TOWSON UNIVERSITY

LOCKOUT/TAGOUT PROGRAM

Department of Environmental Health & Safety

Phone: (410) 704-2949
Fax: (410) 704-2993
Emergency: (410) 704-4444
Email: Safety@towson.edu
Website: **http://wwwnew.towson.edu/adminfinance/facilities/ehs/**

REVISED OCTOBER 2009

TABLE OF CONTENTS

I. General

Lockout is the preferred method of isolating machines or equipment from energy sources. To assist in developing a procedure that meets the requirements of the standard, however, the following simple procedure is provided for use in both lockout and tagout programs. This procedure may be used when there are limited numbers or types of machines or equipment, or there is a single power source. For more complex systems, a more comprehensive procedure has been developed, documented and utilized by our university (lockout procedures are at the end of this program).

II. Purpose

This procedure establishes requirements for the lockout or tagout of energy isolating devices. It should be used to ensure that the machine or piece of equipment is isolated from all potentially hazardous energy and locked out or tagged out before employees perform any servicing or maintenance activities where the unexpected energization, start-up or release of stored energy could cause injury.

III. Scope

Servicing and/or maintenance which takes place during normal production operations is covered by this plan if: 1) An employee is required to remove or bypass a guard or safety device; or 2) An employee is required to place any part of his or her body into an area of the machine or piece of equipment where work is actually performed upon the material being processed (point of operation) or where an associated danger exists during a machine cycle.

Minor tool changes and adjustments (e.g., clearing jammed paper from a copier, printer or typewriter) and other minor servicing activities, which are routine, repetitive, and take place during normal production operations, are not covered by this plan. This type of maintenance must be completed using alternative safety measures (e.g., proper use of manufacturer-required and recommended machine guards).

This plan also does not apply to work on cord and plug connected electrical equipment for which exposure to the hazards of unexpected start-up is controlled by unplugging it from the energy source if the plug is under the exclusive control of the employee performing the service.

IV. Responsibility

All employees who perform lockout or tagout procedures are responsible to follow the appropriate procedures for the specific equipment they are locking or tagging out. All employees who perform lockout/tagout procedures are required to attend training with Environmental Health & Safety prior to performing any lockout/tagout procedures. Those employees are also required to attend an annual inspection/training. Only authorized employees may lockout or tagout machines or equipment.

Each new or transferred affected employee and any other employee whose work operations are or may be in the area will be instructed in the purpose and use of the lockout or tagout procedure. The authorized employees will notify them whenever a lockout or tagout will occur, as well as when the equipment is being placed back in service.

1. Department of Environmental Health & Safety (EHS) shall:

    - Provide consultation to assist in the identification of equipment where LOTO should be utilized.
    - Prepare the LOTO Plan with periodic review and revisions as needed;
    - Distribute the LOTO plan to each affected department for distribution to all individuals who are authorized by the department to perform maintenance on energized equipment;
    - Approve locks to be used by individual departments;
    - Investigate and document all reported accidents and/or near-miss accidents that are directly or indirectly related to the locking and tagging of equipment; and
    - Provide training and retraining to all authorized employees.

2. Department Heads shall:

    - Designate supervisors to implement specific LOTO procedures; and
    - Select appropriate locking and tagging devices for their respective department.

3. Designated Supervisors shall:

    - Implement all provisions of the LOTO for work areas under their control;
    - Inventory and identify all potentially dangerous equipment capable of releasing hazardous energy during maintenance in work areas or facilities under their control;
    - Prepare specific LOTO and emergency procedures for hazardous machinery;
    - Identify persons authorized to implement LOTO procedures and assure that each person attends training provided by the Department of Environmental Health & Safety;
    - Report all workplace injuries, unsafe conditions and near-misses to the Department of Environmental Health & Safety;
    - Instruct authorized LOTO personnel regarding the applicability of this plan to their respective shop;
    - Provide proper locking and tagging equipment including locks, tags, multiple lock holders, etc.;
    - Direct periodic safety audits of LOTO procedures to determine regulatory compliance, and recommend action to correct conditions of non-compliance; and
    - Comply with necessary documentation requirements.

4. Authorized employees shall:

    - Adhere to the requirements of the Lockout Tagout Plan;
    - Follow guidelines referenced in this plan to protect themselves and others from the release of hazardous energy;
    - Ensure the security of their own locking devices;
    - Complete all safety training requirements and comply with documentation procedures; and
    - Report all workplace injuries, unsafe conditions and near-misses to their supervisors and/or the Department of Environmental Health & Safety.

5. Affected employees shall:

- Notify the appropriate persons when equipment needs servicing; and
- Follow LOTO instructions given by the authorized employees.

V. Procedures

The following are minimum requirements for the use of energy isolating devices whenever maintenance or servicing is done. They shall be used to ensure that the machine or equipment is stopped and isolated from all potentially hazardous energy. Additionally, they will serve as an outline to protect workers from the inadvertent release of hazardous energy.
Locking devices and tags shall be used when employees are performing maintenance or service to any machine or system where unexpected or unintentional motion could cause harm. Locking devices shall also be used when guards or other safety devices must be removed during service or when moving or energized parts put any part of the employee's body at risk of injury.

Examples of conditions where locking and tagging must be used may include, but are not limited to:

a. Clearing blocked or jammed mechanical equipment;

b. Maintenance or repair work on equipment with moving parts;

c. Confined space entries (*Refer to the University Confined Space Plan*); and

d. Repairs or installation of electrical equipment.

If the equipment being serviced must be temporarily re-activated (for example, to test the equipment as part of the installation) all start-up and lockout procedures must be followed.

A. Specific Instructions for Hazardous Machinery

Specific instructions shall be developed for the locking and tagging of machinery or equipment under the following conditions:

a. When the machine being serviced has the potential for stored or residual energy, or the re-accumulation of stored energy after shut down;

b. When the machine has multiple energy sources;

c. When the isolation and locking of the machine will not completely deactivate it;

d. When the machine cannot be locked out;

e. When a single lockout device will not achieve a lockout condition; or

f. When the lockout device will not be under the exclusive control of the authorized employee performing the service.

B. Working Without a Lock

If a lock cannot be applied to the equipment, and the supervisor can demonstrate that the tagging procedure will provide a level of safety equivalent to that obtained by the use of a lock, a tag may be used instead. A tag used without a lock shall be supplemented by one additional safety measure that provides a level of safety equivalent to that obtained by the use of a lock. Additional safety methods may include the removal of an isolating circuit element, blocking of a control switch, opening of an extra disconnecting device or the removal of a valve handle to reduce the likelihood of inadvertent activation. The tagout device shall be attached to the same location that the lockout device would have been attached.

VI. Implementing Lockout/Tagout

Employees shall implement an orderly shutdown of machinery to avoid any additional or increased hazards resulting from equipment stoppage. The following is a list of steps to be used during shutdown.

A. PREPARING FOR SHUTDOWN

1. Identify the types of energy and sources
2. Notify affected employees of intent to service equipment

B. SHUTTING DOWN THE EQUIPMENT

1. Turn off equipment
2. Deactivate energy
3. Release all stored or residual energy
4. Attach locking and tagging devices
5. Verify that equipment is secure and deactivated

C. PREPARING TO RETURN EQUIPMENT TO SERVICE

1. Remove all tools from the equipment
2. Inspect the controls to verify they are in the "off" position
3. Remove all locking and tagging devices
4. Re-energize the equipment
5. Notify affected employees when machine is back in service

A. **PREPARATION FOR SHUTDOWN:**

Identification of the Energy Type or Source

Determine where and how equipment is being energized. Since some equipment is powered by several sources (e.g., electrical, mechanical, pneumatic, chemical, thermal and hydraulic), all energizing sources shall be identified. For complex equipment, refer to the manufacturer's control diagram detailing the locations of all isolating points. These points may include breaker panels, switches and valves. Furthermore, possible residual energy and methods used to dissipate or restrain that energy shall be identified. In addition to identifying energy sources, the employee must determine the magnitude of the energy, the hazards of the energy to be controlled and the methods or means to control the energy. **If authorized employees are unable to determine each form of energy, they must consult their supervisors before work is started.**

1. **Notification of employees**

   Affected employees must be notified by authorized personnel of the intent to service equipment. Notification shall be given before LOTO controls are applied and should contain the name and job titles of authorized employees, location of equipment being serviced, and duration/date of service.

B. **SHUTDOWN OF MACHINE:**

1. **Shut Off Equipment**

   If the machine or equipment is operating, employees shall shut it down by the normal stopping procedures (depress the stop button, open the switch, close valve, etc.).

2. **Deactivate the Energy**

   Disconnect the device from all energy sources and release all residual energies that may present a hazard. Inspect the equipment to ensure all energy sources are disconnected.

3. **Release of Stored or Residual Energy**

   Release stored or residual energy, such as that in capacitors, springs, elevated machine members, rotating flywheels, hydraulic systems and pressurized systems (air, gas, steam, or water). If energy is incapable of being released, the employee shall reposition, block or utilize some other protective measure to prevent the release of residual energy while service is in progress.

4. **Attach a Lock and Tag**

Attach a lock and tag, of designated color, type and descriptive warning, on each disconnecting means used to de-energize circuits and equipment on which work is to be performed. The lock shall be attached to prevent persons from operating the equipment. Tags must be securely attached to energy isolating devices so that they cannot be inadvertently or accidentally detached during use. Additionally, tags shall be attached to all points where equipment or circuits can be energized. If multiple employees are servicing the same equipment, each shall attach their own lock to a multiple lock plate.

Note: No attempt shall be made to remove another employee's lock unless the requirements listed in Section III (c) of this document are satisfied.

5. **Verify that equipment is secure and deactivated**

Test the deactivation of the equipment to ensure that equipment cannot be energized and potential energy sources secured. This should be done by:

i. Checking that no personnel are exposed;

ii. Verifying the isolation of equipment by operating the push button or other normal operating controls. Secure all switches to prevent movement to the "on" or "start" position;

iii. Checking pressure gauges to ensure de-pressurization of lines; and

iv. Inspecting electrical circuits to confirm zero voltage.

Note: All employees should consider equipment to be operable at all times except when they have personally locked it out.

C. **RETURNING EQUIPMENT TO SERVICE**

After service has been completed and the machine is ready to be tested or returned to service the following steps must be followed.

a. **Inspect the machine and work area**

Inspect the machine(s) to insure that non-essential materials have been removed and the machine is in operating order. Visual inspections shall be conducted to ensure: a) tools and equipment are removed and secured safe guards are in place; and b) blocks, pins and chain (used during the lockout) are removed. Additionally, employees shall verify all equipment components are fully assembled and operational. Finally, employees shall inspect the work area to ensure that all employees have been safely positioned or removed from the area.

b. **Inspect the controls**

Verify the controls are in neutral or the "off" position.

c. **Remove the lock devices**

Each lock shall be removed by the authorized employee that applied it or under his/her direct supervision. If the authorized employee is absent from the work place then the lock or tag can be removed by a qualified person designated to perform this task provided that the immediate supervisor:

i. Verifies that the employee is not present and therefore unable to remove the lock;

ii. Makes all reasonable efforts to inform the authorized employee that the lockout/tagout device has been removed; **and**

iii. Ensures that the authorized employee knows the lockout/tagout device has been removed before work resumes.

d. **Re-energize the machine.**

After completing the above steps, restore the energy to the machine.

e. **Notify affected employees**

Notify affected employees that the servicing or maintenance is completed, and the machine or equipment is ready for use.

D. Procedure Involving More Than One Person

In the preceding steps, if more than one individual is required to lockout or tagout equipment, each shall place his/her own personal lockout (or tagout) device on the energy isolating device (s). When an energy-isolating device cannot accept multiple locks or tags, a multiple lockout or tagout device (hasp) may be used. If lockout is used, a single lock may be used to lockout the machine or equipment with the key being placed in a lockout box or cabinet that allows the use of multiple locks to secure it. Each employee will then use his/her own lock to secure the box or cabinet. As each person no longer needs to maintain his or her lockout protection, that person will remove his/her lock from the box or cabinet.

VII. Basic Rules for Using Lockout or Tagout System Procedure

All equipment shall be locked out or tagged out to protect against accidental or inadvertent operation when such operation could cause injury to personnel. Do not attempt to operate any switch, valve, or other energy-isolating device where it is locked (or tagged) out. Towson University's disciplinary procedures apply to any violation of the Lockout/Tagout Program.

VIII. Training and Annual Inspection

A. Training

The Department of Environmental Health and Safety will give training. (see the appendix for the PowerPoint presentation)

Authorized employee training will consist of the following elements:

1. Review of 1910.147 "The Control of Hazardous Energy" requirements.
2. Type and magnitude of energy sources on campus.
3. Purpose and use of the Hazardous Energy Control Procedures.
4. Nature and limitations of tags.
5. How to isolate equipment/machinery for lockout/tagout.
6. Conditions for restarting machinery/equipment or removing tags.

This training will last approximately one and a half hours. A classroom style training with PowerPoint presentation will be presented followed by an actual demonstration of lockout/tagout procedures. The participants will then perform the lockout/tagout procedure for evaluation by EHS.

The lockout/tagout training will be given to affected employees as part of their new hire orientation.

Authorized employees will receive training prior to their initial involvement with any lockout or tagout operation.

Retraining will be given for authorized and affected employees whenever there is a change in job assignment, a change in machines, or equipment, or process that presents a new hazard or a change in Hazardous Energy Control Procedure. Retraining will also be given whenever the annual inspection identifies a deficiency in the procedures.

A list of names and dates of training will be maintained by EHS.

B. **Annual Inspection**

Each year an authorized employee (Environmental Health & Safety), who is not involved in the HECP being inspected, will conduct an inspection of the Hazardous Energy Control Procedure (HECP).

This will be accomplished by reviewing the HECP Form with authorized employees. In addition, the authorized employee conducting the inspection will observe the actual implementation of the HECP.

When lockout is used, the HECP will be reviewed with each authorized employee. Where tagout is used, HECP will be reviewed with both affected and authorized employees.

The designated inspector will document this annual inspection. The documentation will include the employee's name, date of the inspection, and the equipment being locked or tagged out.

IX. Group Lockout/Tagout Procedure

This section of the Control of Hazardous Energy Procedure will be reviewed with all personnel affected or authorized by the group lockout/tagout before implementation of the job.

1. One authorized employee will be designated as responsible for the lockout/tagout.

2. The Hazardous Energy control Procedure (HECP) will be reviewed with each group number.

3. If more than one crew, craft, department, etc. is involved, one authorized employee will coordinate the lockout/tagout to ensure that all control measures are applied and that there is continuity of protection for the group.

4. Each authorized employee will affix the lockout or tagout device to the group lockout. Each lock must have that person's name affixed to it. Each authorized employee will remove their lockout or tagout device when they stop working on the equipment or machine being serviced.

X. Shift Changes

The authorized employee in charge of the group or individual lockout or tagout will coordinate shift changes. This will include:

1. Changing locks or tags
2. Retesting to ensure de-energized state of equipment or machinery being serviced.
3. Notification of start-up and testing to be performed.
4. Changes in the job that effect the lockout or tagout procedures (HECP).

XI. Outside Service or Contractor Personnel

Outside personnel or contractors involved in operations relating to equipment or machinery lockout that affects Towson University employees, must submit their energy control procedures to the Department of Environmental Health and Safety. Affected employees must be trained and notified as outlined in this written program. The responsible manager for the affected area will ensure that outside personnel and affected employees are informed of the proper procedure.

Appendix A
OSHA LOTO Standard
29CFR 1910.147

OSHA LOTO Standard
Link: http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=9804

Appendix B
Glossary

Glossary of Terms

Affected personnel: Persons that may use the machine being serviced during the course of their work day and may attempt to activate machinery while service is being done. Affected persons also include those persons whose job requires working in an area while such servicing or maintenance is being performed.

Authorized personnel: Persons that have received training in the use of Lockout/ Tagout equipment and are authorized to perform maintenance. Authorized personnel also include those persons responsible for properly locking and tagging machinery that is to be serviced. (Affected personnel may also be authorized personnel when that employees duties include servicing or maintenance of machinery.)

Blank: A disk inserted into the space between two pipe flanges to prevent the passage of liquid or gases through a pipe.

Bleed: The release of stored hydraulic, electrical or pneumatic energy.

Energy Sources: Any source of electrical, pneumatic, hydraulic, thermal, chemical or other type of energy.

Lock: Keyed device used to secure equipment. Keys for the lock shall be kept by the person completing the service only. Locks issued for use with this plan shall not be used for other purposes. Additionally, locks shall be able to withstand the environment in which they are being used.

Lockout: A system in which a lock, when properly attached to a power or energy source, prevents the unintentional activation of equipment. The lock physically hold the switch or handle in the "off" position until it is removed by the authorized personnel.

Lockout/ Tagout (LOTO): A list of procedures, abbreviated as LOTO, designed and implemented to protect employees from an accidental discharge of energy. LOTO is used interchangeably with, "Control of Hazardous Energy".

Servicing and/or Maintenance: Constructing, repairing, installing, adjusting, inspecting, modifying, lubricating, cleaning and/or clearing jammed equipment.

Tagout: A tagging procedure, intended to act only as a warning device, used to prevent the unintentional activation of equipment. The tag used at Towson University will contain the name and title of the authorized employee and read "DO NOT OPERATE". Tagout device attachment means shall be of a non-reusable type, attachable by hand, self-locking, and non-releasable with a minimum locking strength of no less than 50 pounds. All tags and attachment means shall also be made to withstand the environment in which they are being used.

Appendix C
Energy Checklist

ENERGY CHECKLIST

Energy Type	Hazard	Magnitude	Control Method
Electrical	Shock Burn Fire _____	110 VAC 220 VAC 208 VAC/30 ___V____A	Main Switch Plug Control Fuse Blocks Shielding
Pneumatic	Mechanical/ Pinch Points Crush Laceration Flying Debris	Moderate Slight High ___lb Force	Air Line Valve Gas Cylinder Valve Gas Line Valve _____
Chemical (Gas)	Flammable Corrosive Toxic Reactive	Slight Moderate High	Cylinder Valve Gas Line Valve
Chemical (Liquid)	Flammable Corrosive Toxic Reactive	Slight Moderate High	Valve Flange Plate
Mechanical	Shaft in Motion Moving Parts Crushing Laceration Impalement	Slight Moderate High ____ft-lb ____hp	Main Electrical Switch Plug Control Shielding Blocking Anti-Motion Pin
UV	Skin and Eye Burns	Slight Moderate High ___W/cm²@___%	Shielding Main Switch Plug Control Circuit Breaker
ElectroMagnet	Strong Field	Slight Moderate High ____Gauss	Main Switch Plug Control Circuit Breaker
Thermal	Burns	Moderate Temperature High Temperature Cryogenic ____°C	Main Switch Plug Control Steam Valve Fluid Line Valve