

OSH INFORMATION MEMORANDUM 90-X-86

TO: All OSH Compliance Personnel

FROM: W.M. Lybrand

DATE: January 2, 1991

SUBJECT: Inspection Guidelines for Enforcing the Control of Hazardous Energy Sources (Lockout/Tagout)

A. Background.

1. Since the inception of its enforcement program, OSHA had to rely on the use of the "General Duty Clause" to ensure that employers provided safeguarding for their employees through the use of lockout/tagout from the hazards involving the unintentional release of hazardous energy. This approach met with limited success and therefore required the development and promulgation of a lockout/tagout standard.
2. Federal OSHA has been working since 1977 to gather sufficient information to enable the Agency to write a comprehensive standard for hazardous energy control in general industry. The final rule addresses practice 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 1910.

B. Effective Dates.

The standard was adopted on November 21, 1989 and administratively stayed until January 2, 1990.
Previously existing 1910.147 was redesignated as 1910.150, Sources of Standards

C. Inspection Guidelines.

This standard incorporates performance requirements which allow employers flexibility in developing lockout/tagout programs suitable for their particular facilities. In addition to the standard itself, the preamble accompanying it provides further guidance.

1. Evaluation of compliance with 1910.147 shall be conducted during all general Industry inspections with the scope of the standard. The review of records shall include special attention to injuries related to maintenance and servicing operations.
2. The compliance officer shall evaluate the employer's compliance with the specific requirements of the standard. The following guidance provides a general framework that is designed to assist the CO/IH with all inspections.
 - a. Ask the employer for 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 will aid in determining the adequacy of the program.
 - 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 document procedure must identify the specific type 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 procedure for a particular machine or equipment when all eight 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 part of this evaluation (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 1910.147 (c)(7)(ii) and (d)(4)(iii).
- d. Evaluate the employer's manner of enforcing the program (1910.147 (c)(4)(ii)).
3. The compliance officer shall evaluate the employer's compliance with the specific requirements of the standard, with particular attention to the following items:
 - a. Evaluate compliance with requirements for periodic inspection of procedures.
 - b. Ensure that the person performing the periodic inspection is an authorized employee other than the one implementing the procedure being inspected.
 - c. Evaluate compliance with retraining requirements as a result of periodic inspection of procedures and practices or changes in equipment/processes.
 - d. Evaluate employer's procedure and training program for assessment and correction of situations resulting in near misses and/or injuries, or under any circumstances which would indicate that modifications are necessary.
 - e. Identify procedures for release of lockout/tagout including machine or equipment inspection, notification and safe positioning of employees and removal of lockout/tagout device(s).
 - f. Ensure that where group lockout/tagout is used, it affords a level of protection equivalent to individual lockout or tagout.

The lockout/tagout 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.

D. Scope of the Standard

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

- a. The standard applies to piping systems, and requires, at 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.
- b. The standard also applied to high intensity electromagnetic fields regulated at 1910.97 nonionizing radiation. Such electromagnetic devices shall be deenergized and held off whenever workers are present within a high intensity ambient field
- c. Servicing/maintenance of fire alarm and extinguishing systems and their components, upon which other employees are dependent on fire safety, are not required to meet the requirements of this standard if the worker performing servicing/maintenance upon fire extinguishing systems are protected from hazards related to the unexpected release of hazardous energy by appropriate alternative measures. (1910. Subpart L)
- d. The standard does not apply to servicing and maintenance when employees are not exposed to the unexpected release of hazardous energy
- e. Safeguarding workers from the hazards of contacting electrically live parts (exposure to electric current) continues to be regulated in Subpart S.
- f. Servicing and maintenance functions conducted during normal production operations are not regulated at 1910.147 if the safeguarding provisions of Subpart O or other applicable portions of 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
- g. Generally, activities such as lubrication, cleaning or unjamming, servicing machine or equipment and making adjustments or tool changes, where the employee may be expose to the UNEXPECTED energization or start-up of the equipment or releases 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.

- h. The exclusion of plug and cord connected equipment, at 1910.147(a)(2)(iii)(A), applies only when the equipment is unplugged and the plug is under 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 1910.147(c)(4)(i) 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 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. 1910.147(d)(3) and (d)(5) provide that energy isolation be a mandatory part of the employer's control procedure where either a lockout system or a tagout system is used.
- c. Similar machines and/or equipment (such as those using the same type and magnitude of energy and the same or similar types of controls) can be covered with a single written procedure.

3. Lockout vs. Tagout

- a. OSHA has determined that lockout is a surer means of ensuring deenergization of equipment than tagout, and that is the preferred method.
- b. Section 1910.147(c)(3)(ii) provides that: When using a tagout program in those instances where the equipment is capable of being locked out, the employer shall demonstrate that the tagout program will provide a level of safety equivalent to that obtained when using a lockout program. Additional means beyond those necessary for lockout are required. (Additional means include: additional safety measures such as the removal of an isolating circuit element, blocking of a controlling switch, opening of an extra disconnection device or the removal of a valve handle to reduce the likelihood of inadvertent energization.)
- c. Section 1910.147(c)(4)(ii) provides that: Where lockout/tagout programs are used, the employer is required to implement an effective means of enforcing the program.

- d. Section 1910.147 (c)(7)(ii)(A-F) provide that: additional training of unauthorized, affected and other employees is required when tagout programs are used.
- e. Section 1910.147 (c)(5)(ii)(A) requires that lockout and tagout devices be capable of withstanding the environment to which they are exposed. Devices which are not exposed to harsh environments need not be capable of withstanding such exposures.
- f. Section 1910.147 (c)(5)(ii)(C)(2) requires that tagout devices having reusable, non-locking, easily detachable means of attachment (such as string, cord or adhesive) are not permitted.

4. Employees and Training

- a. The standard recognizes three types of employees: (1) “authorized” and (2) “affected”, defined in 1910.147 (b), and (3) “other”, defined in 1910.147 (c)(7)(ii)(C). Different level of training are required based upon the respective roles of employees in the control of energy and the knowledge which they must possess to accomplish their tasks safely and to ensure the safety of fellow workers as related to the lockout/tagout procedures (1910.147 (c)(7)(i)).
- b. Employees who exclusively perform functions related to normal production operations, and who perform servicing and/or maintenance under the protection of normal machine safeguarding need only be trained as “affected” (rather than “authorized”) employees even if tagout procedures are used.
- c. The employer’s training program must cover, at a minimum, the following three areas: energy control program, elements of energy control procedures relevant to employee duties, and the pertinent requirements of the standard 1910.147 (c)(7) and (d) through (f).
- d. The employer must provide:
 - 1. Effective initial training;
 - 2. Effective retraining as needed; and
 - 3. Certification of training. The certification shall contain each employee’s name and dates of training (1910.147 (c)(7)(iv)).
- e. Retraining of authorized and affected employees is required:
 - 1. Whenever there is a change in employee job assignments;
 - 2. Whenever a new hazard is introduced due to a change in machines, equipment or process;
 - 3. Whenever there is a change in the energy control procedures; or
 - 4. Whenever a periodic inspection by the employer reveals inadequacies in the company procedures or in the knowledge of the employees.

5. Periodic Inspection by the Employer

- a. 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 (1910.147(c)(6)(i)).

1. When lockout is used, the employer's inspection shall include a review of the responsibilities of each authorized employee implementing the procedure with that employee. 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.
 2. When tagout is used, the employer shall conduct this review with each affected and authorized employee.
 3. Energy control procedures used less frequently than once a year need to be inspected only when used.
 - b. The periodic inspection must provide for and ensure effective correction of identified deficiencies (1910.147 (c)(6)(i)(B)).
 - c. The employer is required to certify that the prescribed periodic inspections have been performed (1910.147(c)(6)(ii)).
6. Equipment Testing or Positioning Under 1910.147(f)(1), OSHA allows the temporary removal of lockout or tagout devices and the reenergization of the machine or equipment ONLY during the limited time necessary for the testing or positioning of machines, equipment or components. After the completion of the temporary reenergization, the authorized employees shall again deenergize the equipment and resume lockout/tagout procedures.
7. Group Lockout/Tagout Group lockout/tagout procedures shall be tailored to the specific industrial operation and may be unique in the manner that employee protection from the release of hazardous energy is achieved. Irrespective of the situation, the requirements of this generic standard specify that each employee performing maintenance or servicing activities shall be in control of hazardous energy during his/her period of exposure.
- a. Group operations normally require that a lockout/tagout program be implemented which ensures that each authorized employee is protected from the unexpected release of hazardous energy by his/her personal lockout/tagout devices(s). No employee may affix the personal lockout/tagout device of another employee. Various group lockout/tagout procedures discussed in Appendix C provide for each authorized employee's use of his/her personal lockout/tagout devices(s).
 - b. One of the most difficult problems addressed by the standard involves the servicing and maintenance of complex equipment. Such equipment is frequently used in the petrochemical and chemical industries. Acceptable

group lockout/tagout procedures for complex equipment are discussed further at Appendix C.

8. Compliance with Group Lockout/Tagout. These operations shall, at a minimum, provide the following:
 - a. Before the machine or equipment is shut down, each authorized employee who is to be involved during the servicing/maintenance operation shall be made aware by the employer of the type, magnitude, and hazards related to the energy to be controlled and of the method or means to control the energy. In the event that the machine or equipment is already shut down, the authorized employee shall be made aware of these elements before beginning his/her work (1910.147 (d)(1)). Verification shall be performed as noted at D.8.f. of this instruction.
 - b. An orderly shutdown of the machine or equipment shall be conducted which conforms to the documented company procedure and which will not create hazards (1910.147(d)(2)).
 - c. All energy isolating devices needed to isolate the machine or equipment shall be effectively positioned and/or installed (1910.147(d)(3)).
 - d. The authorized employees(s) performing the servicing or maintenance (following the company procedure) shall personally affix a lock or tag upon each energy isolation device (1910.147 (d)(4)(i)). The company procedure must ensure that no employee affixes a personal lockout/tagout device for another employee.
 1. A single lock upon each energy isolating device, together with the use of a lockbox for retention of the keys and to which each authorized employee affixes his/her personal lock or tag, also satisfies the requirement of (1910.147 (f)(3)(i)).
 2. Locks shall be affixed in a manner that will hold the energy isolating device in a safe (off) position (1910.147(d)(4)(ii)).
 3. Tagout devices, where used, shall be affixed at the same location as would a lock if such fittings are provided, or shall be affixed in a manner that will clearly indicate that movement of the isolating device is prohibited (1910.147 (d)(4)(iii)).
 - e. Following the application of locks or tags, all potentially hazardous stored energy or residual energy shall be relieved, disconnected, restrained, and otherwise rendered safe (1910.147 (d)(5)(i)).
 1. Verification of energy isolation shall be monitored as frequently as necessary if there is a possibility of reaccumulation of stored energy (1910.147(d)(5)(ii)).
 2. Monitoring may be accomplished, for example, by observation or with the aid of a monitoring device which will sound an alarm if a hazardous energy level is being approached.
 - f. Authorized employees shall verify that isolation and deenergization have been effectively accomplished before starting servicing/maintenance work. Verification is also necessary by each group of workers before starting work at shift changes.

- g. Release from lockout/tagout shall be accomplished in compliance with the requirements at 1910.147 (e).
 - 9. The machine or equipment area shall be cleared of nonessential items to prevent malfunctions which could result in employee injuries (1910.147 (e)(1)).
 - 10. The authorized employees shall remove their respective locks or tags from the energy isolating devices for from the group lockbox(s) following the procedure established by the company (1910.147(e)(3)).
 - 11. In all instances, the company procedure must provide a system which identifies each authorized employee involved in the servicing/maintenance operation.
 - 12. Before reenergization, all employees in the machine or equipment area shall be safely positioned or moved from the area, and the affected employees shall be notified that the lockout/tagout devices have been removed (1910.147(e)(2)).
 - h. During all group lockout/tagout operations where the release of hazardous energy is possible, each authorized employee performing servicing or maintenance shall be protected by his/her personal lockout or tagout device and by the company procedure. As described at Appendix C, B.1.g., a master tag is a personal tagout device if each employee personally signs on and signs off on it and if the tag clearly identifies each authorized employee who is being protected by it.
9. Compliance of Outside Personnel Outside servicing and maintenance personnel (contractors, etc.) engaged in activities regulated under 1910.147 are subject to the requirements of that standard.
- a. The CO/IH shall verify that the outside employer and the on-site employer have exchanged information regarding the lockout/tagout energy control procedures used by each employer's workers (1910.147(f)(2)(i)).
 - b. The CO/IH shall verify that the on-site employer has effectively informed his/her personnel of the restrictions and prohibitions associated with the outside employer's energy control procedures (1910.147(f)(2)(ii)).
 - c. When an outside employer is engaged in servicing and maintenance activities within an on-site employer's facility and if that contractor's activities are subject to the requirements of 1910.147, the CO/IH shall coordinate with the Assistant Director to obtain permission to initiate an independent inspection of the outside contractor's activities.
10. Appendix B contains an example of a functional flow diagram to implement safe lockout/tagout procedures. This flow diagram is presented solely as an aid and does not constitute the exclusive or definitive means of complying with the standard in any particular situation.

E. Classification of Violations.

1. Serious violations shall be issued whenever a deficiency in the employer's energy control program and/or procedure can contribute to a potential exposure capable of producing serious physical harm or death.
2. The lack of training of authorized, affected, and other employees shall normally be cited as serious.
3. Paperwork deficiencies in lockout/tagout programs where effective lockout/tagout work procedures are in place shall be cited as other than serious.