Appendix A procedure. The decision explains that in order for this form to be effective, the employer must provide specific, relevant information, including the:

1. Names of affected employees;
2. Types and magnitude of energy;
3. Hazards;
4. Methods to control the energy;
5. Types and locations of machine or equipment operating controls;
6. Types and locations of energy isolating devices;
7. Types of stored energy and methods to dissipate or strain energy; and
8. Method of verifying isolation of the equipment.

The Commission held that the employer's general procedure was unacceptable because it fell far short of the standard's requirements and provided no information about the employer's individual machines that would enable an employee to lock out a machine safely. The purpose of the energy control procedure is to guide an employee through the lockout process. Thus, the Commission affirmed the violation of §1910.147(c)(4)(ii). See *Drexel Chemical Co.* (OSHRC Docket No. 94-1460, 1997) for additional information on the decision. The Commission reaffirmed this position in *General Motors Corp., CPCG Oklahoma City Plant*, (Docket Nos. 91-2834E and 91-2950, 2007).

Although the standard requires the procedure to be written in detail, this does not mean that a separate procedure must be written for each and every machine or piece of equipment. Similar machines and/or equipment (such as those using the same type and magnitude of energy), which have the same or similar types of controls, and which can be rendered safe using the same sequential procedural steps, can be covered by a single procedure, if that procedure satisfactorily addresses the hazards and specifies the measures for controlling the hazards. For purposes of procedure grouping, machines and equipment may be grouped together as one procedure if they all are listed or identified in the scope of the energy control procedure and if they all have the same or similar:

A. Procedural steps for shutting down, isolating, blocking, securing, and dissipating stored energy in machines or equipment;

B. Procedural steps for the placement, removal, and transfer of the lockout or tagout devices and the responsibility for them; and

C. Requirements for testing a machine or equipment to determine and verify the effectiveness of LOTO devices and other control measures.

Thus, for example, an employer who has a number of power presses with similar design characteristics and energy sources, may decide to group their die-setting activities into a single procedure if the presses have the same or similar control measures and the same

sequential procedural steps are used for controlling hazardous energy. However, this single procedure would need sufficient detail and clarity to guide a die-setter safely through the task steps when servicing each of the power presses. Alternatively, employers may choose to develop separate die-set procedures for each press or each type of press. Either method is acceptable as long as the energy control procedure detail provides authorized employees enough information and guidance to safely accomplish all die set-up tasks – e.g., when, where, how and in what order to: 1) position the slide, 2) open the electric disconnect switch, 3) install the safety blocks, and 4) insert the die shoes.

Likewise, many of the machines (e.g. table saws, radial arm saws, planers, routers, grinders, conveyors) in a woodworking shop are similar for purposes of the energy control procedure requirements because they all use relatively the same or similar types (e.g., 120 VAC and 240 VAC, nominal electric disconnect switches) of energy, have the same or similar controls for isolating the machines from the energy source, and use the same sequential procedural steps to protect employees from the mechanical hazards (e.g., shut off the machine; open the electric disconnect adjacent to the machine; apply a personal LO device; allow the blades or other machine components to stop before removing the guards; verify that the machine is isolated and can not unexpectedly start-up). Therefore, a single energy control procedure may be used for this group of woodworking machines, as long as the procedure includes each machine within its scope and has sufficient specificity to allow employees to effectively isolate the hazardous energy source(s) and safely return each of the machine(s) to service.

NOTE: OSHA recognizes that some employers choose to develop "machine-specific" energy control procedures for individual machines or pieces of equipment because this approach provides an optimum level of detail, enhancing overall employee safety during servicing operations. In order not to discourage this practice, employers who develop energy control procedures for individual machines still may group same or similar individual machine/equipment procedures for periodic inspection purposes. [See Section XVII of this chapter for details.]

However, OSHA recognizes that, while in many cases an employer will be able to develop a single energy control procedure applicable to all machines and equipment in a facility, an employer may be required to develop more than one procedure when variations in machine types, energy sources, or energy control methods mandate additional specificity in order to permit employees to effectively isolate hazardous energy and safely perform servicing/maintenance activities.

For example, a single procedure for a number of machines would not be adequate if it does not guide an employee through the energy control process and provide the specific instruction necessary to permit the employee to protect herself effectively from hazardous energy associated with each piece of machinery. For example, assume that a single procedure is intended to cover a group of machines and that part of the energy control procedure requires the use of a start/stop button for shutdown and energy isolation verification purposes. However, one of the machines does not have a start/stop button

because it is wired directly to an electronic *on-demand* signal. In this scenario, the single procedure will not provide adequate instructions for the machine without a start/stop button because the single procedure will not provide sufficient employee guidance on how to effectively shut down the machine and verify energy isolation.

Likewise, grouping dissimilar process systems (e.g., an ammonia refrigeration vs. a natural gas fuel heating system) with different types of hazards and control step sequences or unique control measures within a single energy control procedure would not be permitted if the procedure did not sufficiently specify the hazards and specific control measures pursuant to the LOTO standard's energy control procedure provisions. The Agency recognizes that, while in many cases an employer will be able to develop a single energy control procedure applicable to all machines and equipment in a facility, the employer is required to develop more than one procedure (or to supplement a single, generic procedure with supplemental means such as checklists, appendices, or work authorization permits) for unique or different energy sources, particularly when the associated control measures are dissimilar.

It is important to emphasize that the nature of the machine or piece of equipment (i.e., its production function) is not a significant factor in deciding whether machines/equipment can be covered by a single procedure. For example, machines that are designed to perform different production functions (e.g., a mechanical conveyor, an electrically powered ironworker, a table saw, and a multi-spindle milling machine) may be covered by a single procedure if the procedure clearly and specifically details the same or similar energy control (LOTO) measures such that the authorized employees have sufficient guidance to enable them to safely and effectively utilize hazardous energy control measures for each of the machines that will be included within the procedure.

OSHA recognizes that many portions of an energy control procedure may be standardized for an entire facility. However, it is necessary to supplement the generic procedure with checklists or other supplemental means (e.g., a checklist, work authorization permit system, or manufacturers' servicing and maintenance guidelines) to provide the required specificity – pursuant to paragraph (c)(4)(ii) – when variations (e.g., differences in the machines/equipment, types of energy, energy isolation devices, or hazards) necessitate additional specificity to enable employees to safely and effectively control hazardous energy when working with particular machines or equipment. The generic procedure and supplemental means must provide authorized employees with clear and detailed guidance so that they can understand how to safely and effectively utilize hazardous energy control measures for the machine or equipment being serviced or maintained.

For example, if not apparent, the checklist might address the number and locations of the energy isolating devices in order to achieve total de-energization. If the procedure itself takes the form of a checklist, it must reflect, in part, the sequence of steps necessary to safely and effectively control all hazardous energy sources. The information contained in the generic procedure and supplemental means would, at a minimum, need to meet the performance-oriented requirements of the LOTO standard.

NOTE: The use of generic energy control procedures alone are unacceptable, if generic procedures do not meet the provisions set forth in §1910.147(c)(4)(ii).

In the chemical process and petroleum refining industries, for example, companies augment generic LOTO procedures with work authorization permit systems to detail the job-specific hazardous energy control measures before employees perform servicing and maintenance work activities. It is recognized that the comprehensive use of such a system is more efficient and relevant to the daily tasks than would a *cookbook* type procedure, which might not fully account for a specific situation that might have occurred around the time of the servicing and maintenance activity.

However, if a company uses a work permit authorization system, each permit must identify the: 1) equipment to be serviced/maintained, 2) types and unique energy characteristics that may be encountered, and 3) specific safe work procedures to be used to effectively control hazardous energy associated with the permit's scope of work. Ultimately, however, the quality of any hazardous energy control effort, and ultimately employee safety, is dependent upon the hazard analysis, which in turn is dependent upon the knowledge and skill of the individuals – e.g., operations personnel, engineering support – that identify the tasks, the energy related hazards, and appropriate control measures for the specific servicing operation.

NOTE: Work authorization permit system procedures must, in part, specify that employees are required to perform their work in accordance with the terms and limitations of the work permit and include the means to enforce employee compliance with the work permit provisions. Chapter 4, Section VI of this manual also contains information on the use of work authorization permits as employee accountability devices in group LOTO (control and accountability) procedures.

With the understanding that the standard is flexible and performance-oriented, many procedural items may be incorporated into a generic plant-wide policy (when supplemental means are used) or incorporated without revision into each energy control procedure, regardless of the type of machine or equipment, the type of energy, or the energy control devices associated with the control of the hazardous energy. For example, an employer may decide that it is better to address the purpose and use of the procedure, as well as other general issues, in their generic procedure's policy sections. The following are some general policy issues that may be capable of being developed and contained in the generic portion of the company's energy control procedure:

A. Who is authorized to perform LOTO?
B. Who will notify affected employees of the application and removal of LOTO devices?
C. What method (e.g., lockout versus tagout, including, where appropriate, *full employee protection* measures) will be used for securing energy isolating devices?
D. What types of energy isolation (e.g., electric disconnects) and control methods will be employed in the facility?
E. How will energy control devices be removed and by whom?

F. If removal by others is contemplated by the employer in situations permitted under the LOTO standard, what are the specific procedural steps for the removal of the authorized employee's LOTO device by someone other than the person who applied the device?
G. How will the removal of control devices and re-energization be performed?
H. How will the implementation of these energy control procedures be supervised and enforced?
I. Where groups perform servicing or maintenance work, how will the group LOTO activities be performed and coordinated?
J. Where the servicing or maintenance exceeds a single shift or there is a personnel change, how will authorized employee responsibility be transferred during shift and personnel changes (e.g., job locks)?
K. Where contractor employees may be affected by hazardous energy, how will outside personnel (e.g., contractors) be informed of energy control procedures?

Some issues that an employer may need to incorporate in its supplemental sections, such as a checklist, include:

A. What equipment is being serviced/maintained and what is the scope of work?
B. What are the specific (types and magnitude) hazardous energy sources associated with the system and the specific method and sequence of activities required to control these hazards?
C. How is a safe and orderly shutdown of the system performed?
D. Where (if not readily apparent) and how does the isolation or blocking of energy occur?
E. How is stored energy in the system released?
F. Are there precautions (e.g., use of a test instrument) necessary to monitor for hazards associated with energy re-accumulation?
G. How do authorized employees test and verify that de-energization and isolation have been accomplished?
H. How are LOTO devices removed and what are the steps to re-energize the system?
I. How do employees safely test and position machine components?

In summary, when CSHOs evaluate an employer's energy control procedures, they must determine:

> *Whether an energy control procedure, pursuant to §1910.147(c)(4)(ii), provides sufficient detail and adequate guidance for an authorized employee(s) to clearly understand how to safely and effectively utilize hazardous energy control measures for the particular machine or piece of equipment being serviced and/or maintained?*

If the procedure does, the employer has complied with this performance-oriented standard.

organizational groups may be responsible for the application and removal of the shift/personnel transfer devices.

In addition, the requirements contained in §§ 1910.147(c)(8), 1910.147(d)(4)(i), and 1910.147(e)(3) do not apply to LOTO devices used to ensure the continuity of employee protection for shift or personnel changes. In other words, the authorized employee who applies the continuity device (e.g., *Shift Transfer Device*, *Job Lock*) may or may not be the same authorized employee who removes the continuity device, as long as these actions are performed in accordance with the employer's established energy control procedure. For additional information, refer to Chapter 4, Section IV on the *Job Lock* (*Type D*) control measure.

Another element for assuring continuity of protection is the requirement that each on-coming employee verify that the machine or equipment has been effectively de-energized and isolated. When LOTO devices (personal and/or continuity devices) remain on energy isolation devices from a previous shift, all of the on-coming shift employees must verify for themselves the effective de-energization and isolation of the machinery or equipment. On-coming employees may not depend on the actions of other employees or supervisors, particularly those who have left the workplace for the day, for assurance that it is safe to work on the machinery or equipment.

NOTE: OSHA has recognized the need for an alternative to the verification requirement where complex LOTO operations involve many employees and numerous energy isolating devices. This procedure is described in Chapter 4.

XVI. Employee Training. OSHA's performance-oriented LOTO training program requirements, as detailed in §1910.147(c)(7), were developed to provide employer flexibility and to deal with the wide range of conditions in various workplaces. The specific training material will vary from workplace to workplace, and even from employee to employee within a single workplace, depending upon: the complexity of the machine or equipment and the procedures, the employee's job duties, their responsibilities, and other factors.

NOTE: Self-paced, interactive computer-based training can serve as a valuable training tool in the context of an overall training program. However, unless the training program is specific to the servicing that will be performed by an individual employee, use of computer-based training by itself would not be sufficient to meet the intent of OSHA's LOTO training requirements. The Agency's position regarding computer-based training is essentially the same as our policy on the use of training videos, since the two approaches have similar shortcomings. OSHA urges employers to be wary of relying solely on generic, *packaged* training programs in meeting their training requirements because training must be relevant for the employees' actual servicing and maintenance work activities. Essential training information will necessarily vary from workplace to workplace, and even from employee to employee within a single workplace, depending on the type and complexity of the

energy control procedure, as well as the employee's duties and responsibilities under the LOTO program. Specifically, training under LOTO includes site-specific elements and, very importantly, it must be tailored to employees' assigned duties.

In addition, the employer has the responsibility to ensure that employees understand the purpose and function of the energy control program and to ensure that these employees have the knowledge and skills required to safely apply the energy control measures. In an effective training program, it is important that trainees have the opportunity to ask questions when material is unfamiliar to them. In a computer-based program, this may be achieved by providing a telephone hotline so that trainees will have direct access to a qualified trainer. Equally important is the use of hands-on training and exercises to provide trainees with an opportunity to become familiar with equipment and safe practices in a non-hazardous setting. Industrial operations, and in particular hazardous energy control operations, can involve many complex and potentially hazardous tasks. It is imperative that employees be able to perform such tasks safely.

In summary, OSHA believes that computer-based training programs and training videos can be used as part of an effective safety and health training program to satisfy OSHA training requirements, if the training as a whole provides employees with the information and knowledge necessary to safely perform the work. CSHOs can determine the adequacy of the training by examining the training program as a whole and by conducting employee interviews to evaluate employee knowledge and understanding.

In order to provide adequate information, any LOTO training program must address, at a minimum, the following three areas: 1) the purpose and function of the energy control program; 2) the elements of energy control procedures relevant to employee duties; and 3) the pertinent requirements and prohibitions of the LOTO standard. The training, detailed in paragraph (c)(7)(i), must be specific to the needs of *authorized*, *affected*, and other employees, and the degree of knowledge required for these three employee groups diminishes from *authorized employee* to *affected employee* and from *affected employee* to other employee.

Authorized employees are those responsible for implementing the energy control procedures (e.g., an employee who locks out or tags out machines) and/or performing the servicing or maintenance activities. These employees must have the knowledge and skills necessary for the safe application, use, and removal of energy isolating devices. For employers with a large number of procedures, each *authorized employee* must be able to safely perform the work required by any energy control procedure that he may be called upon to use, however rarely. Therefore, these employees need training in the applicable aspects of the procedure and its proper utilization, together with training in the:

A. Recognition and understanding of all applicable hazardous energy sources;

B. Type and magnitude of the hazardous energy sources associated with machinery or equipment on which they will perform servicing or maintenance; and

C. Energy control procedures, including the methods and means to isolate and control relevant energy sources.

Affected employees are those employees (e.g., machine operators and material handling specialists) who operate or interact with machines that are serviced and maintained pursuant to energy control procedures, as well as those employees (e.g., general laborers) who are assigned to work in areas where energy control procedures are utilized to service or maintain machinery. In other words, employees who are assigned to areas where servicing or maintenance work is performed, but who do not implement energy control procedures or perform servicing and/or maintenance work need only be trained as *affected employees*. *Affected employees* must be able to:

A. Recognize LOTO devices immediately;

B. Recognize when the energy control procedure is being used;

C. Understand the purpose and use of the procedure; and, most importantly; and

D. Understand the importance of not tampering with lockout or tagout devices and not starting or using equipment that has been locked out or tagged out.

Affected employees are required to be instructed in these matters and be informed that disregarding or violating the prohibitions imposed by the energy control procedure could endanger their own lives or the lives of their co-workers.

All other employees who may be in an area where energy control procedures may be utilized must receive instruction regarding the energy control procedure and the prohibition against removing a lockout or tagout device and attempting to restart, reenergize, or operate the machinery. This instruction, which can be provided during new employee orientations, by use of employee handbooks, or through safety meetings, must convey what the energy control program does, the program's prohibitions, and that the employees are not to touch any locks, tags, energy isolation devices, or equipment covered by this program. This instruction is required for all employees who are not classified as "authorized" or "affected" employees unless the company establishes, communicates, and enforces a policy prohibiting an employee or group of designated employees from ever being in an area where servicing or maintenance is performed pursuant to an energy control procedure. Thus, for example, this training would not be required for an office administrator who is prohibited from going into production areas where all servicing and maintenance activities are performed. On the other hand, this training would be required for a salesperson who rarely goes into production areas, but who may go into production areas to discuss product specifications associated with a particular order while servicing or maintenance work may be being performed.

In addition, if tagout devices are used, all employees in all three of the aforementioned categories must receive training regarding the inherent limitations of tags. The training,

described in paragraph (c)(7)(ii), must inform employees that:

A. Tags are essentially warning labels affixed to energy isolating devices, and therefore do not provide the physical restraint associated with locks;

B. Employees are not to remove tags attached to energy isolating devices by authorized employees (unless they are permitted to do so by the employer's energy control procedure due to the unavailability of authorized employees at the workplace – in accordance with the paragraph (e)(3) exception), and that they are never to bypass, ignore, or in any manner defeat the tagout system;

C. Tags must be legible and understandable by authorized and affected employees, as well as other employees who work, or may work, near operations using the energy control procedure;

D. The materials used for tags, including the means of attaching them, must be able to withstand the environmental conditions encountered in the workplace;

E. Tags invoke a false sense of security, and employees must understand that tags are only part of the over-all energy control program; and

F. Employees must attach tags securely to energy isolating devices to prevent the removal of the tags during use.

Although the standard does not prescribe annual refresher training or a set frequency for retraining, it does require training under specific circumstances and specifies those issues that the training must cover. For example, the employer must provide initial training before the servicing and maintenance activities begin and must provide retraining as necessary. However, retraining is required, by paragraph (c)(7)(iii), if a periodic inspection reveals, or an employer has reason to believe, that there are deviations from the application of the energy control procedure or inadequacies in an employee's knowledge of or use the energy control procedure. Additionally, retraining must be provided for all authorized and affected employees whenever there is a change in:

A. Job assignments;

B. Energy control procedures; or

C. Machinery, equipment, or processes that present a new hazard.

The retraining must reestablish employee proficiency and, if relevant, address new or revised energy control procedures. The scope and content of all the retraining must be based upon the severity of the problems encountered and must be directed toward the elimination of those problems. Unless employees are retrained whenever deviations or inadequacies are discovered (or when the employer has reason to believe a problem exists), the overall effectiveness of the energy control program will diminish over time. Properly trained employees, who are proficient in their energy control responsibilities,

are critical to the success of the energy control program.

NOTE: OSHA issued a citation of 29 CFR 1910.147(c)(7)(iii)(A) alleging that the employer did not give lockout/tagout retraining to all employees who had been given new job assignments. The violation addressed two employees, one a pipe-fitter for 20 years, the other an automotive mechanic, who were reclassified as maintenance employees during a reorganization of the plant. The Occupational Safety and Health Review Commission (OSHRC) affirmed the citation holding that these employees were required to perform jobs they had not performed before and were not familiar with the associated lockout/tagout hazards. See *Caterpillar, Inc.*, 17 BNA OSHC 1584, (No. 93-2230, 1996).

Training certifications, which contain each employee's name and dates of training, are required, by paragraph (c)(7)(iv), for both initial training and retraining. These training records must be kept only for the last training activity. However, the employer must certify that the training (required by the LOTO standard) has been given to each employee covered by the standard. In other words, employers must be able to demonstrate that the required LOTO training, which is directly relevant to the duties of the employee, was provided and understood. In evaluating whether an employee has been adequately trained, Compliance Safety and Health Officers (CSHOs) need to examine the employee's responsibilities under the energy control program in relation to the elements of the LOTO standard.

NOTE: The American National Standard on the *Control of Hazardous Energy - Lockout/Tagout And Alternative Methods* (ANSI/ASSE Z244.1-2003; *Communication and training,* Section 5.5) utilizes an approach that, in part, directs users (employers) to inform all personnel regarding the provisions of the energy control program to an *appropriate level* and to apprise appropriate authorized individuals of aspects of the program. Very importantly, this consensus standard emphasizes that the *user should avoid exclusive use of generic training programs to ensure that authorized individuals adequately understand the user's specific program* and that a structured program should be used to make training *understandable to all authorized individuals regardless of their education, primary language, or disabilities.*

The section on *Communication and training,* however, differs from the specific training requirements contained in the OSHA LOTO standard and utilizes a more general approach to the subject. Some of the §1910.147(c)(7) issues that are not explicitly addressed in the consensus standard include the requirement to:

1. Train each employee in the elements of each energy control procedures relevant to his job duties and responsibilities (whereas Section 5.5.2 permits employers to train personnel on a sample of machine specific

procedures);

2. Train employees in the pertinent requirements of the LOTO standard;
3. Train *affected employees* and other employees for the subject matter contained respectively in §§ 1910.147 (c)(7)(i)(B) and (c)(7)(i)(C);
4. Provide additional employee training requirements on the limitations of tags, as required by §1910.147(c)(7)(ii), when employees utilize tagout systems; and
5. Provide retraining to re-establish employee proficiency pursuant to the §1910.147(c)(7)(iii)(C) requirements.

Training, according to the LOTO requirements, must be commensurate with each employee's job responsibilities such that employees have the understanding, knowledge, and skills required to safely apply the applicable provisions of the energy control procedure(s). The ANSI Z244.1-2003 consensus standard does not affect the employer's obligation to meet all of the requirements contained in §§ 1910.147(c)(7) and (d)(1).

XVII. Periodic Inspection. Due to the significant risks associated with inadequate energy control procedures and the failure to properly implement effective energy control procedures, section 1910.147(c)(6)(i) requires that periodic inspections be performed at least annually (based on twelve-month intervals) to verify that the procedures are adequate and being properly applied. OSHA believes that these periodic inspections will, in part, ensure that the employees involved are familiar with their responsibilities and that employees maintain proficiency in the energy control procedures that they implement.

NOTE: Energy control procedures used less frequently than once a year (based on a twelve-month interval) need be inspected only when used.

These periodic inspections must contain at least two components: 1) an inspection of each energy control procedure, and 2) a review of each employee's responsibilities under the energy control procedure being inspected. Each energy control procedure required by §1910.147(c)(4) must be separately inspected to ensure that the energy control procedure is adequate and is being properly implemented by the authorized employee in accordance with the LOTO standard.

NOTE: Energy control procedures that are not required to be documented, per the §1910.147(c)(4)(i) documentation exception, still need to be inspected and reviewed to ensure that they are adequate and being properly utilized.

At a minimum, these inspections must include a demonstration of the procedures and must be performed while the authorized employees perform servicing and/or maintenance activities on machines or equipment. The inspections may be accomplished through random audits, plant safety tours, or planned visual observations. The inspector, who must be an authorized employee other than the one(s) utilizing the energy control procedure being inspected, must observe the implementation of the energy control procedure for the servicing and/or maintenance activities being evaluated and talk with