CONTROL OF HAZARDOUS ENERGY
(LOCKOUT/TAG OUT PROGRAM)

Washington State University – Tri-Cities
(all departments)

PURPOSE

This program establishes the general and specific requirements for the control of hazardous energy during the servicing and maintenance of equipment in accordance with WSU policy and the Washington Administrative Code.

It describes responsibilities, training requirements and procedures intended to reduce or eliminate injuries resulting from stored or residual energy and/or the sudden activation of equipment while personnel are engaged in maintenance activities.

DEFINITIONS

Affected Employee: An employee whose job requires him/her to operate equipment on which servicing or maintenance is being performed under energy controlled (locked-out) conditions, 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 equipment in order to perform service or maintenance activities. An affected employee becomes an authorized employee when that employee's duties include performing servicing or maintenance.

Crew Lockout: More than one employee affixing a lock to a single or multiple energy isolating devices.

Energy Isolating Device: A mechanical device which physically prevents the transmission of energy. Examples include, but are not limited to: circuit breakers, manually operated disconnect switches, slide gates, slip blinds, line valves, blocks or similar devices with visible indication of the device's position. Push buttons, selector switches and other controls are not energy isolating devices.

Energy Source: Any electrical, mechanical, hydraulic, pneumatic, chemical, thermal or other energy, including gravity, which could cause injury to employees.

Lock Box: A box which can be locked out, for use with crew lockouts or multiple point lockouts.

Lockout Device: A device requiring use of lock and key to hold an energy isolating device in the deactivated position. These include, but are not limited to: electrical plug caps, valve handle chains or covers, lockout hasps, circuit breaker lockouts and ball valve lockouts.

Locked-Out Condition: All energy sources to equipment are isolated and controlled through the application of locks, blinds, blocking and the dissipation of stored energy.

Multiple Point Lockout: Equipment having more than one energy source and/or more than one lockout point, requiring the application of multiple lockout devices to achieve a locked-out condition.

Single Point Lockout: Equipment requiring the application of a single lockout device to achieve a locked-out condition.

Tag Out Device: A tag placed on a locked-out energy isolating device to identity the authorized employees and to communicate that the equipment is in a locked-out condition.

RESPONSIBILITIES

Supervisors must enforce the Control of Hazardous Energy/LOTO program and are responsible for the following:

- Understanding that failure to lockout hazardous energy constitutes a serious hazard.
- Implementing the "General Lockout Procedures" in this program for equipment requiring single point lockout.
- Developing equipment specific energy control procedures for equipment in their area of responsibility which meets the criteria in the "Specific Lockout Procedures" section.
- Providing the necessary equipment for lockout procedures.
- Ensuring affected employees receive appropriate training in LOTO procedures *prior to working on equipment requiring the control of hazardous energy*.
- Evaluating affected employee's conformance to program requirements and documenting nonconformance at least annually.
- Requesting retraining for nonconforming employees and initiating disciplinary action when necessary.

Employees must adhere to all aspects of this program and are responsible for the following:

- Understanding that violations of lockout procedures constitute a serious safety threat to themselves and others.
- Conforming to lock out procedures when working on equipment or in areas where hazardous energy is, or may be present.
- Removing locks whenever:
    - They (and others) are not working on the equipment,
    - At the end of the work shift, or
    - At the completion of the project. It is acceptable to leave personal locks in place on a job requiring more than one shift to complete, provided that practice does not interfere with equipment start up and

recommissioning.

- Informing their supervisor when equipment or facility components in their work areas requiring lockout procedures are identified.
- Reporting to their supervisor any near miss or incident resulting from inadequate lockout procedures.
- Attending and participating in lockout/tagout training.

WSU's Departmental of Environmental Health and Safety (EHS) provides assistance in the development and implementation of, and training on, lockout procedures.

ENERGY CONTROL PROCEDURES

Cord and Plug Connected Equipment: Equipment powered by a cord and plug inserted into an electrical outlet receptacle are to be disconnected from the receptacle during maintenance and service activities. The plug must be under the exclusive control of the authorized person performing the maintenance or service activity. If the plug cannot be under the exclusive control of the person performing the maintenance or service activity, then the plug will be locked-out with a plug lockout device. Additionally, any stored energy in the machine (e.g. hydraulic, pneumatic, electrical, potential, kinetic etc.) must be de-energized before starting work, and energy reaccumulation must also be prevented.

General Lockout Procedure: This procedure applies to non-cord and plug connected equipment in which a locked-out condition can be achieved with a single point lockout and there is no potential for stored or residual energy.

1. The authorized employee completing the lockout must know the type and magnitude of the energy associated with the equipment, hazards associated with the energy, and the means or methods to control it.
2. Notify all affected employees that the equipment is under maintenance or service and will be in a locked-out condition, and no one is to attempt to manipulate the controls unless done while verifying energy nullification.
3. Inspect and ensure the equipment is safe to shut down.
4. Shutdown the equipment using procedures established by the manufacturer (e.g., render equipment inoperative using control buttons, switches or handles).
5. Identify and engage the energy isolating device needed to control the energy to the equipment. The equipment will now be physically isolated from the energy source.

   Any **stored energy**, such as that found in springs, rotating fans, sheaves, or fly wheels, hydraulic systems or compressed air or gas lines must be dissipated or restrained by either re-positioning, blocking or bleeding down. If a device (e.g. drain valve) is operated to remove stored energy then the device shall be tagged and left in the "open" position. The tag shall note the date, the authorized employee and job, stating the reason it was left open. **N o t e : Additional energy isolation controls or procedures apply when servicing equipment with the potential for energy re-accumulation. If maintenance work requires that a belt be "walked-off" a pully sheave, use a rag or tool to guide the belt off the sheave to avoid pinch points.**

6. Authorized personnel apply lockout devices, locks and tags to the isolating device. Each employee working on the equipment will place his/her lock and tag on the lockout device. Ensure that the lockout device(s) hold the energy isolating device in the safe position.
   Note: **Lockout** tags must be completed in full before attachment to the lockout device. The name of the employee, their supervisor, and the date the tag was placed must be written on the front of the tag. The reason for the lockout is written on the back of the tag. For jobs where multiple employees cannot lock onto the lockout device, a lock box shall be utilized (see procedure below). Follow Special Lockout Procedures (outlined below) if it is necessary to temporarily activate the equipment for testing during the job or if a shift change occurs prior to completion of maintenance and service activities.
7. Verify that the equipment is isolated from its energy source. Attempt to start the equipment using the control button, switch or handle before work is started. If the equipment does not start, return the control button, switch or handle to the "off" position to ensure the equipment does not start-up and cause injury when the equipment is re-energized. Caution: If the equipment does start-up contact the supervisor and/or EH&S. A survey is to be conducted to assure all energy sources are identified.
8. After maintenance and servicing are completed the authorized employee(s) inspect the area to make sure nonessential items have been removed and verify the machine or equipment is in operating condition and ready to be re-energized.
9. Notify the affected employee(s) that the lockout devices are to be removed.
10. Lockout devices are removed by authorized employees. A lock may be removed only by the person who applied it. (Exception: See Special Procedures section).

Tag-out Procedures: Tag-outs are only allowed where lockout procedures cannot be completed. The following requirements must be met before tag-outs are allowed:

- The tag-out device must be attached where a lockout device would have been put and is shown clearly that the energy isolation device is in the off or safe position.
- Configuration of the equipment makes it impossible to use a lock.
- Tag-out tags must be durable and able to withstand environmental conditions.
- The means used to attach the tag to the energy isolating device isn't reusable, is self-locking, can be attached by hand, similar to a nylon cable tie.
- When tags are applied, they may be removed only by the person who applied it. See forcible lock removal procedure below for exceptions.
- Tags must never be bypassed, ignored or otherwise defeated.
- Tags must be legible and understandable by all authorized and affected employees.
- Additional safety measures for isolation with a tag-out will improve employee protection. These should be implemented wherever possible. Examples are; removing part of the isolating circuit, blocking a control switch, removing a valve handle, etc.

Equipment Testing Procedures – Working on Activated Systems: When locks must be temporarily removed from lockout devices and the equipment energized to test or position equipment components, the following sequence of steps must be followed:

- Clear the equipment of all tools and materials.
- Employees remove their locks and tags and go to a safe position.
- Affected employees thoroughly review the activation procedure to be used.
- Verify that no one has entered or is working in the area to be energized.
- Energize the equipment and proceed with testing or positioning.
- De-energize the equipment following the *General Lockout* or *Equipment Specific Lockout Procedures* before continuing maintenance or service activities.

Working on Energized Circuits: Exposed live parts may be worked on only by qualified persons and only when de-energizing the components increases the work hazard, or makes the work task infeasible due to equipment design or operating limitations. Some examples include alarm circuits, life support systems, electrical circuit testing and checkout, etc. This variance is to only be used as the last resort and must be approved in advance by the supervisor after review. Procedures and supervisor approval must be documented. Use of proper PPE is required.

Shift Changes and Extended Lockouts: For equipment requiring lockout for more than one day, or multiple shifts, personal locks may be left on equipment if there is no chance the equipment will be restarted until repairs are completed and the employee assigned the personal lock will be at the job site to commission the equipment for start-up. If this condition cannot be met, then a department lock shall be placed on the equipment with an identification tag stating the reason the equipment is locked out and who is authorized to start the equipment back up. For lockouts utilizing the lockbox, the department lock may be applied, before all personal locks are removed. The lockout is not to be modified during this time.

Specific Lockout Procedure: Equipment-specific written lockout procedures are required when equipment has one or more of the following conditions:

- More than one energy source; or,
- More than one energy isolating device is required to achieve a locked-out condition; or,
- There is a potential for stored or residual energy or energy reaccumulation; or,
- The energy isolating device cannot accommodate multiple lockout devices during a crew lockout. (A lock box or similar lockout device is needed.)

Equipment specific written lockout procedures are documented by completing the form at the end of this program. A copy of the form can be laminated and affixed to the equipment as a reminder and reference.

Special Lockout Procedures: These procedures are to be developed as necessary to ensure employee safety during crew lockout, equipment testing, shift changes, lock removal by a person other than the one who applied it, and working with contractors.

Crew Lockout: Special procedures are needed for situations when the configuration of a lockout device will not accept the weight or the number or personal locks required. These procedures will be developed and documented with assistance from EH&S to assure employees are afforded a level of protection equivalent to that provided by each employee affixing their personal lock.

Equipment Testing: In situations when locks must be temporarily removed from lockout devices and the equipment energized to test or position equipment components, the following sequence of steps are to be followed:

1. Clear the equipment of all tools and materials.
2. Make sure that all affected employees are clear of the machine
3. The authorized employees remove their locks and tags and go to a safe position.
4. Energized the equipment and proceed with testing or positioning.
5. De-energize the equipment following the *General Lockout* or *Specific Lockout Procedures* before continuing any maintenance or service activities

Lock Removal: If an employee leaves the work-site without removing his/her lock from a lockout device and the equipment must be returned to service the following procedure is to be followed:

- The employee's supervisor is to verify that the authorized employee is not at the facility.
- All reasonable efforts are to be made to contact the employee who applied the device to inform him/her that the lock has been removed.
- The supervisor will ensure that the authorized employee has been informed that his/her lock has been removed before the employee resumes work at the facility.

The supervisor is to complete the "Notification of Lock Removal" form located at the end of this program.

Working with Contractors: Whenever outside servicing personnel are working at the facility equipment, the department supervisor is responsible for:

- Verifying the Contractor uses a properly designed written program for LOTO and hazardous energy control. Note: Do not dictate contractor means and methods for lockout, if conditions are deemed unsafe to proceed, stop work and contact the EHS Occupational Health and Safety Unit at 335-3041.
- Inform the contractor of applicable WSU LOTO procedures and inform affected WSU personnel of the Contractor's LOTO procedures. Ensure that all employees understand and will follow the restrictions of the other employer's energy control program.
- Verifying the contractor understands it is the contractor's responsibility to ensure the

energy source is isolated and locked out completely and that all safety procedures are followed including the safe release of re-accumulated and/or residual system energy.
- Verifying the contractor's locks are labeled to differentiate the contractor's locks from WSU locks.
- Ensuring that energy conveyance systems related to contract work are identified in the contract documents.
- Ensuring the contractor provides an appropriate notice prior to shut down of energy conveyance systems supplying occupied WSU facilities.
- Ensuring that WSU authorized employees conduct the work to initially isolate the energy conveyance system unless written approval is given allowing the contractor to perform the isolation work.

Ensuring that WSU authorized employees conduct the work to re-energize the system and return it to normal service, unless written approval is given allowing the contractor to perform the isolation work

LOCKOUT HARDWARE AND SUPPLIES

Each person authorized to routinely lockout equipment is to be issued a lock(s) and appropriate lockout devices (e.g., hasps). Locks are to meet the following criteria:

- Provided by the department.
- Singularly keyed.
- Equipped with label or tag identifying the authorized employee.
- Used only for locking out equipment.
- Standardized within a department (standardized by color, size or shape).

EMPLOYEE TRAINING

Each authorized employee is to be trained by the supervisor or designee prior to working on equipment requiring the control of hazardous energy (lockout). The training includes:

- The recognition of applicable energy sources.
- The types and magnitude of energy in the workplace.
- The general, specific and special procedures to isolate and lockout hazardous energy.

Each affected employee is to be trained by the supervisor or designee. The training includes:

- The purpose and use of the lockout procedures.
- The prohibition of attempting to restart or reenergize equipment which are locked-out.

Retraining is to be provided for all authorized and affected employees whenever there is:

- A change in job assignment.
- An addition or modification of equipment or processes presenting a new hazard.
- Modification of the lockout procedures.

- A periodic inspection of employee performance indicates the employee's knowledge and understanding of the lockout procedure is inadequate.

Supervisors are to document employee training.

Contact EH&S for assistance in lockout/tag out training.

PERIODIC INSPECTION

A periodic inspection is to be performed by the supervisor at least annually to evaluate the program's effectiveness. The inspection is to include observing a representative sample of each type of lockout procedure and interviewing authorized employees to:

- Verify that employees understand and follow energy control procedures, including employee interview questions.
- Review documentation for accuracy and adherence to established procedures.
- Observe devices used in LOTO procedures.

The supervisor is to complete the "Lockout Procedure Inspection Record" located in the back of this program.

All deficiencies identified during the inspection will be corrected.

DISCIPLINARY PROCEDURES

Employees who do not follow the procedures in this program bring increased risk of serious injury to themselves and co-workers. WSU Tri-Cities considers violation of Lock Out Tag Out rules and procedures a serious infraction with disciplinary action ranging from a letter of reprimand to suspension with termination possible in the most serious of cases

RECORDS RETENTION

Completed lockout procedure, Forcible Lock Removal Form, periodic inspection forms and associated communication documents must be retained by the Program Manager for at least one year

EQUIPMENT/MACHINE SPECIFIC LOCKOUT PROCEDURE

SCOPE
Equipment (name, identification number and description):

PURPOSE
This procedure contains the minimum requirements to protect employees from injury caused by the unexpected energization, start-up, or release of stored energy during service and maintenance.

Use this procedure to make sure the machine or equipment is stopped and 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:

MEETING THE REQUIREMENTS OF THIS PROGRAM
All employees need to follow the restrictions and limitations that result from this procedure. 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.

INTENDED USE
This procedure will be used for the following service or maintenance activities:

SPECIFIC PROCEDURAL LOCKOUT STEPS

Step 1: List the type and magnitude of the energy to be controlled, its hazards and the methods to control the energy.

Equipment Specific Lockout Energy Sources

Energy Source 1	Type:	
	Magnitude:	
Isolating Device 1	Type	
	Location:	
Specify Lockout Device 1:		

Energy Source 2	Type:	
	Magnitude:	
Isolating Device 2	Type	
	Location:	
Specify Lockout Device 2:		

Energy Source 3	Type:	
	Magnitude:	
Isolating Device 3	Type	
	Location:	
Specify Lockout Device 3:		

List additional safety measures required and or comments:

Step 2: Notify all affected employees that the machine or equipment will be shut down and locked-out for service or maintenance.

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 the types and locations of operation controls:

Step 4: Completely isolate the machine or equipment from its energy sources by using the appropriate energy isolating devices listed above in Step 1.

Step 5: Lockout the energy isolating devices with assigned individual locks.

Step 6: Dispel or restrain stored and residual energy, such as that in capacitors, springs, elevated machine parts, rotating flywheels, hydraulic systems, and air, gas, steam, or water pressure, using methods such as grounding, repositioning, blocking, or bleeding down.

Step 7: Make sure the equipment or machine is disconnected from the energy sources, and stored and residual energy has been made safe. Check that no employees are exposed, and then verify the isolation of the equipment.

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 sure 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 source.

THE MACHINE OR EQUIPMENT IS NOW LOCKED-OUT AND READY FOR SERVICE OR MAINTENANCE TO BE COMPLETED.

RETURNING THE MACHINE OR EQUIPMENT TO SERVICE

Follow the steps below to return the machine or equipment back to service:

Step 1: Check the machine or equipment and immediate area around it to make sure all nonessential items have been removed and that the machine or equipment is in an 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 the controls are in neutral.

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

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

LOCKOUT PROCEDURE INSPECTION

Equipment To Be Locked-Out:		Location:			
Supervisor:		Date		Time	
List of Authorized Employees Involved:					
Description of Maintenance / Repair:					

In-Field Observation	Yes	No
1. Have all affected employees been notified?		
2. All energy sources de-energized and isolated?		
3. Lock, lockout device, and tags applied?		
4. System tested for shutdown prior to start of work?		
5. Is written lockout procedure in use?		
6. Are lockout devices removed and equipment returned to operation?		

Employee Interview

1. When should lockout procedures be used?
2. What is a lockout device?
3. What is the approved locking device?
4. What is an energy isolating procedure?
5. What is the procedure to remove lockout devices and return system to operation?
6. What is the procedure for lock removal when a person who applied the lock is unavailable?

Notes:	
Supervisor:	Date:

NOTIFICATION OF LOCK REMOVAL

Date:		Time:	
Employee Name:			
Equipment/Location:			
Supervisor Name:			
Explanation of Lock Removal Need			

On the above date and time a lock was left affixed to a lockout device on the indicated equipment.

	Yes	No
Supervisor verified employee is not at worksite	☐	☐
Supervisor attempted contact with employee by phone	☐	☐
Employee authorized lock removal	☐	☐
Lock forcibly removed	☐	☐
Supervisor-signed copy of this notice posted at worksite	☐	☐
Employee notified directly of lock removal on next work day	☐	☐

The supervisor has inspected the equipment or area and determined the lock can be removed without danger to employees

Supervisor: _____