OFG - LOCKOUT TAGOUT (LOTO) PROGRAM

1. PURPOSE
This program establishes the requirements for isolation of both kinetic and potential electrical, chemical, thermal, hydraulic and pneumatic and gravitational energy prior to equipment repair, adjustment or removal. This procedure applies to energy devices owned by the University of Hawaii at Manoa, or leased by the University of Hawaii at Manoa, which are operated by the Office of Facilities and Grounds (OFG).


2. 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 training and who 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 are directly affected by the LOTO (e.g., they operate machinery or equipment upon which a lockout, or tagging out, is required under this program). Training of these individuals will be less stringent than the authorized employee, in that it will include the purpose and use of the lockout procedures.

Other Employees are identified as those that do not fall into the authorized, affected or qualified employee category. Essentially, it will include all other employees who are secondarily affected by a LOTO (e.g., lighting will temporarily be out in their section of the building). These employees will be provided instruction in what the program is and not to touch any machine or equipment when they see that it has been locked or tagged out.

3. RESPONSIBILITIES

Assistant Vice Chancellor for Campus Services - Responsible for the overall implementation of this procedure.

BGM, FMO and Admin. Services Directors, Managers and Supervisors - Ensure that the necessary training is acquired by all OFG employees performing maintenance or inspections on, working on or operating energy sources as described in Para. 1 above, or any combination of such devices.
BGM and FMO Managers - Responsible to appoint OFG Supervisor(s) or Lead Person(s) to serve as an Authorized/Qualified Employee(s), to ensure training for this/these position(s), and ensure that frequent and annual inspections are performed. The name(s) of this/these individuals shall be maintained by the OFG Personnel Office.

BGM and FMO Supervisors - Ensure that all OFG employees assigned to this type of work are properly trained and certified to perform the duties assigned.

OFG Personnel Office - Responsible to ensure that all provisions of this procedure are kept updated according to the latest OSHA requirements (no less than annually), that training is available for OFG employees, and notifying management if written reports are not received. Also responsible for scheduling necessary training on this procedure, and maintaining training records.

OFG employees - Are not to conduct work on energy sources, or perform LOTO, without having been properly trained on the details of this procedure.

4. TRAINING

Authorized Employees Training

As applicable, all maintenance employees, department supervisors and janitorial employees will be trained in the use of lock and tagout procedures.

The OFG will ensure training is conducted at the time of initial hire. At a minimum, the training will consist of the following:

1. Review of general procedures
2. Review of specific procedures for machinery, equipment and processes
3. Location and use of specific procedures
4. Procedures when questions arise

Affected Employee Training

1. Only trained and authorized employees will repair, replace or adjust machinery, equipment or processes.
2. Affected employees may not remove locks, locking devices or tags from machinery, equipment or circuits.
3. The purpose and use of the lockout procedures.
**Other Employee Training**

1. Only trained and authorized employees will repair, replace or adjust machinery or equipment.

2. Other employees may not remove locks, locking devices or tags from machinery, equipment or circuits.

**5. PREPARATION FOR LOCK AND TAGOUT PROCEDURES**

Prior to the start of work, a Lockout-Tagout Energy Isolating Device Survey and Schedule must be conducted to locate and identify all energy sources and to verify which switches or valves supply energy to machinery and equipment.

The survey and schedule must be developed for each piece of equipment and machinery applicable to this LOTO program. This schedule describes the energy sources, location of disconnects, type of disconnects, special hazards and special safety procedures. The schedule will be reviewed each time to ensure employees properly lockout and tagout 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.

An example of a Lockout-Tagout Energy Isolating Device Survey and Schedule, and LOTO Procedures can be found on Page’s 10 through 13 of this LOTO Program.

Lockout-Tagout Energy Isolating Device Survey’s and Schedules are maintained and made available by the FMO Electrical Engineer (Registered Engineer II) and the Supervisor(s) for each affected Maintenance Trade Shop(s) (e.g., Electrical Shop, A/C Repair Shop, Carpenter Shop, Physical Plant, etc.).

In addition to the LOTO survey and schedule, the following **Hazard Controls** are to be implemented:

- Only authorized and trained employees may engage in tasks that require use of lockout-tagout procedures
- Equipment needs to be identified that may have more than one source of electrical power or potential energy
- Lockout procedures need to be developed for all equipment and processes
Restoration from Lockout is to be a controlled operation. Improper, or failure to use, LOTO procedures may result in:

- Electrical shock
- Chemical exposure
- Skin burns
- Lacerations & amputation
- Fires & explosions
- Chemical releases
- Eye injury
- Death

**Routine Maintenance & Machine Adjustments**

Lock and tagout procedures are not required if equipment must be operating for proper adjustment. Only trained and authorized employees may use this rare exception when specific procedures have been developed to safely avoid hazards with proper training. 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.

**Locks, Hasps and Tags**

All qualified maintenance personnel will be assigned a lock with one key, hasp and tag. All locks will be keyed differently, except when a specific individual is issued a series of locks for complex lockout-tagout tasks. In some cases, more than one lock, hasp and tag are needed to completely de-energize equipment and machinery. All locks and hasps shall be uniquely identifiable to a specific employee.

**6. GENERAL LOCK AND TAGOUT PROCEDURES**

Before working on, repairing, adjusting or replacing machinery and equipment, the following procedures will be utilized to place the machinery and equipment in a neutral or zero mechanical state.

*Preparation for Shutdown:* Before authorized or affected employees turn off a machine or piece of equipment, the authorized employee will have knowledge of the type and magnitude of the energy, the hazards of the energy to be controlled, and the means to control the energy.

Notify all affected employees, and affected “other” employees, that the machinery, equipment or process will be out of service
**Machine or Equipment Shutdown:** The machine or equipment will be turned or shut down using the specific procedures for that specific machine. An orderly shutdown will be utilized to avoid any additional or increased hazards to employees as a result of equipment de-energization.

If the machinery, equipment or process is in operation, follow normal stopping procedures (depress stop button, open toggle switch, etc.).

Move switch or panel arms to “Off” or “Open” positions and close all valves or other energy isolating devices so that the energy source(s) is disconnected or isolated from the machinery or equipment.

**Machine or Equipment Isolation**

All energy control devices that are needed to control the energy to the machine or equipment will be physically located and operated in such a manner as to isolate the machine or equipment from the energy source.

**Lockout or Tagout Device Application**

Authorized employees will affix lockout or tagout devices to energy isolating devices. Lockout devices will be affixed in a manner that will hold the energy isolating devices in the “safe” or “off” position.

If a lockout device cannot be physically attached to the machine or equipment, a tagout device may be used. Where tagout devices are used they will be affixed in such a manner that will clearly state that the operation or the movement of energy isolating devices from the “safe” or “off” positions is prohibited.

The tagout devices will be attached to the same point a lock would be attached. If the tag cannot be affixed at that point, the tag will be located as close as possible to the device in a position that will be immediately obvious to anyone attempting to operate the device.

Lock and tagout all energy devices by use of hasps, chains and valve covers with assigned individual locks.

**Stored Energy**

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.

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.
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**

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.

After assuring that no employee will be placed in danger, test all lock and tagouts by following the normal start up procedures (depress start button, etc.).

**Caution:** After test, place controls in neutral position.

**Extended Lockout - Tagout**

If there is a shift change before the machinery or equipment can be restored to service, the lock and tagout must remain. If the task is reassigned to the next shift, those employees must lock and tag out before the previous shift may remove their lock and tag.

### 7. 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:

1. The work area will be thoroughly inspected to ensure that nonessential items have been removed and that machine or equipment components are operational.

2. The work area 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.

3. The employee who applied the device will remove each lockout or tagout device from each energy-isolating device.
8. LOCKOUT/TAGOUT PROCEDURES 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:

1. Unplug electrical equipment from wall socket or in-line socket.
2. Attach “Do Not Operate” tag and plug box & lock on end of power cord.
   An exception is granted to not lock & tag the plug when the cord & plug remain in the exclusive control of the employee working on, adjusting or inspecting the equipment.
3. Test Equipment to assure power source has been removed by depressing the “Start” or On” switch.
4. Perform required operations.
5. Replace all guards removed.
6. Remove lock & plug box and tag.
7. Inspect power cord and socket before plugging equipment into power source. Any defects must be repaired before placing the equipment back in service.

NOTE: Occasionally used equipment may be unplugged from power source when not in use.

9. LOCKOUT/TAGOUT PROCEDURES INVOLVING MORE THAN ONE EMPLOYEE

In the preceding procedures, if more than one employee is assigned to a task requiring a lock and tagout, each must also place his or her own lock and tag on the energy isolating device(s).

10. MANAGEMENT’S REMOVAL OF LOCK AND TAGOUT

Only the employee that locks and tags out machinery, equipment or processes may remove his/her lock and tag. Should the employee leave the facility before removing his/her lock and tag, the supervisor may remove the lock and tag,
provided the following conditions are met. He/she must be assured that all tools have been removed, all guards have been replaced and all employees are free from any hazard before the lock and tag are removed and the machinery, equipment or process are returned to service. Notification of the employee who placed the lock is required prior to lock removal.

11. CONTRACTORS

Contractors, working on University property and equipment must follow their company-specific LOTO program, in conjunction with this lockout-tagout procedure while servicing or maintaining equipment, machinery or processes.
LOCKOUT/TAGOUT ENERGY ISOLATING DEVICE SURVEY AND PROCEDURES

EXAMPLES

Some examples to include in the survey are water treatment systems, air handling equipment, water pumps, sump pumps, air compressors, A/C units, gas fired hot water heaters, chillers, boilers, electric hot water heaters, water tanks and general electrical systems (e.g., outlets and light ballasts).

PROCEDURES

General LOTO procedures are in the facility LOTO program. The facility does not need to document a specific 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 re-accumulation 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 de-energize 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 locked-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 re-energization of the machine or equipment during servicing or maintenance.

When ANY of these conditions DO NOT exist, then a specific procedure will need to be written for a particular machine or equipment. The specific procedure will need to provide, in detail, all the steps necessary to completely shut down, and to re-start the machine or equipment. The written procedure(s) shall be immediately available (or posted at the equipment) for the duration of the LOTO.
# EXAMPLE OF ENERGY ISOLATING DEVICE SURVEY, SCHEDULE AND PROCEDURES

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LOCKOUT/TAGOUT PROCEDURES

Group 1

For all equipment in this group, open and lock the nearest disconnect to electrically de-energize. If a disconnect is not available, lockout the circuit breaker. Hang your tag. Activate the power switch or depress the start switch, as applicable, to verify that the equipment is not energized.

Group 2

For all equipment in this group, open and lock the disconnect located on the machine to electrically de-energize. Hang your tag. Un-plug the DRO and hang your tag on the plug. Activate the power switch to verify that the equipment is not energized.

Group 3

For all equipment in this group, open and lock the disconnect located on the machine to electrically de-energize. Hang your tag. Un-plug the DRO and hang your tag on the plug. Activate the forward/reverse switch to verify that the equipment is not energized. Disconnect the pneumatic coupler and hang your tag on the nipple fitting. Activate the power draw bar to verify that the pneumatic system is vented.

Group 4

Close and lock the pneumatic valve on the wall. Hang your tag. Turn on the reclaim switch and depress the foot switch to purge any residual air pressure. Turn off the reclaim switch. Un-plug the power cord and hang your tag on the plug.

Group 5

For all equipment in this group, open and lock the disconnect located on the machine to electrically de-energize. Hang your tag. Disconnect the pneumatic coupler and hang your tag on the nipple fitting. Check that the pneumatic spindle brake is not engaged to verify that the system is vented.

Reviewed 09/04/2007
Group 6

For all equipment in this group, open and lock the disconnect located on the machine to electrically de-energize. Hang your tag. Close and lock the pneumatic supply valve. Hang your tag. Open the water drain valve on the filter/regulator to vent any residual air pressure.

Group 7

For all equipment in this group, open and lock the nearest disconnect to electrically de-energize. If a disconnect is not available, lockout the circuit breaker. Hang your tag. Unplug the DRO if applicable and hang your tag on the plug. Activate the power switch or depress the start switch, as applicable, to verify that the equipment is not energized. Operate any feature of the hydraulic system to insure that there is no residual hydraulic pressure.