LOCKOUT / TAGOUT
Program Requirements Guide
November 2017

This guide was developed as an aid for DOE facilities to help ensure that their site Lockout Tagout (LOTO) program meets the **minimum** regulatory requirements. The minimum requirements are based on the consensus opinion of the Hazardous Energy Control (HEC) subgroup of the Energy Facility Contractor Group – Electrical Safety Task Group (EFCOG-ESTG). The HEC subgroup utilized and evaluated a crosswalk of requirements that included 29 CFR 1910.147, NFPA 70E 2015 Edition, 29 CFR 1910.333 Subpart S, 29 CFR 1926.417 Subpart K, ASSE Z244.1, and DOE Order 422.1 Conduct of Operations (as applicable) to determine minimum requirements.

1. All lockout tagout programs/procedures **shall have** a "Purpose" statement that generally describes the implementation of the lockout tagout program. A **sample** statement is identified below:

    a. *This program/procedure has been developed to implement the applicable requirements of Occupational Safety and Health Administration (OSHA) 1910 and 1926 regulations, applicable parts of National Fire Protection Association (NFPA) 70E standard, Department of Energy (DOE) O 422.1, Conduct of Operations, and ANSI Z244.1 to provide a consistent method to protect employees from hazardous energy while performing servicing or maintenance of equipment through the use of lockout and tagout. 29 CFR 1910.147(a)(3)(i)*

2. All lockout tagout programs/procedures **shall have** a "Scope and Applicability" section that describes what the program/procedure covers and what it does not. A **sample** description of scope and applicability is identified below:

    a. *This program/procedure establishes the requirements for isolating hazardous energy during servicing or maintenance of equipment where the unexpected energization or startup of the equipment or release of stored energy could cause injury to personnel. 29 CFR 1910.147(a)(1)(i)*

    b. *This program/procedure applies to the control of all forms of hazardous energy including but not limited to electrical, hydraulic, pneumatic, mechanical, chemical, thermal, radiation from radiation generating machines, and other potentially hazardous sources such as toxic substances contained within a system. 29 CFR 1910.147(a)(2)(i)*

    c. *This program/procedure applies to all personnel, contractors/subcontractors, and vendors. NFPA 70E 120.2(B)(1)*

This program/procedure does not cover:

a. *Hot-tap operations involving transmission and distribution systems for substances such as gas, water, steam, or petroleum products when performed on pressurized pipelines provided that all of the following conditions are met:*

- *Continuity of service is essential*
- *Shutdown of the system is impractical*
- *Documented programs are followed and special equipment is used which will provide proven effective personnel protection. 29 CFR 1910.147(a)(2)(iii)(B)*

b. *Installations under the control of electric utilities for the purpose of power generation, transmission, and distribution, including related equipment for communication or metering. 29 CFR 1910.147(a)(2)(C)*

c. *Energized electrical conductors and circuit parts that operate at less than 50 volts to ground if there is no increased exposure to electrical burns or to explosion due to electric arcs. 29 CFR 1910.333(a)(1)& NFPA 70E 130.2(A)(3)*

d. *Work on cord-and-plug-connected electric equipment for which exposure to the hazards of unexpected energization or startup of the equipment is controlled by the unplugging of the equipment from the energy source and by the plug being under the exclusive control of the employee performing the servicing or maintenance. 29 CFR 1910.147(a)(2)(iii)(A)*

e. *When physical separation from the hazardous energy source(s) is achieved and properly identified by tags or configuration management documentation. EFCOG* Best Practice #180 *Lockout Tagout Applicability to Physical Separation.*

3. All lockout tagout programs/procedures **shall have** a "General Information" section that further describes specifics of the LOTO program/procedure that is not covered elsewhere. An **example** of items that may be found in the general information section are listed below:

a. *The lockout devices and tagout devices mentioned in this program shall be the only devices used for controlling hazardous energy during servicing and maintenance activities and shall not be used for any other purpose. 29 CFR 1910.147(c)(5)(ii) & NFPA 70E 120.2(E)(2)*

b. *Each employee working under the protection of a LO/TO shall be protected by a personal lock or personal danger tag under the exclusive control of that employee. 29 CFR 1910.147(f)(3)(ii)(D) & NFPA 70E 120.2(D)(2)(d)*

c. *If an energy isolating device is not capable of being locked out, the employer's energy control program shall utilize a tagout system. 29 CFR 1910.147(c)(2)(i)*

NOTE: NFPA 70E 2015 permits the use of tagout only on equipment that by design precludes the use of a lock. Under these circumstances the isolation device shall not be the only means used to establish an electrically safe work condition. When tagout alone is used to establish an electrically safe work condition, one additional safety measure shall be employed.

d. *If an energy isolating device is capable of being locked out, the employer's energy control program shall utilize lockout, unless the employer can demonstrate that the utilization of a tagout system will provide full employee protection. 29 CFR 1910.147(c)(2)(ii)*

e. *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.*(29 CFR 1910.147(c)(3)(i)) *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.29 CFR 1910.147(c)(3)(ii)& NFPA 70E 120.2(F)(2((k)(4)*

NOTE: NFPA 70E 2015 does not allow the option of utilizing a tagout method only when working on exposed conductors or circuit parts. An additional safety measure must be put in place such as removing fuses or opening extra disconnecting switches. NFPA 70E 2015 120.2(F)(2)(k)(4)

4. All lockout tagout programs/procedures **shall have** a "Defined Terms" section that adequately describes specific terms used in the LOTO program/procedure. An **example** of terms that may be included in the defined terms section are included below:

- **a.** Affected Employee
- **b.** Authorized Employee
- **c.** Capable of being locked out
- **d.** Energized
- **e.** Energy Isolating device
- **f.** Energy source
- **g.** Exclusive control
- **h.** Hot Tap
- **i.** Lockout
- **j.** Lockout device
- **k.** Normal production operations
- **l.** Operational try/Attempt to start

m. Personal danger tag
n. Physical separation
o. Servicing and or maintenance
p. Tagout
q. Tagout device
r. Zero Energy Verification
s. Absence of voltage verification

5. All lockout tagout programs **shall have** a requirement to train employees who perform activities related to the performance of LO/TO.

a. *Employees assigned to perform activities related to the performance of LO/TO shall be trained to understand their respective roles and responsibility in the LO/TO process outlined in this program/procedure. 29 CFR 1910.147(c)(7)(i)(A) & NFPA 70E 120.2(B)(2)*

b. *Employees affected by the LO/TO or working in an area in which servicing and or maintenance is being performed must be trained to understand their role and responsibility in the LO/TO process. 29 CFR 1910.147(c)(7)(i)(B) & NFPA 70E 120.2(B)(2)*

c. *Provide re-training for employees whenever there is a change in the equipment or processes that present a new hazard. When there is a change in the energy control procedures, or when there are deviations or inadequacies in the employee's knowledge or use of the procedure. 29 CFR 1910.147(c)(7)(iii)(A&B) & NFPA 70E 120.2(B)(3)*

6. All lockout tagout programs **shall have** a requirement to audit the LO/TO program/procedure to ensure the program/procedure requirements are being followed.

a. An annual audit shall be performed on the energy control procedure and at least one LO/TO in progress. The audit shall be conducted to correct any deficiencies in the procedure or correct employee understanding of the procedure. Deficiencies shall be corrected. *29 CFR 1910.147(c)(6)(i &ii) & NFPA 70E (120.2(C)(3)*

7. All lockout tagout programs **shall have** application of controls.

a. *Notify affected employees prior to application of controls. 29 CFR 1910.147(c)(9)*

b. *Shutdown machine or equipment using established procedures. 29 CFR 1910.147(d)(2)*

c. *Isolate the machine or equipment from the energy source. 29 CFR 1910.147(d)(3) & NFPA 70E 120.2(F)(2)(a)*

d. *Install lockout device to secure the Energy Isolating Device. 29 CFR 1910.147(d)(4)(i) & NFPA 70E 120.2(F)(2)(k)*

e. *Release stored or residual energy. 29 CFR 1910.147(d)(5) & NFPA 70E 120.2(F)(2)(b)*

f. *Verify machine or equipment is isolated and de-energized. 29 CFR 1910.147(d)(6) & NFPA 70E 120.2(F)(2)(e&f)*

1. *For electrical energy hazards a qualified person shall use test equipment to test the circuit elements and electrical parts of equipment to which employees will be exposed and shall verify the circuit elements and equipment are de-energized. The test shall also determine if any energized condition exists as a result of inadvertently induced voltage or unrelated voltage back-feed even though specific parts of the circuit have been de-energized and presumed to be safe. Test equipment used to verify absence of voltage shall be tested prior to and after verification to ensure proper operation of the test equipment. NFPA 70E 2015 120.2(F)(2)(f)(1)*

NOTE: Perform servicing/maintenance.

g. *Release from lockout or tagout. 29 CFR1910.147(e) & NFPA 70E 120.2(F)(2)(m)*

Additional Requirements 29 CFR 1910.147(f)

1. *All lockout tagout programs shall have a requirement for temporary clearances for testing or positioning of equipment. 29 CFR 1910.147(f)(1) & NFPA 70E 120.2(F)(2)(n)*

- **a.** *Clear the machine or equipment of tools and materials. 29 CFR 1910.147 (f)(1)(i)*
- **b.** *Remove employees from the machine or equipment area. 29 CFR 1910.147 (f)(1)(ii)*
- **c.** *Remove lockout or tagout devices. 29 CFR 1910.147 (f)(1)(iii)*
- **d.** *Energize and proceed with positioning and testing. 29 CFR 1910.147 (f)(1)(iv)*
- **e.** *De-energize all systems and re-apply lockout or tagout. 29 CFR 1910.147 (f)(1)(v)*

2. *Removal of authorized employee lockout tagout device when the employee is not available. 29 CFR 1910.14(e)(3)*

3. *Outside personnel (contractors)*

- **a.** *Whenever outside personnel are engaged in activities covered by the scope and application of this guideline, the on-site employer and the outside employer shall be informed of each other's respective lockout tagout procedure. 29 CFR 1910.147(F)(2)*

4. *Group lockout or tagout*

- ***a.*** *When performed, group lockout/tagout shall utilize a procedure. 29 CFR 1910.147(f)(3)(i) & NFPA 70E 2015 120.2(D)(b)*

5. *Shift or personnel changes*

- ***a.*** *Specific procedures shall be utilized during shift or personnel changes to ensure the continuity of lockout or tagout protection. 29 CFR 1910.147(f)(4) & NFPA 70E 2015 120.2(F)(2)(h)*

NOTE: DOE Order 422.1 "Conduct of Operations" *attachment 2 paragraph 2(i)* specifically cites lockout and tagouts (LOTO), however DOE Order 422.1 may not apply at every DOE site. Conduct of operations may or may not be specifically identified and/or implemented in a sites contractor requirements document (CRD). Each site must therefore determine applicability of the order based on paragraph 3 "Applicability". Implementation of Conduct of Operations in a sites LOTO program/procedure is then dependent on applicability and whether the order is institutionalized in a sites (CRD) per DOE Order 422.1 paragraph 4 "Requirements".

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