



Control of Hazardous Energy (Lockout/Tagout) Program

1. **Purpose:** The purpose of the Hazardous Energy Control Program (Lockout/Tagout) is to prevent injury to employees caused by the unexpected energization, start-up, or release of stored energy. Sources of hazardous energy include radiation, electrical, mechanical, hydraulic, pneumatic, chemical, thermal, or other energy. This program establishes the minimum performance requirements found in the Virginia Occupational Safety and Health Standard (VOSH) 1910.147, "The Control of Hazardous Energy (Lockout/Tagout)."
2. **Scope/Applicability:** Any employee servicing or maintaining machinery or equipment, where the unexpected energization, start-up or release of stored energy could occur and cause injury, shall isolate and make inoperative the machinery or equipment before servicing. The following normal production operations are covered in this program:
 - a) An employee is required to remove or bypass a guard or other safety device; or
 - b) An employee is required to place his or her body or body part into an area on a machine or piece of equipment where work is performed upon the material being processed or where an associated danger zone exists during an operating cycle.
 - c) Out of scope: The following are not covered in this program
 - 1) Supervised cord and plug connected equipment; or
 - 2) Hot taps

3. Table of Contents:

<i>Purpose</i>	<i>Page 1</i>
<i>Scope/Applicability</i>	<i>1</i>
<i>Definitions</i>	<i>2</i>
<i>Responsibilities</i>	<i>3</i>
<i>Devices and Hardware Requirements</i>	<i>4</i>
<i>General Guidelines</i>	<i>5</i>
<i>General Sequence of LOTO Procedures</i>	<i>5</i>
<i>Equipment Specific Energy Control Procedures</i>	<i>6</i>
<i>Testing or Re-positioning of Equipment</i>	<i>7</i>
<i>Group Lockout/Tagout</i>	<i>7</i>
<i>Shift or Personnel Changes</i>	<i>7</i>
<i>Removal of LOTO Device</i>	<i>8</i>
<i>Periodic Inspection</i>	<i>8</i>



<i>Training and Re-training</i>	8
<i>Recordkeeping</i>	9

4. Definitions:

- **Affected employee** - An employee whose job requires him/her to operate or use a machine or equipment on which servicing or maintenance is being performed under **lockout** or **tagout** or whose job requires him/her to work in an area in which such servicing or maintenance is being performed.
- **Authorized employee** - A person who locks or implements a **tagout** system procedure on machines or equipment to perform the servicing or maintenance on that machine or equipment. The authorized employee has been designated to perform such duties by the employer. The authorized employee not only attaches the lock and tag but must also perform the servicing or maintenance.
- **Capable of being locked out** - An **energy isolating device** will be considered to be capable of being locked out either if it is designed with a hasp or other attachment or integral part of which, or through which a lock can be attached, or it has a locking mechanism built into it. Other energy isolating devices will also be considered to be capable of being locked out, if **lockout** can be achieved without the need to dismantle, rebuild, or replace the energy isolating device or permanently alter its energy control capability.
- **Energized** - Connected to **energy source** or containing residual or stored energy.
- **Energy isolating device** - A mechanical device that physically prevents the transmission or release of energy, including but not limited to the following: A manually operated electrical circuit breaker; a disconnect switch; a manually operated switch by which the conductors of a circuit can be disconnected from all ungrounded supply conductors and, in addition, not pole can be operated independently; a slide gate; a slip blind; a line valve; a block; and any similar device used to block or isolate energy. The term does not include a push button, selector switch, and other control circuit type devices.
- **Energy source** - Any source of electrical, mechanical, hydraulic, pneumatic, chemical, thermal, or other energy.
- **Hot tap** - A procedure used in the repair, maintenance and service activities that involves welding on a piece of equipment (pipelines, vessels or tanks) under pressure, in order to install connections or appurtenances. It is commonly used to replace or add sections of pipeline without the interruption of service for air, gas, water, steam, and petrochemical distribution systems.



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- **Lockout** - The placement of a lockout device on an energy isolating device, consistent with an established procedure, ensuring that the energy isolating device and the equipment being controlled cannot be operated until the lockout device is removed.
- **Lockout device** - A device that utilizes a positive means such as a lock, either key or combination type to hold an energy isolating device in the safe position and prevent the energizing of a machine or equipment.
- **Normal production operations** - The use of a machine or equipment to perform its intended production function.
- **Servicing and/or maintenance** - Work place activities such as constructing, installing, setting up, adjusting, inspecting, modifying and maintaining and/or servicing machines or equipment. These activities include lubrication, cleaning or un-jamming 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.
- **Setting up** - Any work performed to prepare a machine or equipment of perform its normal production operation.
- **Tagout** - The placement of a tagout device on an energy isolating device, using an established procedure, to indicate that the energy isolating device and the equipment being controlled may not be operated until the tagout device is removed.
- **Tagout device** - A prominent warning device, such as a tag and a means of attachment, which can be securely fastened to an energy isolating device consistent with an established procedure, to indicate that the energy isolating device and the equipment being controlled may not be operated until the tagout device is removed.

5. Responsibilities:

- a) Safety and Risk Management (SRM) is responsible for:
 - i. Developing and updating basic training and standard guidelines;
 - ii. Maintaining basic LOTO training records along with department supervisors;
 - iii. Validating Program implementation; and
 - iv. Assisting with revising and updating departmental specific programs as necessary.
- b) Departments involved in hazardous energy tasks covered in this program are responsible for:
 - i. Assigning a Program Coordinator;



- ii. Identifying equipment and energy sources where LOTO is required;
 - iii. Developing equipment-specific energy control procedures and testing the equipment or machine to verify the effectiveness of the energy controlling measure;
 - iv. Maintaining basic LOTO training records along with SRM;
 - v. Providing LOTO equipment; and
 - vi. Assigning employees to authorized or affected status and maintaining a list of current authorized employees.
- c) Program Coordinators are responsible for:
- i. Program implementation
 - ii. Ensuring all affected employees receive appropriate training on the specific procedures pertaining to their particular job duties;
 - iii. Selecting and approving specific lockout devices for each type of equipment that may be serviced;
 - iv. Reviewing LOTO procedures at least annually;
 - v. Pursuing the appropriate corrective action for any employee that does not comply with this program;
 - vi. Ensuring coordination and cooperation between employees and outside contractors; and
 - vii. Removing or approving the removal of a lockout device if the initial authorized employee is unavailable.
- d) Employees involved in tasks covered by this Program (authorized and affected employees) are responsible for:
- i. Complying with all aspects of the Program;
 - ii. Attending basic LOTO training; and
 - iii. Notifying their supervisor of any unsafe condition

6. Devices and Hardware Requirements: Tags are only warning devices and are to accompany locks, which provide the physical restraint on energy isolating devices. Tags will be accepted only if lockout cannot be accomplished.

Tagout devices are to be attached at the same location that the lockout device would have been attached. LOTO devices must be marked by the authorized employee, only used for controlling energy and never used for other purposes. Devices must:

- Indicate the identity of the authorized employee applying the device;
- Be capable of withstanding the environment for the maximum period of time that exposure is expected, including but not limited to corrosive environments;



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- Be constructed and printed so that exposure to weather conditions or wet and damp locations will not cause the tag to deteriorate or the message on the tag to become illegible; as with the use of bolt cutters;
- Be substantial enough to prevent inadvertent or accidental removal. All attachments are to be of a non-reusable type, attaches by hand, and a minimum of unlocking strength of no less than 50 pounds;
- Be standardized in at least one of the following criteria: color, shape, or size. Tags must be the same print and format.
- Warn against hazardous conditions if the machine or equipment is energized and shall include a statement such as the following: "DO NOT OPERATE", "DO NOT START", "DOT NOT ENERGIZE"; and
- Be approved by the Program Coordinator.

7. **General Guidelines**

Only authorized employees shall perform LOTO procedures. Authorized employees shall notify all affected employees that a LOTO system is going to be utilized and why.

A LOTO device shall only be removed by the initial authorized employee unless the following is done:

- a) Verify the authorized employee who applied the device is not at the location by making responsible efforts to contact the authorized employee (inspect area, machine, equipment, or process to ensure that employee has left the facility, check employee time card, attempt to contact the employee at home); and
- b) Approval has been received from the Program Coordinator to remove the device; and
- c) The Absentee Lock/Tag Removal Form is filled out in its entirety (see Appendix A).

The Program Coordinator will ensure that the authorized employee has been informed that his/her LOTO device has been removed.

8. **General Sequence of LOTO Procedures**

1. Notify all affected employees that a LOTO systems is going to be utilized and the reason for LOTO. All authorized employees shall have knowledge of the type and magnitude of energy, the hazard to be controlled, and the method or means to control the energy.
2. If the machine or equipment is operating, shut it down by the normal stopping procedure.
3. Isolate the equipment from its energy source(s).



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5. Dissipate all stored energy (such as that in springs, elevated machine members, rotating flywheels, hydraulic systems, and air, gas steam or water pressure, etc.). Restrain if necessary by methods such as grounds, repositioning, blocking, bleeding down, etc.
6. Relieve all potentially hazardous stored or residual energy by disconnecting, restraining, etc. to render the equipment safe. Prior to working on machines **or equipment verify that isolation or de-energization has been accomplished** by operating the push button or other normal operating controls to make certain the equipment will not operate. Return the operating control(s) to "neutral" or "off" position after the test.

9. Equipment- Specific Energy Control Procedures

The Program Coordinator is responsible for inspecting facilities and consulting with employees and supervisors assigned to service and maintain equipment in order to develop equipment-specific energy control procedures. These specific procedures are required and must be developed, documented, and used when controlling hazardous energy during service or maintenance work (See Appendix B). If an energy isolating device is capable of being locked out, equipment-specific LOTO procedures must be completed and must specify the use of a lockout system. If an energy isolating device is not capable of being locked out, equipment-specific LOTO procedures must specify to use of a tagout system. When equipment contains a single hazardous energy source that can be isolated with a single lock may be exempt from equipment-specific procedures. All exemption criteria specified under [29 CFR 1910.147\(c\)\(4\)\(i\)](#) must be met to receive an exemption.

When using a tagout versus lockout system, specific procedures shall describe the necessary steps taken to provide an equivalent level of protection. In order to demonstrate full employee protection when using a tagout system alone, additional elements shall be considered such as removing an isolating circuit element, blocking a controlling switch, or the removal of a valve handle to reduce the likelihood of inadvertent energization. Whenever deviating from standard equipment-specific LOTO procedures, approval from the Program Coordinator must be implemented and documented.



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10. Testing or Re-positioning of Equipment

If a LOTO device must be temporarily removed from the energy isolating device to test or position the machine, the following sequence will be followed:

1. Clear the machine or equipment of tools and materials;
2. Notify all employees and remove them from the area;
3. Remove LOTO device(s);
4. Energize and proceed with testing or positioning; and
5. De-energize all systems and reapply energy control measures to continue servicing and/or maintenance.

11. Group Lockout or Tagout

When service or maintenance is performed by a crew, craft, department or other group, general procedures shall be followed along with the following specific requirements:

- One authorized employee shall be designated as responsible for the group LOTO;
- Hazardous energy control procedures shall be reviewed with each group member;
- When more than one crew, craft, department, etc. is involved, assignment of overall job-associated LOTO control responsibility shall be designated to an authorized employee to coordinate affected work forces and ensure continuity of protection for the group;
- Each authorized employee is to affix a personal LOTO device to the group lockout device, group lock box, or comparable mechanism when beginning work, and is to remove those devices when he or she stops working; and
- The equipment cannot be re-energized until all individuals in the group have removed their LOTO device.

12. Shift or Personnel Changes

Specific procedures are to be used during shift or personnel changes to ensure continuity of LOTO protection, including provisions for the orderly transfer of LOTO devices between off-going and oncoming employees. Each employee shall be responsible for removing his/her own LOTO device at the completion of his/her shift. If the work is to cease until the following day, the supervisor shall place his/her personal lock and tag on the equipment and the employees shall remove their lock and tag. When work resumes,



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the employees shall affix his/her personal lock and tag to the equipment and the supervisor shall remove his/her lock and tag.

13. **Removal of LOTO Device**

Each LOTO device shall only be removed from an energy isolating device by the employee who applied the device. If the authorized employee that applied a LOTO device is not available, the employees' immediate supervisor, under the approval of the department Program Coordinator, may remove the device (refer to General Guidelines). Before LOTO devices can be removed and energy restored to the machine or equipment, the following procedures are to be followed by the authorized employee(s):

1. After service and/or maintenance is complete and the equipment is ready for normal production operations, check the area around the machine(s) or equipment to ensure that no one is exposed and notify affected employees that LOTO devices have been removed;
2. After all tools have been removed from the machine or equipment, guards have been reinstalled and employees are in the clear, all LOTO devices are to be removed by the employee who applied the device; and
3. Operate the energy isolating devices to restore energy to the machine or equipment. Check for proper operation.

14. **Periodic Inspection:**

The department responsible for the employees performing LOTO is required to conduct a periodic inspection of the energy control procedures at least annually. The purpose of the periodic inspections is to correct any deviations or inadequacies identified by the inspector. Inspections shall be performed while directly observing authorized individuals (i.e. an authorized employee not participating in the LOTO) participate in the shutdown using the periodic inspection form (See Appendix C). The immediate supervisor shall be notified and take appropriate action to ensure the safety of all affected individuals. Any deficiencies or problems observed shall be reported to the Program Coordinator. Each department is responsible for keeping a copy of these inspections.

15. **Training and Retraining**

All departments covered under the Program shall maintain a list of all current authorized employees. A copy of this list shall be made accessible to SRM upon request to the Program Coordinator.



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VCU SRM is responsible for providing basic affected employee LOTO training for employees to ensure that the purpose and function of the energy control program are understood and that employees possess the basic knowledge and skills required for the safe application, usage, and removal of energy controls. Authorized employees shall receive training in the recognition of all applicable hazardous energy sources, the type and magnitude of the energy available in the workplace, and the methods and means necessary for energy isolation and control. Authorized employees shall also be trained in the following specific limitations of tags:

- a) Tags do not provide physical restraint on energy isolating devices. Tags are essentially warning devices;
- b) When a tag is attached to an energy isolating means, it is not to be removed without authorization of the authorized person responsible. It is never to be bypassed or ignored;
- c) Tags are required to be legible and understandable by all authorized employees, affected employees, and all other employees whose work operations are or may be in the area, in order to be effective;
- d) Tags and their means of attachment must be made of materials which will withstand environmental conditions countered in the workplace;
- e) Tags must be securely attached to energy isolating devices so that they cannot be inadvertently or accidentally detached or removed during use;
- f) Tags are to be understood as part of the overall energy control program and not provoke a false sense of security.

Supervising departments are responsible for equipment-specific LOTO procedure training for their employees. The supervising department is also responsible for validating comprehension of these procedures as well as instructing affected employees on the purpose and use of energy control procedures.

Retraining shall be provided for all authorized and affected employees whenever there is a change in their job assignment, a change in machine, equipment or process that presents a new hazard, or when there is a change in the energy control procedure.

Retraining shall be conducted if a periodic inspection reveals, or whenever the supervising department or SRM has reason to believe, deviations from or inadequacies in the employee's knowledge or use of the energy control procedure.



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Retraining is designed to reestablish employee proficiency and introduce new or revised control methods and procedures.

16. Recordkeeping

- a) Each department is responsible for verifying that training is current and documented. SRM will maintain basic lockout/tagout training records. Records shall contain the employee name and signature, date of training, and subject and description of training;
- b) Absentee LOTO device removal forms (Appendix A) shall be maintained by the supervising department for the lifetime of the applicable machine or equipment;
- c) Specific energy control procedures shall be readily accessible in the area of the specific equipment and available to all affected employees upon request. Copies of all energy control procedures shall be kept by the Program Coordinator. The following are considered an acceptable means for making procedures accessible:
 - Electronic means;
 - Posting procedures on the equipment; or
 - Providing a binder in the mechanical room or working space.
- d) Periodic inspection documentation shall include the identity of the machine or equipment on which the energy control procedure was being utilized, the date of the inspection, any deviation of inadequacy, any corrective action taken, the employees included in the inspection, and the person performing the inspection (Appendix B).

17. References

29 CFR 1910.147 – Control of Hazardous Energy
Electrical Safety Program

18. Appendices

Appendix A – Absentee Lock/Tag Removal Form
Appendix B – Machine/Equipment Specific Lockout/Tagout Form
Appendix C – LOTO Periodic Procedure Inspection Form



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Appendix A: Absentee Lock/Tag Removal Form

When an authorized employee who applied a lock or tag device is not available to remove the lock or tag, then this lock removal procedure shall be used. The supervisor will apply the following procedure:

- Verify that the authorized employee who applied the device is not at the facility;
- Make all reasonable efforts to contact the authorized employee to inform he/she that his/her lockout or tag out device has been removed.
- Ensure that the authorized employee has this knowledge before he/she resumes work. This can be accomplished by meeting with the employee prior to that employee beginning work activities upon their earliest return to work.
- Complete a lock removal form and submit to the safety manager upon completion of this form.

- **Owner of Lock:** _____ (print)
- **Name of Supervisor Initiating Removal:** _____ (print)
- **Location/Name of Equipment:** _____
- **Date of Removal:** _____ **Time:** _____
- **Type of Energy (e.g. Electric, Pneumatic, Mechanical):** _____

Steps taken to contact Owner of Lock/Tag:

Date/Time Contact was Attempted: _____

Phone number/Method of Contact: _____

Reason for removing Lock or tag:

Signature of Supervisor Initiating Removal: _____

Signature of Individual whose LOTO device was removed:** _____

**By signing, the individual whose LOTO device was removed certifies that they have been made aware of the fact that their energy control device identified above was removed under the supervision of an authorized supervisor and realize that they no longer have this equipment under isolation.



Appendix B: Machine / Equipment Specific Lock Out / Tag Out

Machine: _____

Department: _____

Types and Magnitude of Energy

Electric: _____

Hydraulic: _____

Pneumatic _____

Water (Hot/Cold): _____

Thermal _____

Gas: _____

Other: _____

Location of energy and isolation means: _____

Affected Employees: _____

Specific steps for shutting down machine: _____

Types of stored energy and method to dissipate: _____

Lock Out methods to be used: _____

After locking out machine, attempt to start the machine using normal operating controls. Once it has been assured that the machine cannot operate, be sure to return the operating controls to the neutral or off position.

After the work is completed:

- A. Install and adjust point of operation guards and/or other safety devices.
- B. Remove all tools, equipment, or other non-essential items.
- C. Inform appropriate personnel.
- D. Remove Lock Out devices.
- E. Test cycle the machine to ensure it operates as expected.
- F. If further work is needed, reinstall Lock Out procedure.
- G. Remove Lock Out devices and notify affected employees that the equipment is ready for use.



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Appendix C: Lockout/Tagout Periodic Inspection Form

Department:

Equipment type and ID#:

Inspection conducted by:

Equipment location:

Inspection date:

List authorized employees using this procedure. Has the employee been trained in the procedure?

Employee name: Yes No

Employee name: Yes No

Employee name: Yes No

Employee name: Yes No

Do *authorized* employees know the location of the written procedure? Yes No

Do *authorized* employees have access to the procedure? Yes No

Are *affected* employees notified when the procedure is being used? Yes No

Have *affected* employees been trained to recognize when the procedure is being used and instructed not to remove lockout/tagout devices or start de-energized equipment? Yes No

Can energy-isolating devices be locked out? Yes No

Note: When you replace, renovate, or modify machines and equipment, ensure that the energy-isolating devices will accept lockout devices. New equipment and equipment renovated or modified after January 2, 1990, must be capable of being locked out.

Did each *authorized* employee lock out all energy sources? Yes No

Does this procedure involve group lockout/tagout? Yes No

Did the *authorized* employees verify that the equipment was de-energized? Yes No



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Did the *authorized* employees follow the lockout/tagout procedure?

Yes No

Does the lockout/tagout procedure adequately protect employees?

Yes No

If not, list and describe the deficiencies requiring corrective action.

- 1.
- 2.
- 3.
- 4.
- 5.

If this is a lockout procedure, did the inspector review with all *authorized* and employees their responsibilities under the procedure? **Note: A review can be accomplished by meeting with employees individually or in a group.**

Yes No

Not applicable

If this is a tagout procedure, did the inspector review with all *authorized* and affected employees their responsibilities under the procedure? **Note: A review can be accomplished by meeting with employees individually or in a group.**

Yes No

Not applicable