CONTROL OF HAZARDOUS ENERGY (LOCKOUT/TAGOUT) OSHA STANDARD 1910.147

I. INTRODUCTION

Harford Community College (HCC) is committed to providing a safe work environment for its employees and must comply with certain state and federal regulations. This Hazardous Energy Control program establishes requirements and procedures to protect employees from the unintended or unexpected release of potentially hazardous energy, which could cause injury or death, during the adjustment, repairing, servicing, or installing of equipment, machines, processes, or circuits. The standard identifies the practices and procedures necessary to shut down and lockout or tagout machines or equipment, requires that employees receive training in their role in the lockout/tagout program, and mandates that periodic inspections be conducted to maintain or enhance the energy control program.

This rule requires that, in general, before service or maintenance is performed on machinery or equipment, the machinery or equipment must be turned off and disconnected from the energy source, and the energy-isolating device must be either locked or tagged out.

This program applies to energy sources such as, but not limited to: electrical, mechanical, hydraulic, pneumatic, chemical, radiation, thermal (steam, hot water), compressed air / gas, mechanical or potential stored energy (raised loads, coiled springs).

II. SCOPE AND APPLICATION

The lockout/ tagout standard applies to general industry employment and covers the servicing and maintenance of machines and equipment in which the unexpected start-up or the release of stored energy could cause injury to employees. (If employees are

performing service or maintenance tasks that do not expose them to the unexpected release of hazardous energy, the standard does not apply.)

This program applies to all college employees whose job requires servicing and/or maintenance of machines/equipment. Training applies to all employees who will use lockout/tagout procedures. The training requires special lockout/ tagout instructions, rules, and techniques including, but not limited to:

1. Intended use of procedure;
2. Steps for shutting down, removal and transfer or lockout/tagout devices and responsibility; and
3. Requirements for testing to determine and verify the effectiveness of the lockout/ tagout devices.

The standard establishes minimum performance requirements for the control of hazardous energy.

The standard does not apply in the following situations:

1. While servicing or maintaining **cord** and **plug** connected electrical equipment. (Unplugging the equipment from the energy source must control the hazard; the plug must be under the exclusive control of the employee performing the service and/ or maintenance.)
2. During **hot tap operations** that involve transmission and distribution systems for gas, steam, water, or petroleum products when they are performed on pressurized pipelines; when continuity of service is essential, and shutdown of the system is impractical; and employees are provided with an alternative type of protection that is equally effective.
3. This program does not apply to **minor tool changes, adjustments and other minor servicing activities during normal operations** if they are routine, repetitive and integral to the use of the equipment AND alternative measures that provide effective protection are also used (i.e., proper use of manufacturer-required and recommended machine guards.

In certain circumstances, however, some hazards encountered during normal production operations may be covered by the lockout/ tagout rule. The following are some examples:

1. The employee must either remove or bypass machine guards or other safety devices, resulting in exposure to hazards at the point of operation:
2. The employee is required to place any part of his or her body in contact with the point of operation of the operational machine or piece of equipment; or
3. The employee is required to place any part of his or her body into the danger zone associated with a machine operating cycle.

In the above situations the equipment must be de-energized and locks or tags must be applied to the energy isolation device.

III. PROVISIONS OF THE STANDARD

A. Energy Control Program

The lockout/tagout rule requires that the employer establish an energy control program that includes (1) documented energy control procedures, (2) an employee-training program, and (3) periodic inspections of the procedures. The standard requires employers to establish a program to ensure that machines and equipment are isolated and inoperative before any employee performs service or maintenance where the unexpected start up, or release of stored energy could occur and cause injury.

Employers have the ability to develop a program and procedures that meet the needs of their particular workplace and the particular types of machines and equipment being maintained or serviced.

B. Energy Control Procedure

This standard requires that energy control procedures be developed, documented, and used to control potentially hazardous energy sources whenever workers perform activities covered by the standard.

The written procedures must identify the information that authorized employees must know in order to control hazardous energy during service or maintenance. If this information is the dame for various machines or equipment or if other means of logical grouping exists, then a single energy control procedure may be sufficient. If there are other conditions - such as multiple energy sources, different connecting means, or a particular sequence that must be followed to shut down the machine or equipment- then the employer must develop separate energy control procedures to protect employees.

The energy control procedure must 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, it includes, but is not limited to, the following elements:

1. A statement on how the procedure will be used;
2. The procedural steps needed to shut down, isolate, block, and secure machines or equipment;
3. The steps designating the safe placement, removal, and transfer of lockout/ tagout devices and who has the responsibility for them; and
4. The specific requirements for testing machines or equipment to determine and verify the effectiveness of locks, tags, and other energy control measures.

The procedure must include the following steps: (1) preparing for shutdown, (2) shutting down the machine(s) or equipment, (3) isolating the machine or equipment from the energy source(s), (4) applying the lockout or tagout devise(s) to the energy-isolating device(s), (5) safely releasing all potentially hazardous stored or residual energy, and (6)

verifying the isolation of the machine(s) or equipment prior to the start of service or maintenance work.

In addition, before lockout or tagout devices are removed and energy is restored to the machines or equipment, certain steps must be taken to re-energize equipment after service is completed, including: (1) assuring that machines or equipment components are operationally intact; (2) notifying affected employees that lockout or tagout devices are removed from each energy-isolating device by the employee who applied them. [See sections 6(e) and 6(f) of 29CFR 1910.147 for specific requirements of the standard.]

C. Lockout/Tagout Steps

Only authorized employees who have received training as required by this program may lockout/tagout machines or equipment on which repair, service, or maintenance is to be performed.

The established procedures for the application of energy control shall cover the following elements and actions and shall be done in the following sequence:

1. **Preparation for shutdown**: Before an authorized or affected employee turns off a machine or piece of equipment, they shall have knowledge of the type and magnitude of the energy, the hazards of the energy to be controlled, and the method or means to control the energy.
2. **Machine or equipment shutdown**: An orderly shutdown must be utilized to avoid any additional or increased hazard(s) to employees as a result of equipment de-energization.
3. **Machine or equipment isolation**: All energy-isolating devices that are needed to control the energy to the machine or equipment shall be physically located and operated in such a manner as to isolate the machine or equipment from the energy source(s).
4. **Lockout or tagout device application**: Only authorized employees shall affix lockout or tagout devices to each energy-isolating device. Lockout devices, where used, shall be affixed in a manner that will hold the energy in a "safe" or "off" position. Tagout devices, where used, shall be affixed in such a manner as will clearly indicate that the operation or movement of energy-isolating devices from the "safe" or "off" position is prohibited.

Where tagout devices are used with energy-isolating devices designed with the capability of being locked, the tag shall be fastened at the same point at which the lock would have been attached. Where a tag cannot be affixed directly to the energy-isolating device, the tag shall be located as close as safely possible to the device, in a position that will be immediately obvious to anyone attempting to operate the device.

5. **Stored Energy**: Following the application of lockout or tagout devices to energy-isolating devices, all potentially hazardous stored energy shall be rendered safe. If there is a possibility of re-accumulation of stored energy to a hazardous level,

verification of isolation shall be continued until the servicing or maintenance is completed, or until the possibility of such accumulation no longer exists.

6. **Verification of Isolation**: Prior to starting work on machines or equipment that have been locked out or tagged out, the authorized employee shall verify that isolation and de- energization of the machine or equipment has been accomplished.
7. **Lockout or Tagout Device Removal**: the employee who applied the device shall remove each lockout or tagout device from each energy-isolating device. Before lockout or tagout devices are removed and energy is restored to the machine or equipment, the authorized employee(s) must take the following actions and observe the following procedures:

    a. Inspect the work area to ensure that non-essential items have been removed and that machine or equipment components are intact and capable of operating properly;
    b. Check area around the machine or equipment to ensure that all employees have been safely positioned or removed;
    c. Notify affected employees immediately after removing locks or tags and before starting equipment or machines; and
    d. Make sure that ONLY those employees who attached the locks or tags remove them. (With one exception.)

Exception: When the authorized employee who applied the lockout or tagout device is not available to remove it, that device may be removed under the direction of the installer's immediate supervisor. Specific training and procedures for such removal shall be provided by each department involved in lockout or tagout operations. The procedures and raining shall be documented. The documentation shall demonstrate that safety equivalent to the original process of having only the installer remove the device is maintained. The specific procedure shall include at least the following elements:

- Verification by the immediate supervisor that the employee who applied the device is not at the facility.
- Making all reasonable efforts to contact the authorized employee to inform them that his/her lockout or tagout device has been removed, and
- Ensuring that the authorized employee has this knowledge before they resume work at the facility

8. **Testing or Positioning of machines, equipment, or components thereof:** In situations where lockout or tagout devices must be temporarily removed from the energy-isolating device and the machine or equipment energized to test or position the equipment or component thereof, the following sequence of actions shall be followed:
    a. Clear the machine or equipment of tools and materials.
    b. Remove employees from the machine or equipment area.
    c. Remove the lockout or tagout devices.
    d. Energize and proceed with testing or positioning.

    e. De-energize all systems and reapply energy control measures to continue the servicing and/or maintenance.

9. **Outside Personnel (contractors, etc.)**: Whenever outside servicing personnel are to be engaged in activities covered by the scope and application of this program, the Facilities Maintenance Manager and the outside employer shall inform each other of their respective lockout or tagout procedures. The Facilities Maintenance Manager must make sure his/her employees understand the specifics of the Contractors program. All outside contractors who work with machinery or equipment must have their own Lockout/tagout program.
10. **Shift or Personnel Changes**: To insure the orderly transfer of the lockout or tagout devices between off-going and on-coming employees and minimize exposure to hazards from unexpected energization, start-up of the machine or equipment, or release of stored energy, these procedures shall be followed:

. The on-coming personnel shall notify the off-going personnel that they are ready to begin work on the machine or equipment

    a. All lockout and/or tagout devices attached to the machine or equipment by the off-going personnel shall be removed and immediately replaced by the on-coming authorized personnel.
    b. The primary authorized employee shall insure that all procedures were followed and that all necessary energy has been rendered safe.

11. **Group lockout or tagout**: During all group lockout/tagout operations where the release of hazardous energy is possible, each authorized employee performing service or maintenance shall be protected by his/her personal lockout or tagout device or comparable mechanism that affords equivalent protection.

D. Program Responsibilities:

Facilities Maintenance Manager and Personnel

1. Equipment Inventory: Facilities Department shall complete, keep current and provide the Manager for EOH with the inventory of all of their department's new or existing equipment, machines and systems that are serviced, maintained or repaired by their personnel, if such work exposes them to potentially hazardous energy sources. The inventory may combine groups of equipment together. The information obtained from this inventory is the basis for preparing appropriate lockout/tagout procedures for each item or groups of items and helps determine the appropriate level of training of authorized or affected employees.

<u>Appendix A can be used to document this information.</u>

2. Supervise employees to make sure they follow the written lockout/tagout procedures to protect against accidental or inadvertent operation, which could cause injury or death.
3. Ensure that before using contractors for work on the college grounds that written verification is kept on file certifying that the contractor will perform all work in

accordance with applicable provisions of the OSHA standards 1910.147 (general industry) and 1926.417 (construction).

Appendix E can be used to document compliance with this responsibility

Manager for EOH

1. Employee Lists: Complete and keep current with a list of all new and existing authorized employees and affected employees covered by this program.
2. Employee Training: Shall ensure that all new and existing authorized and affected employees receive appropriate hazardous energy control training.

Appendix B-1 may be used to document with this responsibility.

3. Program development, revisions, and periodic inspections: The EOHS is responsible for initial program development, written program revisions, periodic inspections and corrective action recommendations for any deviations or inadequacies identified.

Employees

1. Required use of lockout/tagout procedures: Before set up, adjustment, repair, service, or installation work on equipment covered by the scope of this program, authorized employees **must use written lockout/ tagout procedures** in order to prevent against accidental or inadvertent operation which could cause employee injury or death. **Only designated authorized employees who have received training as required by this program may lockout/tagout machines or equipment on which repair, service or maintenance is to be performed.** Any other employee, upon observing a machine or piece of equipment which is locked or tagged out to perform servicing or maintenance, shall not attempt to start, energize or operate any hazardous energy isolating device or disable any block, blank, or restraint device applied to such equipment.
2. Interlocks: Interlocks shall not be relied upon by any employee for safety and cannot be used in place of lockout protective devices.
3. Tagout Procedures Alone: Unless documented, as unsafe or not practical, lockout and tagout methods shall be used to achieve maximum safety. However, if a tag must be used instead of a lock the authorized employee must still follow the general hazardous energy control procedure except for applying the lockout device. In addition, the authorized employee must utilize a second means of isolating the hazardous energy. Examples of secondary measures include removal of an isolating circuit element, blocking of a control switch, opening of an extra disconnect device or removal of a valve handle. The second means of isolating must be identified on the tag, and tags must be affixed to both the energy-isolating device AND at the point of the second means of isolation.

E. Training

1. Authorized Employees and their immediate supervisors must receive initial training and special instructions concerning the scope, purpose, authorization, rules, and techniques for lockout/ tagout of hazardous energy sources. The training shall include, at a minimum, the following items:
    a. Recognition of the types of hazardous energy sources;
    b. Intended use of the lockout, tagout procedure;
    c. Steps for shutting down, neutralizing, isolating, holding and securing;
    d. Steps for placement, removal and transfer of lockout, tagout devices and the associated responsibility;
    e. Requirements for testing to determine and verify the effectiveness of lockout, tagout devices; and other appropriate measures necessary to protect employees from hazardous energy;
    f. Purpose, scope, and contents of the Harford Community College Hazardous Energy Control Program
2. *Affected Employees* are required to receive instructions concerning the purpose and use of energy control procedures and that they must never attempt to restart or re-energize machines or equipment which have been locked-out or tagged- out.

F. Requirements for Lockout/Tagout Devices:

When attached to an energy-isolating device, both lockout and tagout devices are tools that the employer can use in accordance with the requirements of the standard to help protect employees from hazardous energy. The lockout device provides protection by holding the energy-isolating device in the safe position, thus preventing the machine or equipment from becoming energized. The tagout device does so by identifying the energy-isolating device as a source of potential danger; it indicates that the energy-isolating device and the equipment being controlled may not be operated until the tagout device is removed. Whichever devices are used, they must be singularly identified, must be the only devices used for controlling hazardous energy, and must meet the following requirements:

1. **Durable**- Lockout and tagout devices must withstand the environment to which they are exposed for the maximum duration of the expected exposure. Tagout devices must be constructed and printed so that they do not deteriorate or become illegible, especially when used in corrosive (acid and alkali chemicals) or wet environments.
2. **Standardized** - Both lockout and tagout devices must be standardized according to color, shape, or size. Tagout devices must also be standardized according to print and format.
3. **Substantial**- Lockout and tagout devices must be substantial enough to minimize early or accidental removal. Locks must be substantial to prevent removal by excessive force of special tools such as bolt cutters or other metal cutting tools. Tag means of attachment must be non-reusable, attachable by hand, self-locking

and non-releasable, with a minimum unlocking strength of no less than 50 pounds.

4. **Identifiable**- Locks and tags must clearly identify the employee who applies them. Tags must also earn against hazardous conditions if the machine or equipment is energized and must include a legend such as the following: DO NOT START, DO NOT OPEN, DO NOT CLOSE, DO NOT ENERGIZE, and DO NOT OPERATE.

The device for attaching the tag also must have the general design and basic characteristics equivalent to a one-piece nylon cable tie that will withstand all environments and conditions.