

**SUBJECT: LOCKOUT/TAGOUT PROCEDURES
APPALACHIAN STATE UNIVERSITY**

**SWC-13
Effective: 3/23/04**

PURPOSE

This procedure establishes the minimum requirements for the lockout and/or tagout of electrical disconnects, liquid, gas and steam valves, hydraulic/pneumatic systems or other energy sources. It shall be used to ensure that machines or equipment are stopped, isolated from all potentially hazardous energy sources, and locked out before employees perform any servicing or maintenance activities where the unexpected start-up or release of stored energy could cause injury.

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 out or tags out machines or equipment in order to perform servicing or maintenance on that machine or equipment. An affected employee becomes an authorized employee when that employee's duties include performing servicing or maintenance covered under this section.

Capable of being locked out. An energy isolating device is capable of being locked out if it has a hasp or other means of attachment to which, or through which, a lock can be affixed, or it has a locking mechanism built into it. Other energy isolating devices are 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 an 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, no pole can be operated independently; a line valve; a block; and any similar device used to block or isolate energy. Push buttons, selector switches and other control circuit type devices are not energy isolating 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 services activities which 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.

Lockout. The placement of a lockout device on an energy isolating device, in accordance 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 a safe position and prevent the energizing of a machine or equipment. Included are blank flanges and bolted slip blinds.

Normal production operations. The utilization of a machine or equipment to perform its intended production function.

Servicing and/or maintenance. Workplace activities such as constructing, installing, setting up, adjusting, inspecting, modifying, and maintaining and/or servicing machines or equipment. These activities include lubrication, cleaning or unjamming of machines or equipment and making adjustments or tool changes, where the employee may be exposed to the unexpected energization or startup of the equipment or release of hazardous energy.

Setting up. Any work performed to prepare a machine or equipment to perform its normal production operation.

Tagout. The placement of a tagout device on an energy isolating device, in accordance 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.

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 in accordance 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.

BACKGROUND

The potential exists for severe injuries to occur when employees perform electrical, mechanical or hydraulic work. Machinery or equipment may start automatically or other energy sources may be active and cause injury. It is of the utmost importance that every employee follow a safe and thorough lockout or tagout procedure when working on any electrical, mechanical, hydraulic/pneumatic machinery or equipment or other stored energy system.

LOCKOUT OR TAGOUT

If an energy isolating device is not capable of being locked out, a tagout procedure shall be utilized.

If an energy isolating device is capable of being locked out, a lockout procedure shall be utilized, unless it can be conclusively demonstrated that the utilization of a tagout procedure will provide full employee protection as required by OSHA regulations, 29 C.F.R. § 1910.147(c)(3). Whenever replacement or major repair, renovation or modification of a machine or equipment is performed after January 2, 1990, and whenever new machines or equipment are installed after that date, energy isolating devices for such machine or equipment must be designed to accept a lockout device.

RESPONSIBILITY

All employees shall be appropriately trained in the appropriate lockout or tagout procedures by their supervisor. Each new or transferred employee shall be instructed by their supervisor as to the purpose and use of appropriate lockout or tagout procedures. In addition supervisors are responsible for purchasing, training and enforcing the use of the appropriate lockout and/or tagout equipment as required.

The Supervisor's Checklist for Lockout or Tagout (See Appendix A) and the Lockout or Tagout Safety Training Form (See Appendix B) are designed to ensure that all employees who work with electrical, mechanical or hydraulic machinery or equipment, liquid, gas or other energy sources understand and are appropriately trained in lockout or tagout procedures. Completed checklist and training forms must be forwarded to departmental offices for record keeping and retention. A copy of the training form should also be forwarded to the Safety & Workers' Compensation Office as well.

All employees are required to comply with the restrictions and limitations imposed upon them during the use of lockout or tagout. The authorized employees are required to perform the lockout or tagout in accordance with this procedure. A Lockout-Tagout Checklist is included for use by authorized employees to document lockout-tagout procedures (See Appendix C). Completed checklists should be kept on file in the authorized employee(s)' department. All employees, upon observing a machine or piece of equipment which is locked out or tagged out to perform servicing or maintenance shall not attempt to start, energize or use that machine or equipment.

Employees who violate the restrictions and limitations imposed upon them by this procedure shall be subject to discipline or discharge from employment.

SCOPE

This procedure applies whenever an employee is servicing or provides maintenance to machinery or equipment in a manner which requires the removal or bypass of guards or other safety devices or in a manner that requires the employee to place any part of his or her body into an area on a machine or piece of equipment where work is actually performed upon the material being processed (point of operation) or where an associated danger zone exists during a machine operating cycle, or in a manner that otherwise exposes the employee to electrical, mechanical, gas, liquid or steam hazards in the event the machinery or equipment or system is accidentally re-energized during maintenance or service work. Typical operations covered include, but are not necessarily limited to:

1. Work on electric motors and circuits
2. Work on steam lines and boilers
3. Work on refrigeration and air conditioning equipment
4. Work on LP gas lines

5. Work on permanently wired machinery or equipment including ovens
6. Work on wood planners, radial saws or other shop and laboratory equipment.
7. Work on pressurized liquid or chemical lines.
8. Work on compressed air or gas (chemical) lines.
9. Work on hydraulic/pneumatic systems.
10. Work on elevators/hoists.

Employees authorized to perform lockout or tagout procedures include, but are not necessarily limited to:

Art Department Laboratory Manager, Faculty members, Student monitors
 ASU Physical Plant - Mechanical Shop, Electrical Shop, Steam Plant,
 Telecommunications/Electronics Shop, Carpentry Shop, Zone
 Maintenance employees
 Housing Department Maintenance employees
 Food Service Maintenance employees
 Printing & Publications Print Equipment operators
 Student Union Maintenance employees
 Technology Department Electronics Technician, Faculty members
 Outside Vendors and Contractors approved and assisted by Physical Plant
 Employees

PREPARATION FOR LOCKOUT AND/OR TAGOUT

Conduct a survey to locate and identify all energy sources to determine which switches, valves or other energy isolating devices apply to machinery or equipment to be locked and/or tagged out. More than one energy source (electrical, mechanical or other) may be involved. Questionable energy source problems must be resolved before job authorization is obtained and lockout or tagout commences.

Identify and list affected employees by job title and name. As defined above, an "affected employee" is one "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."

Where stored or residual energy (such as that in capacitors, springs, elevated machine members, rotating flywheels, hydraulic systems, and air, gas, steam, or water pressure, etc.) may be encountered, identify and document such type(s) of stored or residual energy, and identify and document appropriate methods of dissipating or restraining such energy (e.g., by methods such as grounding, repositioning, blocking, bleeding down, etc.).

SEQUENCE OF LOCKOUT AND/OR TAGOUT SYSTEM PROCEDURE

- (1) Notify all affected employees that a lockout or tagout system is going to be utilized and the reason therefor. Notification must be in such a manner as to ensure that each affected employee has actual notice of the implementation of lockout or tagout (e.g., in person or telephone notification), and notification should be documented.
- (1) The authorized employee(s) shall identify the type and magnitude of energy that the machinery or equipment utilizes, shall understand the hazards of the energy, and shall know the methods to control the energy. The authorized employee should document the type and magnitude of energy, its hazards, and the methods of control.
- (2) If the machinery or equipment is operating, the authorized employee shall shut it down by the normal stopping procedures by depressing the stop button, opening the toggle switch, etc.
- (3) The authorized employee shall operate the switch, valve or other energy isolating device(s) so that the machinery or equipment is blocked or isolated from its energy sources.
- (4) Lockout or tagout the energy isolating device(s) with assigned individual locks or tags. If the machinery or equipment cannot be locked out, use a tag only. The identity of the employee applying the lockout device shall be indicated on the device.
- (5) Stored or residual energy that may be contained in springs, elevator machine members, rotating flywheels, hydraulic systems, and air, gas, steam, or water pressure, etc. must also be dissipated or restrained by methods such as grounding, repositioning, blocking, bleeding down, etc.
- (6) After ensuring that no personnel are exposed, and as a check on having disconnected the machinery or equipment from the energy sources, operate the push button or other normal operating controls to make certain the machinery or equipment will not operate. Document the method of verifying the isolation of the equipment from the energy source(s).

CAUTION

RETURN THE OPERATING CONTROLS TO THE “NEUTRAL” OR “OFF” POSITION AFTER THE TEST.

- (7) The equipment is now locked out or tagged out.

RESTORING MACHINERY OR EQUIPMENT TO NORMAL OPERATIONS

- (1) After servicing and/or maintenance is completed and the machinery or equipment is ready for normal operations, check the machinery or equipment and the area around the machinery to insure that nonessential items have been removed from the machinery or equipment, guards have been reinstalled, machine or equipment components are operationally intact.
- (2) Check the work area to ensure that all employees have been safely positioned or removed from the area.

- (3) **Verify that the controls are in the neutral position.**
- (4) Remove the lockout or tagout devices and re-energize the machinery or equipment. The removal of some forms of blocking may require re-energization of machinery or equipment before safe removal.
- (5) Notify affected employees that the servicing or maintenance of machinery or equipment is completed and that the machinery or equipment is ready for use.

LOCKOUT AND/OR TAGOUT PROCEDURES INVOLVING MORE THAN ONE PERSON/GROUP LOCKOUT, TAGOUT PROCEDURES

When servicing and/or maintenance is performed by a crew, craft, department or other group, they shall utilize a procedure which affords the employees a level of protection equivalent to that provided by the implementation of a personal lockout or tagout device, as described above.

Group lockout or tagout devices shall be used in accordance with the above-described procedures for implementation of a personal lockout or tagout device, including, but not necessarily limited to, the following specific requirements:

1. Primary responsibility is vested in an authorized employee for a set number of employees working under the protection of a group lockout or tagout device (such as an operations lock);
2. An authorized employee must ascertain the exposure status of individual group members with regard to the lockout or tagout of the machine or equipment;
3. When more than one crew, craft, department, etc. is involved, assignment of overall job-associated lockout or tagout control responsibility to an authorized employee designated to coordinate affected work forces and ensure continuity of protection; and
4. Each authorized employee shall affix a personal lockout or tagout device to the group lockout device, group lockbox, or comparable mechanism when he or she begins work, and shall remove those devices when he or she stops working on the machine or equipment being serviced or maintained.

LOCKOUT OR TAGOUT PROCEDURES INVOLVING SHIFT OR PERSONNEL CHANGES

Specific procedures shall be utilized during shift or personnel changes to ensure the continuity of lockout or tagout use on machinery or equipment, including provisions for the orderly transfer of Lockout or Tagout devices between employees leaving the worksite and replacement employees in order to minimize exposure to hazards from the unexpected energization or start-up of machinery or equipment, or the release of stored energy.

ANNUAL LOCKOUT, TAGOUT PROCEDURE REVIEW (INSPECTIONS)

At least annually, affected University departments will conduct a periodic inspection of the energy control procedure(s) used in their areas to ensure that the procedure and the requirements of the governing standard are being followed. This inspection shall consist of an authorized employee observing the implementation or utilization of an energy control procedure, and shall be conducted for the purpose of identifying and correcting any deviations or inadequacies identified.

The periodic inspection shall be performed by an authorized employee other than the ones(s) utilizing the energy control procedure being inspected.

Where lockout is used for energy control, the periodic inspection shall include a review, between the inspector and each authorized employee, of that employee's responsibilities under the energy control procedure being inspected.

Where tagout is used for energy control, the periodic inspection shall include a review, between the inspector and each authorized and affected employee, of that employee's responsibilities under the energy control procedure being inspected, and employee awareness of the following limitations of tags:

(A) Tags are essentially warning devices affixed to energy isolating devices, and do not provide the physical restraint on those devices that is provided by a lock.

(B) When a tag is attached to an energy isolating means, it is not to be removed without authorization of the authorized person responsible for it, and it is never to be bypassed, ignored, or otherwise defeated.

(C) Tags must 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 the environmental conditions encountered in the workplace.

(E) Tags may evoke a false sense of security, and their meaning needs to be understood as part of the overall energy control program.

(F) Tags must be securely attached to energy isolating devices so that they cannot be inadvertently or accidentally detached during use.

Affected University departments will certify that the periodic inspections have been performed, and the certification shall identify:

1. The machine or equipment on which the energy control procedure was being utilized;
2. The location of the equipment;
3. The nature of the lockout or tagout procedure observed;
4. The date and time of the inspection;
5. The employees included in the inspection;
6. The person performing the inspection;
7. Inspection findings;
8. Any deviations or inadequacies observed;
9. Recommendations for corrective action; and
10. Corrective action taken.

The department head shall ensure that these annual inspections occur within his or her department. A record of the inspection will be maintained in the department.

CONTRACTORS

All outside servicing personnel (e.g. outside contractors) must comply with all applicable lockout/tagout standards or requirements.

Whenever outside servicing personnel (e.g., outside contractors) are to be engaged in activities covered by the scope and application of these procedures, the University and the outside employer shall inform each other of their respective lockout or tagout procedures.

Affected University departments shall ensure that its employees understand and comply with the restrictions and prohibitions of the outside employer's energy control program.

If you need additional information or have questions concerning these procedures, contact your supervisor or the Safety & Workers' Compensation Office at Ext. 4007.

(Revised 2/17/04)

APPENDIX A

SUPERVISOR'S LOCKOUT AND/OR TAGOUT SAFETY CHECKLIST

SUPERVISOR/CREW LEADER _____ DATE _____
(please print)

BUILDING/SITE

Procedure

Initial

1. Never pull a disconnect when a circuit is under load.
2. The only safe way to electrically isolate a motor is at the disconnect site.
3. Always check the voltage tester on a known voltage source before testing a live or dead circuit.
4. Always check the blades in the disconnect box to make sure they have been pulled.
5. Check all interior circuits.
6. Test the control circuit in the disconnect/motor starter to make sure it is dead.
7. Always recheck the voltage tester on a known voltage source after you have checked the circuit.
8. Double check the machinery or equipment at the start/stop switch, toggle switch, etc. just to make sure it is deactivated.
9. Discharge any electrical, mechanical, hydraulic or other devices that can hold potential energy.
10. Never remove a lock and/or tag at a disconnect if you did not place it there.
11. Only you can control a safe lockout and/or tagout procedure. It is your responsibility to make sure a lockout and/or tagout procedure is in effect any time you are working with an electrical or mechanical hazard.

(Supervisor's/Crew Leader's Signature)

NOTE: Place original in Supervisor/Crew Leader's file and a copy in departmental files.

APPENDIX C

**LOCKOUT-TAGOUT CHECKLIST
(TO BE COMPLETED BY AUTHORIZED EMPLOYEE)**

1. Identification of Equipment or Machinery to Be Serviced
 - a. _____
2. Name of Authorized Employee
 - a. _____
3. Name(s) of Affected Employees; Date, Time, and Method of Notification for Paragraph 4:
 - a. _____
 - b. _____
 - c. _____
 - d. _____
 - e. _____
 - f. _____
 - g. _____
 - h. _____
 - i. (use additional sheet(s) if needed; and refer to item number)
4. Have all affected employees been notified that servicing or maintenance is required on a machine or equipment and that the machine or equipment must be shut down and locked out or tagged out to perform the servicing or maintenance.
 - a. Yes _____ No _____
 - b. Do not proceed until all affected employees have been notified.
5. Identification of type and magnitude of the energy that the machine or equipment utilizes
 - a. _____
6. Nature of the hazards of the energy
 - a. _____
 - b. _____

7. Methods for controlling the energy
 - a. _____
 - b. _____
8. Is machine or equipment or machine operating?
 - a. Yes _____ No _____
 - b. If "No," go to Step 10.
9. If the machine or equipment is operating, shut it down by the normal stopping procedure (depress stop button, open switch, close valve, etc.). Identify type(s) and location(s) of machine or equipment operating controls and the normal stopping procedure:
 - a. _____
 - b. _____
10. Machine or equipment shut down?
 - a. Yes _____
11. Identify type(s) and location(s) of energy isolating devices for machine or equipment.
 - a. _____
 - b. _____
12. De-activate the energy isolating device(s) so that the machine or equipment is isolated from the energy source(s).
 - a. Energy isolating device(s) de-activated _____
13. Lock out the energy isolating device(s) with assigned individual lock(s).
 - a. Energy isolating device(s) Locked out: _____
14. Identify potential sources and types of stored or residual energy (such as that in capacitors, springs, elevated machine members, rotating flywheels, hydraulic systems, and air, gas, steam, or water pressure, etc.).
 - a. _____
 - b. _____

15. Identify method(s) for dissipating or restraining stored or residual energy (by methods such as grounding, repositioning, blocking, bleeding down, etc.):
 - a. _____
 - b. _____
16. Residual or stored energy dissipated or restrained: _____
17. Identify method(s) of verifying the isolation of the equipment (e.g., by operating the push button or other normal operating control(s) or `by testing to make certain the equipment will not operate:
 - a. _____
 - b. _____
18. Checked to determine that no personnel are exposed: _____
19. Isolation of equipment and disconnection from energy source verified: _____
20. Operating control(s) returned to neutral or "off" position after verifying the isolation of the equipment: _____

LOCKOUT OR TAGOUT

21. Is the energy isolating device capable of being locked out?
 - a. Yes _____ No _____
22. If "yes," lockout utilized: _____
23. If "no," tagout utilized: _____

UPON COMPLETION OF SERVICING OR MAINTENANCE

24. Machine or equipment and the immediate area checked to ensure that nonessential items have been removed and that the machine or equipment components are operationally intact: _____
25. Work area checked to ensure that all employees have been safely positioned or removed from the area: _____
26. Verified that the controls are in neutral: _____.
27. Removed the lockout or tagout devices and reenergized the machine or equipment _____.
- a. If needed, reenergized machine prior to removal of blocking: _____.

28. Affected employees notified that the servicing or maintenance is completed and the machine or equipment is ready for use: _____

Authorized Employee (Signature)

Authorized Employee (Printed)

Date