

EFFECTIVE DATE: 1-11-2007

ASU LOCKOUT/TAGOUT Program

Purpose: Control of Hazardous energy is the purpose of the Lockout- Tagout Program. This program establishes the requirements for isolation of both kinetic and potential electrical, chemical, thermal, hydraulic and pneumatic and stored (gravitational) energy prior to equipment repair, adjustment or removal.

Reference: OSHA Standard 29 CFR 1910. 147, the control of hazardous energy.

Background: To comply with the OSHA lockout/tag out standard (29 CFR 1910-147) which went into effect on Oct 31, 1989. The following procedure for lockout/tag out for Facilities Management has been established.

Applicability: All ASU Facilities and employees.

Definitions

Authorized (*Qualified*) Employees - are the only ones certified to lock and tagout equipment or machinery. Whether an employee is considered to be "*qualified*" will depend upon various circumstances in the workplace. It is likely for an individual to be considered "*qualified*" with regard to certain equipment in the workplace, but "*unqualified*" as to other equipment. An employee who is undergoing *on-the-job* (OJT) training and who, in the course of such training, has demonstrated an ability to perform duties safely at his or her level of training and who is under the direct supervision of a qualified person, is considered to be "*qualified*" for the performance of those duties.

Affected Employees - are those employees who operate machinery or equipment upon which lockout or tagging out is required under this program. Training of these individuals will be less stringent in that it will include the purpose and use of the lockout procedures.

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.

Lockout – the act of physically securing by locking means, if possible, any and all sources for energy to prevent inadvertent energization or accidental start up of equipment or systems. This is a personnel safety procedure.

Tagout – the act of physically tagging (identifying) using written means to indicate the current status, individual responsible and level of the equipment or system.

Zero State (zero-point energy) - the lowest possible energy that a physical system may possess or its neutral state, it is the energy of the ground state of the system. All mechanical systems have a zero point of energy.

Procedure

Locks and tags will be provided or made available by the unit supervisors. All lockout tags will be stocked in the Facilities Management Maintenance Stores Warehouse, as well as the multiple hasp or clamshell locking devices.

- Locks for personal safety-Only Master Lock 6835 may be used for Lock Out Tag Out and should be yellow in color.
- Locks for equipment securing – Shop Locks which are typically American Standard 1105 should be used for equipment out of service locks.

All personal safety locks for which only one key exists for the employee shall be used for lockout and will be provided by the individual unit supervisor. Multiple personnel locks may be keyed the same for each lock used for LOTO provided it is issued to the same individual. When a piece of equipment is locked out, a tag will be attached at the disconnecting means to indicate who, which unit, date and a description of the piece of equipment or system that is being locked out. An approved one piece personal tag can be used to tag out a piece of equipment if the equipment is down for a short duration such as; preventative maintenance (PM's), trouble shooting, minor repairs or adjustments.

When a piece of equipment is locked and tagged out, and it will remain “out of service” longer than a four (4) hour period, or if the employee leaves the area for any substantial length of time, an approved equipment “out of service” tag will be placed on the equipment with an equipment lock, which will be different from locks used for LOTO. See **Machine or Equipment Isolation Section** for specific equipment or system procedures.

Procedures shall be developed, documented and utilized for the control of potentially hazardous energy when employees are engaged in the activities covered by this section.

Note: **Exception:** The employer need not document the required procedure for a particular machine or equipment, when all of the following elements exist: (1) The machine or equipment has no potential for stored or residual energy or reaccumulation of stored energy after shut down which could endanger employees; (2) the machine or equipment has a single energy source which can be readily identified and isolated; (3) the isolation and locking out of that energy source will completely deenergize and deactivate the machine or equipment; (4) the machine or equipment is isolated from that energy source and locked out during servicing or maintenance; (5) a single lockout device will achieve a locker-out condition; (6) the lockout device is under the exclusive control of the authorized employee performing the servicing or maintenance; (7) the servicing or maintenance does not create hazards for other employees; and (8) the employer, in utilizing this exception, has had no accidents involving the unexpected activation or reenergization of the machine or equipment during servicing or maintenance.

When an energy control procedure is required, a qualified employee may develop it using the template in appendix A of this procedure. Each energy control procedure developed is to be submitted to each shop supervisor and maintained in each shop for future reference.

BASIC RULES FOR USING THE LOCKOUT/TAGOUT SYSTEM

All equipment that is to be serviced or worked on or adjusted shall be locked out and tagged out prior to work being performed on the equipment or system to ensure protection against accidental or inadvertent operation when such operation could cause injury to personnel.

DO NOT ATTEMPT TO OPERATE ADJUST OR WORK ON ANY SWITCH, VALVE, OR OTHER ENERGY-STORING DEVICE OR SYSTEM UNLESS IT IS LOCKED AND TAGGED OUT AND HAS BEEN VERIFIED AS TO “ZERO” STATE.

Purpose: When a piece of equipment is to be inspected, cleaned repaired or worked on by an employee, that piece of equipment must have all energy sources REMOVED or otherwise CONTROLLED prior to commencing work on the equipment. The electrical energy source will be removed or controlled by an Electrician at the request of other units.

NOTE: All sources (energy) must be VERIFIED “Zero” state before work may begin.

Only those Electricians TRAINED AND QUALIFIED to operate the ASU electrical primary distribution system will be the “ONLY” authorized personnel to lockout/tag out primary power sources.

Electricians will be authorized to lockout/tag out motors and machines for both their safety and the safety of other employees.

THE PROCEDURE: Personnel Safety Lockout

1. Each employee shall be issued a set of safety lockout locks consisting of the following:
 - a. Personal safety locks for which only one key exists for the employee will be supplied with their ID number engraved or stamped on it or a tag will be used to identify this information. Issued individual locks maybe keyed to the same for the individual, but may not be keyed the same between individuals or groups.
 - b. Personal safety locks and tag out devices must be used by all employees who work on, adjust, repair or replace equipment that has the potential for storing energy.
 - c. The requesting unit(s) and any other units, who are working on a piece of equipment, or system, must install each of their own personal safety locks. Lock hasps (Christmas trees) will be used when more than one individual is working on the equipment or a system.
2. Removal of personal lock and tag, if the employee is called away, equipment repairs are delayed due to parts or the employee completes their work shift, their personal lock must be removed and replaced with an equipment “Out of Service” tag and equipment lock. If it becomes necessary to remove a personal safety lock due to an employee’s failure to comply with these instructions, the employee will be required to return immediately on their own time to the job site and remove the lock. If the lock has to be cut because an employee fails to comply with this policy, the same type of lock will be

replaced at the employee's expense and noted on the employee's evaluation. See section on "Management's Removal of Lock and Tagout".

Preparation for Lockout/Tagout

The following steps for electrical shut down shall be followed. A Lockout/Tagout survey must be conducted to locate and identify all energy sources needing lock and tagout. Dual or redundant controls have been identified and all sources of energy will be secured, blocked, wedged, or otherwise restrained in a safe state. If an energy control procedure is available it must be reviewed and followed. If one is not available, but required it is to be developed using the template provided in Appendix A and followed during the lockout/tagout activity and submitted to the Shop Supervisor at the completion of the lockout/tagout activity.

- a. All sources of hazardous energy must be identified prior to work commencing. This will allow the employee to properly assess and acquire the proper lockout and securing devices to ensure their safety. A tagout schedule must be developed for each piece of equipment and machinery and should be kept on file for future reference or use. This schedule describes the energy sources; location and type of disconnect means.
- b. When shutting down any primary electrical equipment, a shutdown procedure will be written in advance and approved by an Electrical Services supervisor.

NOTE: Proper personal protective equipment and clothing must be worn and the ASU Electrical Safety Program followed for all energized circuits at or above 50 volts.

- c. Locks and tags are to be used to lock out electrical switches, breakers and disconnect means provided for that purpose. Securing or locking out other equipment with the use of chains or other safety support devices maybe required. Tags must be used with these devices as well.

Note: When the power source is over 220 volts between phases or above, only employees considered qualified under the ASU Electrical Safety Program may disconnect power sources.

STORED ENERGY

- a. Following the application of the lockout or tagout devices to the energy isolating devices, all potential or residual energy will be relieved, disconnected, restrained, and otherwise rendered safe.
- b. Where the re-accumulation of stored energy to a hazardous energy level is possible, verification of isolation will be continued until the maintenance or servicing is complete.
- c. Release stored energy (capacitors, springs, elevated members, rotating fly wheels, and hydraulic/air/gas/steam systems) must be relieved or restrained by grounding, repositioning, blocking and/or bleeding the system.

VERIFICATION OF ISOLATION

- a. Prior to starting work on machines or equipment that have been locked or tagged out, the authorized employees will verify that isolation or de-energization of the machine or equipment have been accomplished.
- b. After assuring that no Employee will be placed in danger, test all lock and tag outs by following the normal start up procedures (depress start button, etc.).
- c. Caution: After Test, place controls in neutral position.

RELEASE FROM LOCKOUT/TAGOUT

Before lockout or tagout devices are removed and the energy restored to the machine or equipment, the following actions will be taken:

- a. The work area will be thoroughly inspected to ensure that nonessential items have been removed and that machine or equipment components are operational.
- b. The work will be checked to ensure that all employees have been safely positioned or removed. Before the lockout or tagout devices are removed, the affected employees will be notified that the lockout or tagout devices are being removed.
- c. Each lockout or tagout device will be removed from each energy isolating device by the employee who applied the device.

LOTO PROCEDURE FOR ELECTRICAL PLUG-TYPE EQUIPMENT

This procedure covers all Electrical Plug-Type Equipment such as Battery Chargers, some Product Pumps, Office Equipment, Powered Hand Tools, Powered Bench Tools, Lathes, Fans, etc. When working on, repairing, or adjusting the above equipment, the following procedures must be utilized to prevent accidental or sudden startup:

- a. Unplug Electrical Equipment from wall socket or in-line socket.
- b. Attach "Do Not Operate" Tag and Plug Box & Lock on end of power cord.
Exception - not to lock and tag the plug if the cord and plug remain in the exclusive control of the employee working on, adjusting or inspecting the equipment.
- c. Test Equipment to assure power source has been removed by depressing the "Start" or "On" Switch.
- d. Perform required operations.
- e. Replace all guards removed.
- f. Remove Lock & Plug Box and Tag.
- g. Inspect power cord and socket before plugging equipment, any defects must be repaired before placing the equipment back in service.

LOTO PROCEDURES INVOLVING MORE THAN ONE EMPLOYEE

If more than one Employee is assigned to a task requiring a lock and tag out, each must also place his or her own lock and tag on the energy isolating device(s). If more than one employee is working on the same piece of equipment at the same time, each employee is to have their own lock on the lockout device.

The first employee applying the lock and tagout on the equipment or system will use a group hasp to accommodate for multiple individual locks and tags. Individual tags must be placed with the individuals lock to ensure consistency and traceability.

The general equipment unit lock(s) will be used by the assigned unit when a piece of equipment is to remain locked out at the end of the shift or when locked out for “Out of Service” purposes. When it is known that another employee in the unit may finish the job (i.e., replace motor or other electrical devices at a later date) the general equipment unit lock will be used as protection for the equipment and for employees.

EXTENDED LOCKOUT/TAGOUT

Should the shift change before the machinery or equipment can be restored to service, the individual lock and tag out must be removed and replaced with an equipment lock and “Out of Service” tag. If the task is reassigned to the next shift, those Employees must employ their individual lock and tag out before the previous shift may remove their lock and tag or equipment lock, if applicable.

MANAGEMENT'S REMOVAL OF LOCK AND TAG OUT

Only the Employee that locks and tags out machinery, equipment or processes may remove his/her lock and tag. However, should the Employee leave the facility before removing his/her lock and tag, the Maintenance Manager or Supervisor may remove the lock and tag if the abandoned lock procedure process is followed and the form in Appendix C is completed.

CONTRACTORS

Contractors, working on ASU property and equipment must comply with lockout tagout and energy control procedures as prescribed under 29 CFR1910.147 while servicing, maintaining or installing equipment, machinery or processes. ASU employees and contractors working in the same location must adhere to their respective lockout/tagout procedures and inform each other of the specific procedures being followed while working in the same location.

Machine/Equipment Control (Equipment Lock)

All energy control devices that are needed to control the energy to the machine or equipment will be physically located and secured in such a manner as to isolate the machine or equipment from all energy sources. When a piece of equipment is locked and tagged out and will remain out of service longer than a 4 hour period, or if the employee leaves the area for any length of time, an approved The equipment “Out of Service” tag will be placed on the equipment with an equipment lock,

Locks for machine or equipment securing – Any lock may be used for equipment out of service locks except for the Master Lock 6835 as they must be distinct from locks used for LOTO.

The individual lock used for LOTO will be removed at this time and replaced with a dedicated “equipment” lock. Equipment locks may be keyed the same for the entire group.

1. A two-part tag will be used only once. After the tag has been removed from a piece of equipment or system, the top half of the tag will be returned to the unit supervisor for tracking equipment status and filing purposes.

2. All tags will be signed by the employee applying the tag, the unit designation and the current date. A tracking method to determine the current status of equipment and systems should be developed using the tag system.

Group Lockout/Tagout

If the primary locking device will not accommodate each employee's lock, multiple locking devices are to be used and are available from the tool cribs. When multiple locking devices are required, the shank of the multiple devices must immobilize the equipment and not merely be attached to the shank of another lock.

1. Before work commences, the employee will make certain that the equipment is immobilized by pushing the start button in the field. Only after the entire area has been inspected and each employee has been advised, that the test will be performed.
2. If an employee has any doubt as to the location of lockout switches, lockout procedures, job procedure or any other questions pertaining to their particular job assignment, all doubt will be removed before starting the job by asking their supervisor for assistance or clarification.
3. Whenever it might become necessary to operate or test the equipment during the work assignment, one employee will be designated or assigned to operate the equipment. After each employee removes their lock and tag, and only after the entire area has been inspected to make certain that each employee has been advised of the intent to operate and assuring everyone is in the clear, will the assigned employee operate the equipment.
4. Each employee who will continue to work on the equipment will replace their lock and tag on the lockout device after the test is performed. Then before proceeding to work on the equipment, the retesting of the equipment will be conducted to assure no energy source is present and after checking to make sure everyone is clear of danger.
5. All work performed on the equipment will be accomplished in a safe and prescribed orderly manner ensuring "Zero" state.
6. Tags **MUST** be used in addition to the padlocks, and **MAY NOT** substitute for the padlock except as covered by NOTE 10. Each unit involved in the repair or maintenance of a particular piece of equipment or system working on the job will provide their own personal tag and a two-part tag. See paragraph under "POLICY" on page one.
7. Before leaving the job for another assignment, or at the end of a shift or upon completion of the job, the employee will remove their personal lock and replace it with the general equipment unit lock. When the job is not complete, the employee will notify their supervisor. The supervisor or subsequent employee will remove the lock only after all work has been completed, all guards have been replaced, and no hazardous operating or working conditions has been left.

When work is completed, all tags and locks will be removed by the employees. The last employee in each unit assigned to the job will remove the unit tag. Only after the lock(s) and tag(s) have been removed, and the area inspected and checked for hazards and

assuring that all employees are clear, the equipment or system may be placed back into service.

8. In the event someone forgets to remove their personal lock, the employee will be required to return on their own time and remove the lock. Should the employee not be available and it becomes necessary to remove the lock, the lock will be cut off and replaced at the employee's expense.

Note: This lock will not however be removed until a thorough check of the equipment has been made by the unit Assistant Supervisor or the Supervisor in charge and not until the Supervisor is certain that it is safe to operate the equipment.

9. Each employee will be assigned a key to their personal safety lock. A duplicated key cannot be made or given to a second party or left for others to use.

10. In the event that standard locks are not applicable to immobilize equipment, "T" legs or line leads at the breakers must be removed by a qualified electrician and tagged out to reflect who, when, and why they were removed or other physical secured locking mechanisms may be substituted in place of a lock (i.e. self-locking ties on electrical breakers, where space and location do not allow for locks or may create an additional hazard). This should be a last resort methods and not an alternative.

NOTE: If in doubt, check with supervision for a suitable means of isolating the energy source.

ROUTINE MAINTENANCE

If routine maintenance and machine adjustments are required, lockout and tag out procedures are not required, if equipment must be operating for proper adjustment. This rare exception may be used only by trained and authorized Employees when specific procedures have been developed to safely avoid hazards with proper training. Where applicable, these activities are to be identified on the energy control procedure. All consideration shall be made to prevent the need for an employee to break the plane of a normally guarded area of the equipment by use of tools and other devices.

PERIODIC INSPECTING PROGRAM

An audit of the tagging procedure will be conducted of each type of energy control procedure utilized by each affected department. The audit may be conducted by the Supervisors, Assistant Supervisors and other authorized employees or EH&S on an annual basis. The audit is to be documented utilizing the form in Appendix B of this procedure.

TRAINING:

All employees will be given training on the lockout/tag out procedure. All employees will be retrained on a yearly basis. Records of participation on this training will be retained in Facilities Management office files.

Authorized Employees Training - All Building and Equipment Maintenance employees and their Supervisors will be trained to use the Lock and Tag Out Procedures. Additionally, employees involved in research activities that may involve Lock Out Tag Out will be trained. The training will be conducted by EH&S or other designated trainer at the time of initial hire. Retraining shall be held at least every three years or as needed.

- a. Training will consist of the following:
 - i. Review of General Procedures
 - ii. Review of Specific Procedures for machinery, equipment and processes
 - iii. Location and use of Specific Procedures
 - iv. Procedures when questions arise

- b. Affected Employee Training:
 - i. Only trained and authorized Employees will repair, replace or adjust machinery, equipment or processes
 - ii. Affected Employees may not remove Locks, locking devices or tags from machinery, equipment or circuits.
 - iii. Purpose and use of the lockout procedures.

- c. Other Employee Training:
 - i. Only trained and authorized Employees will repair, replace or adjust machinery or Equipment.
 - ii. Other Employees may not remove Locks, locking devices or tags from machinery, equipment, circuits, or special hazards and special safety procedures. The schedule will be reviewed each time to ensure employees properly lock and tag out equipment and machinery. If a Tagout Schedule does not exist for a particular piece of equipment, machinery and process, one must be developed prior to conducting a Lockout - Tagout. As repairs and/or renovations of existing electrical systems are made, standardized controls will be used.

DISCIPLINE

When an employee fails to lock and tag-out any equipment prior to performing work on that equipment, that employee will be subject to discipline according to “ASU SPP 809 Discipline”.

If an employee removes a personal lockout lock or tag other than their own without prior approval from their supervisor, the employee will be subject to appropriate discipline that may include termination of employment. (Note: this does not include general equipment locks or tags).

If an employee energizes any equipment that has been properly tagged by other employees, that employee will be subject to appropriate discipline which may include termination of employment. (Note: this includes both types of tags).

Appendix A Fill-in-the-Blank ECP Template

SCOPE:

This lockout procedure is for (*Specific machine or equipment that this procedure applies to*):

PURPOSE:

- This procedure establishes the minimum requirements necessary to protect employees from injury caused by the unexpected energization, start up, or release of stored energy during service or maintenance.
- Use this procedure to make sure the machine or equipment is stopped, isolated from all potentially hazardous energy sources, and locked out before any employee begins work.

AUTHORIZATION:

- The following persons are authorized to lock out the machine or equipment using this procedure (*List the names of authorized employees you want to use this procedure*):
-

COMPLIANCE WITH THIS PROGRAM:

- All employees are required to comply with the restrictions and limitations imposed upon them during the use of lockout.
- Authorized employees will perform lockout as described in this procedure.
- No employee will attempt to start, energize or use any machine or equipment that is locked out.
- Failure to comply with this procedure will result in the following disciplinary action.

INTENDED USE:

- This procedure will be used for the following service or maintenance actions (*List the service and maintenance activities that require using the procedure*):
-

SPECIFIC PROCEDURAL STEPS:

Step 1: The authorized employee will identify the type and magnitude of the energy that the machine or equipment uses, understand the hazards of the energy, and the methods to control the energy before using this procedure. (*List the type and magnitude of the energy, its hazards, and the methods to control the energy.*)

Step 2: Notify all affected employees that the machine or equipment is to be shutdown and locked out for service or maintenance. (*List the names or job titles of affected employees and how to notify them (i.e. verbally)*):

Step 3: Shut down the machine or equipment by the normal stopping procedure (such as depressing a stop button, opening switches, or closing valves). (*List types and locations of machine or equipment operating controls.*)

Step 4: Completely isolate the machine or equipment from its energy sources by using the appropriate energy-isolating devices. (*List types and locations of energy isolating devices.*)

SPECIFIC PROCEDURAL STEPS: (continued)

Step 5: Lock out the energy isolating devices with assigned individual locks (List any additional procedural requirements, such as putting on a tag with amplifying information, necessary for the authorized employee to know):

Step 6: Dissipate or restrain stored and residual energy, such as that in capacitors, springs, elevated machine members, rotating flywheels, hydraulic systems, and air, gas, steam, or water pressure, using methods such as grounding, repositioning, blocking, or bleeding down. (*List the types of stored and residual energy and the methods to dissipate or restrain them.*)

(List any actions necessary to prevent stored energy from re-accumulating to a hazardous level):

Step 7: Make sure the equipment is disconnected from the energy sources and stored and residual energy has been made safe. Check that no personnel are exposed, then verify the isolation of the equipment by doing the following: (List the method of verifying machine or equipment isolation, such as operating the push button or other normal operating controls or by testing to make certain the equipment will not operate.)

CAUTION: Return the operating controls to the **safe, neutral, or off** position, after verifying the equipment is isolated from its energy sources.

THE MACHINE OR EQUIPMENT IS NOW LOCKED OUT

Restore the machine or equipment to service after the service or maintenance is completed and the machine or equipment is ready to return to its normal operating condition by doing the following steps:

Step 1: Check the machine or equipment and the immediate area around it to make sure all nonessential items have been removed and that the machine or equipment is in operating condition and ready to energize.

Step 2: Make sure all employees are safely positioned for starting or energizing the machine or equipment.

Step 3: Verify that the controls are in neutral.

Step 4: Remove the lockout devices and reenergize the machine or equipment.

Note: Some forms of blocking may require re-energization of the machine before they can be safely removed.

Step 5: Notify affected employees that the servicing or maintenance is completed and the machine or equipment is ready to use.

APPENDIX B

Annual Review Information			
Department:		Date:	
Supervisor:		Reviewer:	

	Yes	No
1. Are department personnel who conduct work covered by this manual trained as Lockout Authorized Employees? List those who are trained and those who are not trained but need it.	<input type="checkbox"/>	<input type="checkbox"/>
2. Are department Lockout Authorized Employees familiar with and follow the General Lockout Procedure?	<input type="checkbox"/>	<input type="checkbox"/>
3. Have Energy Control Procedures been developed in accordance with the General Lockout Procedure? List Energy Control Procedures needed and whether they have been developed.	<input type="checkbox"/>	<input type="checkbox"/>
4. Does the department have adequate locks, tags, and lockout devices? List what is needed and whether or not the department has them.	<input type="checkbox"/>	<input type="checkbox"/>
5. Does the department conduct Group Lockout? Review procedure.	<input type="checkbox"/>	<input type="checkbox"/>
6. Does the department conduct lockout work across shift/personnel changes? Review procedure.	<input type="checkbox"/>	<input type="checkbox"/>
7. Does the department have an Emergency Lock Removal procedure? Review key security method and list persons who will implement the Emergency Lock Removal procedure/form.	<input type="checkbox"/>	<input type="checkbox"/>
8. Have Lockout Authorized Employees demonstrate Energy Control Procedures or General Lockout Procedure as appropriate. List Energy Control Procedures demonstrated and the Lockout Authorized Employee who demonstrated.	<input type="checkbox"/>	<input type="checkbox"/>

APPENDIX C
ABANDONED LOCK REMOVAL FORM

Note: Only supervisors can remove abandoned locks.

Name of Person whose lock must be removed: _____

Has an attempt been made to contact him or her? YES NO

Why is it critical to remove this lock now?

Are you sure it is safe to remove this lock? YES NO

Supervisor's Name: _____

Signature: _____

Date: _____

Facilities Management Representative:

Signature: _____

Date: _____