

(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.

(iii) After October 31, 1989, 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.

(3) *Full employee protection.* (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.

(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.

(4) *Energy control procedure.* (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 ma-

chine 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 locked-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.

(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:

(A) A specific statement of the intended use of the procedure;

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

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

(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.

(5) *Protective materials and hardware.* (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.

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

(A) *Durable.* (1) Lockout and tagout devices shall be capable of withstanding the environment to which they are

through the use of lockout/tagout from the hazards involving the unintentional release of hazardous energy. Such violations reached a level so significant that the development and promulgation of a lockout/tagout standard was required.

2. The new rule addresses practices and procedures that are necessary to disable machinery or equipment and to prevent the release of potentially hazardous energy while maintenance and servicing activities are being performed.

3. The lockout/tagout provisions of this standard are for the protection of general industry workers while performing servicing and maintenance functions and augment the safeguards specified at Subparts O, S, and other applicable portions of 29 CFR 1910.

H. *Inspection Guidelines.* The standard incorporates performance requirements which allow employers flexibility in developing lockout/tagout programs suitable for their particular facilities.

1. The compliance officer shall determine whether servicing and maintenance operations are performed by the employees. If so, the compliance officer shall further determine whether the servicing and maintenance operations are covered by 29 CFR 1910.147 or by the requirements or employee safeguarding specified by other standards as discussed in I.1.

2. Evaluations of compliance with 29 CFR 1910.147 shall be conducted during all general industry inspections within the scope of the standard in accordance with the FOM, Chapter III, D.7. and 8., Additional Information to Supplement Records Review. The review of records shall include special attention to injuries related to maintenance and servicing operations.

3. The compliance officer shall evaluate the employer's compliance with the specific requirements of the standard. The following guidance provides a general framework to assist the compliance officer during inspections:

a. Ask the employer for any hazard analysis or *other basis* on which the program related to the standard was developed. Although this is not a specific requirement of the standard, such information, *when provided*, will aid in determining the adequacy of the program. It ~~should~~ be noted that the absence of a hazard analysis does not indicate non-compliance with the standard.

b. Ask the employer for the documentation including: procedures for the control of hazardous energy including shutdown, equipment isolation, lockout/tagout application, release of stored energy, verification of isolation; certification of periodic inspections; and certification of training. The documented procedure must identify the specific types of energy to be controlled and, in instances where a common procedure is to be used, the specific

equipment covered by the common procedure must be identified at least by type and location. The identification of the energy to be controlled may be by magnitude and type of energy. Note the exception to documentation requirements at paragraph 1910.147(c)(4)(i), "Note". The employer need not document the required procedure for a particular machine or equipment when all eight (8) elements listed in the "Note" exist.

c. Evaluate the employer's training programs for "authorized", "affected", and "other" employees. Interview a representative sampling of selected employees as a part of this evaluation (29 CFR 1910.147(c)(7)(i)).

(1) Verify that the training of authorized employees includes:

(a) Recognition of hazardous energy;
(b) Type and magnitude of energy found in the workplace;

(c) The means and methods of isolating and/or controlling energy; and

(d) The means of verification of effective energy control, and the purpose of the procedures to be used.

(2) Verify that affected employees have been instructed in the purpose and use of the energy control procedures.

(3) Verify that all other employees who may be affected by the energy control procedures are instructed about the procedure and the prohibition relating to attempts to restart or reenergize such machines or equipment.

(4) When the employer's procedures permit the use of tagout, the training of authorized, affected, and other employees shall include the provisions of 29 CFR 1910.147(c)(7)(ii) and (d)(4)(iii).

d. Evaluate the employer's manner of enforcing the program (29 CFR 1910.147(c)(4)(ii)).

4. In the event that deficiencies are identified by following the guidelines in H.3. of this instruction, the compliance officer shall evaluate the employer's compliance with specific requirements of the standard, with particular attention to the interpretive guidance provided in section I. and to the following:

a. Evaluate compliance with the requirements for periodic inspection of procedures.

b. Ensure that the person performing the periodic inspection is an authorized employee other than the one(s) utilizing the procedure being inspected.

c. Evaluate compliance with retraining requirements which result from the periodic inspection of procedures and practices, or from changes in equipment/processes.

d. Evaluate the employer's procedures for assessment, and correction of deviations or inadequacies identified during periodic inspections of the energy control procedure.

e. Identify the procedures for release from lockout/tagout, including:

- (1) Replacement of safeguards, machine or equipment inspection, and removal of non-essential tools and equipment;
- (2) Safe positioning of employees;
- (3) Removal of lockout/tagout device(s); and
- (4) Notification of affected employees that servicing and maintenance is completed.

f. Ensure that when *group lockout or tagout* is used, it affords a level of protection equivalent to individual lockout or tagout as amplified in I.7. through I.9. of this instruction.

5. The lockout/tagout standard is a performance standard; therefore, additional guidance is provided in Appendix C of this instruction to assist in effective implementation by employers and for uniform enforcement by OSHA field staff.

1. *Interpretive Guidance.* The following guidance relative to specific provisions of 29 CFR 1910.147 is provided to assist compliance officers in conducting inspections where the standard may be applicable:

1. Scope of the Standard.

a. The standard as specified in 29 CFR 1910.147(b), applies to any source of mechanical, hydraulic, pneumatic, chemical, thermal, or other energy.

(1) The standard applies to piping systems, and requires, at 29 CFR 1910.147(d)(5), that all potentially hazardous stored or residual energy be relieved, disconnected, restrained, and otherwise rendered safe. If there is a possibility of reaccumulation of stored energy to a hazardous level, continued monitoring shall be performed while a potential hazard exists.

(2) The standard also applies to high intensity electromagnetic fields regulated at 29 CFR 1910.97, nonionizing radiation. Such electromagnetic devices shall be deenergized and held off whenever workers are present within a high intensity ambient field.

(3) Servicing/maintenance of fire alarm and extinguishing systems and their components, upon which other employees are dependent for fire safety, are not required to meet the requirements of this standard if the workers performing servicing/maintenance upon fire extinguishing systems are protected from hazards related to the unexpected release of hazardous energy by appropriate alternative measures. (See 29 CFR 1910, Subpart L.)

b. The standard does not apply to servicing and maintenance when employees are not exposed to the unexpected release of hazardous energy.

c. Safeguarding workers from the hazards of contacting electrically live parts (exposure to electric current) continues to be regulated at Subpart S.

d. Servicing and maintenance functions conducted during normal production operations are not regulated at 29 CFR 1910.147 if the safeguarding provisions of Subpart O or other applicable portions of 29 CFR 1910 prevent worker exposure to hazards created by the unexpected energization or start-up of the machine or equipment. However, lockout/tagout procedures are required if the production safeguards are rendered ineffective while an employee is exposed to hazardous portions of the machines or equipment.

e. Generally, activities such as lubrication, cleaning or unjamming, servicing of machines or equipment, and making adjustments or tool changes, where the employee may be exposed to the UNEXPECTED energization or start-up of the equipment or release of hazardous energy, are covered by this standard. However, 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 equipment for production, and if work is performed using alternative protective measures which provide effective employee protection. Thus, lockout or tagout is not required by this standard if the alternative protective measures enable the servicing employee to clean or unjam, or otherwise service the machine without being exposed to unexpected energization or activation of the equipment, or the release of stored energy.

NOTE: Appendix C, section A, provides further guidance in this area.

f. The exclusion of plug and cord connected electric equipment, at 29 CFR 1910.147(a)(2)(iii)(A), applies only when the equipment is unplugged and the plug is under the exclusive control of the employee performing the servicing and/or maintenance.

(1) The plug is under the exclusive control of the employee if it is physically in the possession of the employee, or in arm's reach and in line of sight of the employee, or if the employee has affixed a lockout/tagout device on the plug.

(2) The company lockout/tagout procedures required by the standard at 29 CFR 1910.147(c)(4) shall specify the acceptable procedure for handling cord and plug connected equipment.

2. Procedures.

a. The employer must develop and document procedures and techniques to be used for the control of hazardous energy. The standard, at 29 CFR 1910.147(c)(4)(i) "Note," identifies eight (8) conditions that must exist in order to excuse the employer's obligation to maintain a written procedure for a specific machine or piece of equipment.

b. 29 CFR 1910.147(d)(3) and (d)(5) provide that

design is feasible. This provision will assure that even if current equipment is not designed to be locked out, future generations of such equipment will have a lockout capability. Under the requirements of this Final Rule, this equipment will then be subject to the requirement to use lockout except when a tagout system can be shown to be equally effective. OSHA anticipates, however, that the designing of lockout capability into new equipment will encourage the employer to utilize that capability in the energy control program, rather than relying on tagout.

→ In paragraph (c)(4), OSHA requires that employers develop, document and utilize procedures for the control of potentially hazardous energy, and that the procedures clearly and specifically outline the steps to be followed, techniques to be used, and measures to be applied by the employer to assure that the procedure is used. OSHA also specifies that the employer ensure that the control measures are used by employees whenever they might be exposed to injury from the unexpected energization or start up of machines or equipment or the release of stored energy.

There were four commenters (Ex. 2-38, 2-58, 2-70 and 2-87) to this requirement for the development and utilization of a procedure. Two of these commenters (Ex. 2-38 and 2-70) objected to the use of the word "specific" when defining the elements of the procedure while one commenter interpreted the requirement as mandating a generalized procedure for each plant, as well as a specific procedure for every machine or piece of equipment. The last commenter on this issue (Ex. 2-87) suggested the standard make it clear that it may not be necessary to have multiple procedures. This commenter also alluded to the fact that the standard should require a determination that a need to control hazardous energy exists and how this should be done before work begins.

In this final standard, OSHA has retained the word "specific" when detailing the elements of the procedure. This was done to emphasize the need to have a detailed procedure, one which clearly and specifically outlines the steps to be followed. Overgeneralization can result in a document which has little or no utility to the employee who must follow the procedure. However, whereas the procedure is required 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 (those using the same type

and magnitude energy) which have the same or similar types of controls can be covered with a single procedure.

The written energy control procedure required by this standard need not be overly complicated or detailed, depending on the complexity of the equipment and the control measures to be utilized. For example, if there is a single machine with a single energy source that must be isolated, and the control measure chosen is simple, such as opening an electrical disconnect and locking out that energy source during servicing, the written procedure could be very simple. The steps set forth in the standard can be incorporated into the procedure with very little detail, reflecting the lack of complexity of the control measure. In addition, the employer's procedures may not need to be unique for a single machine or task, but can apply to a group of similar machines, types of energy and tasks if a single procedure can address the hazards and the steps to be taken satisfactorily.

OSHA believes that because of the need to follow the steps in the energy control procedure carefully and specifically, and the number of variables involved in controlling hazardous energy, a documented procedure is necessary for most energy control situations. However, the Agency has determined that in certain limited situations, documentation of the procedure will not add markedly to the protections otherwise provided by the standard. These situations incorporate several common elements: First, there is a single source of hazardous energy which can be easily identified and isolated, and there is no potential for stored or residual energy in the equipment. This greatly simplifies the procedure for controlling the energy, since the single energy source is all that need to be isolated. Second, the isolation and locking out of that single energy source will totally deenergize and deactivate the machine or equipment. There are no collateral sources of energy which need to be addressed. Third, 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 or maintenance. As used in this provision, exclusive control means that the authorized employee is the only person who can affix or remove the device. The authorized employee follows all steps necessary for deenergizing the equipment, verifying the deenergization, performing the work, and reenergizing the equipment upon completion of

servicing. Because the energy control elements are simple, with a single energy source being locked out and no other potential sources of unexpected activation or energization, the authorized employee can perform them without referring to a written document. Fourth, while the equipment is locked out, the servicing or maintenance cannot expose other employees to hazards. For example, shutdown and lockout of a conveyor cannot cause jams or other hazards at other conveyors which feed into the conveyor being serviced.

The exception is intended to apply to situations in which the procedure for deenergization, servicing, and reenergization can be carried out without detailed interactions of energy sources, machines, and employees. For example, a motor in a small machine shop is wired into a single electrical disconnect, with no other energy source, and the motor does not present the hazards of stored or residual energy. When the motor needs repair, the authorized employee can isolate the motor from the single energy source and lock it out, using his/her personal lockout device on the disconnect, in accordance with the procedures set forth in the standard. Under these conditions, and provided that no other employees are exposed to hazards from the servicing operation, the servicing may be performed without the need to document the energy control procedure.

When all of the conditions for the exception are met, the standard does not require the employer to document the energy control procedure. However, if the employer, in utilizing this exception, has an accident involving the machinery or equipment, in which the unexpected release of hazardous energy is a factor, this indicates the need for more formal treatment of the energy control procedure, and documentation then becomes necessary.

It should also be noted that a small business does not necessarily have small energy control problems. Much complex machinery and equipment can be found in workplaces with few employees, especially in highly-automated companies. From the standpoint of the safety to be achieved from development of end compliance with a written energy control procedure, there is nothing to indicate that a small employer needs a written procedure any less than a large employer. As discussed earlier, the available data clearly demonstrate the need for written procedures to control hazardous energy. For example, the BLS Work Injury Reports (WIR) (Ex. 3-3) indicated that printed instructions or posted