



## **CONSTRUCTION ENVIRONMENTAL HEALTH & SAFETY EXHIBIT** **CONTROL OF HAZARDOUS ENERGY**

### **I. Definitions**

- A. Affected Employee: Any employee whose assigned job or task requires him/her to operate or use a machine/equipment/system on which servicing, testing, or maintenance is being performed under lockout/tagout (LO/TO), or one who is working in the area where such servicing, testing, or maintenance is being performed.
- B. Authorized Employee: The person(s) who has been trained in accordance with this Exhibit that locks/tags out machines, equipment, circuits, or systems to allow servicing or maintenance on that system. The authorized employee is typically the controlling supervisor or **Foreman** responsible for overseeing any operation where the potential release of hazardous energy may occur.
- C. Hazardous Energy: Energy, in any form, that when released in an uncontrolled or unexpected manner has the potential to cause injury or property damage. Hazardous energy forms include electrical, fluid systems (water, coolant, process chemicals, etc.), pneumatic, gaseous, thermal, and gravity (e.g. raised loader bucket).
- D. Isolating Device: Any device that physically blocks or stops the flow of hazardous energy. Isolating devices include breakers, valves, piping blanks/blinders, key switches, lever arms, etc.
- E. Lockout Device: Any device that, when installed over an isolating device or as an integral block/blank in a piping system, positively restricts the isolating device from being energized or activated.
- F. Zero Energy: The state of a machine, equipment, circuit, or system where LO/TO has been performed and where there is no possibility of hazardous energy release.

### **II. General Requirements**

- A. The Contractor shall establish a program consisting of energy control procedures, employee training and periodic inspections to ensure that before any employee performs any servicing or maintenance on a machine or equipment where the unexpected energizing, startup or release of stored energy could occur and cause injury, the machine or equipment shall be isolated from the energy source and rendered inoperative. This program shall be part of the **Contractor's HASP**.
- B. The employer's **Competent Person** shall ensure that all **Employees** involved in the operation requiring LO/TO possess the knowledge and skill required to perform the duties for which they are assigned. In addition, a hazard analysis shall be completed prior to the operation.
- C. At a minimum, all employees shall be trained in accordance with the requirements of this Exhibit and the applicable hazard analysis prior to commencement of the operation. The training shall include recognition of potential energy release sources, avoidance of energy release hazards, recognition of unsafe conditions that could potentially lead to the release of energy, types of LO/TO methods used for the operation, roles and responsibilities for affected and authorized employees, correct procedures for locking and tagging energized equipment/systems, and correct procedures for re-energizing systems and notifications.
- D. Locks used to lock out energized machines/equipment/systems shall be keyed differently, and only one key shall exist for each lock. The key used to lock out equipment shall remain in the possession or under the control (i.e. in a key lock box) of the authorized employee until the system is re-energized.



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- E. Tags used to identify locked machines/equipment/systems shall be ‘Danger’-type tags, and shall include the date, the name and phone number of the authorized employee, and the reason for the lock out.
- F. Service on corded tools and equipment will be deemed to comply if the cord is unplugged and is in the possession of the person conducting the servicing.
- G. Where work on energized systems is required and necessary, the requirements outlined in the Harvard Construction HUEHS Electrical Safety Exhibit shall be adhered to. NOTE: It is assumed that it is feasible and practical to isolate, lock, and tag all hazardous energy sources, except those instances where continuity of service is essential to life and health.
- H. Where isolation or LO/TO of the owner’s equipment or systems is required, prior approval shall be obtained. The Utility Disruption Permit shall be used.

### **III. Lockout/Tagout Procedure (Minimum Requirement)**

#### A. Achieve Zero Energy:

NOTE: Verification of zero energy (which includes voltage testing and metering) is considered energized electrical work and requires the use of Voltage-rated Tools and Personal Protective Equipment as listed in Tables 130.7 (C)(9)(a) and 130.7 (C) (10) of NFPA 70E.

- 1. Identify and locate all sources of energy that could affect individuals involved.
- 2. The authorized employee shall notify all affected personnel that the equipment is going to be de-energized and accessed.
- 3. Isolate and disconnect the main source(s) of power by breaking the primary power circuit/valve/pipe, etc. NOTE: For electrical disconnects, ensure that all loads are shed from the circuit prior to de-energization.
- 4. Isolate and disconnect each separate power source of multiple power systems (e.g. pneumatic over hydraulic, electric over fluid, etc.)
- 5. Release all residual energy remaining behind the power source (e.g. pneumatic, fluid, hydraulic, electrical capacitor, batteries, springs, etc.)
- 6. The authorized employee (controlling supervisor) shall secure all power sources in the de-energized position with the proper lockout device (e.g. lock, circuit breaker hasp and lock, valve hasp and lock, etc.). **Multiple locks will be required when more than one trade or group must work on the same de-energized system.**  
NOTE: All affected employees have the right to place his/her own lock on any de-energized system that he/she is required to work on.
- 7. Each person who is protected by the lockout, or the authorized person, shall place a lock and tag on the source location.
- 8. The person performing the lockout shall remain in possession of the sole key for that lock and **shall only work on the de-energized/protected equipment.** The lock can only be removed by the individual that performed the lockout, and only at the completion of the work (as noted below).
- 9. Test the equipment, prior to working on it, to ensure that all sources of energy have been isolated. This can be accomplished by attempting to energize the unit/system downstream of the isolating lock (i.e. at the unit), by electrically testing any circuits downstream, attempting to produce gas/water/steam flow in a line downstream of the isolating lock, etc. No systems should be worked upon until positive recognition of a ‘zero energy state’ is attained.

#### B. Re-Energization of the System



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1. Once the task has been completed, the authorized employee shall ensure that all tools have been picked up/removed, all safety chains, guards, guardrails, warning signs, etc., have been re-installed, and all repairs have been made appropriately.
  2. The authorized employee shall notify all affected persons that the LO/TO device is going to be removed.
  3. The authorized employee shall remove the lock and tag only after the above items B.1 and B.2 have been completed.
  4. Restart the equipment and inspect for proper function.
- C. Temporary Operation of a Locked-Out Source
1. The authorized employee shall inspect the work area to ensure that all personnel, tools, etc. are clear of the system.
  2. The authorized employee shall notify all affected employees of the forthcoming system temporary energization ('system bump').
  3. The authorized employee shall remove the lock from the system.
  4. The authorized employee shall energize the system and conduct the 'bump' or system check.
  5. The authorized employee shall immediately de-energize the system and replace the locks/tags.
  6. Inform all affected employees of the de-energization.

#### **IV. Reference**

1910.147, The Control of Hazardous Energy (Lockout/Tagout)

ANSI/ASSP A10.44-2014, Control of Energy Sources (Lockout/Tagout) for Construction and Demolition Operations