SAFETY GUIDELINE

CONTROL OF HAZARDOUS ENERGY
(LOCKOUT/TAGOUT)

1.0 INTRODUCTION

1.1 The purpose of this Safety Guideline is to establish minimum requirements for the isolation of hazardous energy sources to prevent the unexpected energization or startup of machines or equipment, or release of stored energy during maintenance, servicing and repair operations.

1.2 This Safety Guideline applies to all employees (staff, students, etc.) and contractors of the Woods Hole Oceanographic Institution (WHOI), as per OSHA 29 CFR 1910.147. This Guideline does not apply to marine operations that are addressed by applicable U.S. Coast Guard regulations.

2.0 ROLES AND RESPONSIBILITIES

2.1 EH&S Manager: The EH&S Manager is responsible for maintaining this Safety Guideline, assisting with implementation and performing a periodic evaluation of the program.
2.2 Managers and Supervisors: Managers and/or Supervisors are responsible for implementing these procedures and assuring that their employees and on-site supervisors are properly trained, and that appropriate lockout/tagout equipment is available.

2.3 Employees and Contractors: All employees and contractors are responsible for complying with the requirements of this Safety Guideline.

3.0 DEFINITIONS

3.1 Affected employee -- An employee whose job requires him/her to operate or use machinery or equipment on which servicing or maintenance is being performed under this lockout or tagout guideline, or whose job requires him/her to work in an area in which such servicing or maintenance is being performed.

3.2 Authorized employee -- A person who locks out or tags out machinery or equipment in order to perform servicing or maintenance. This individual is authorized to perform this work by the cognizant supervisor or manager.

3.3 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.

3.4 Energized -- Connected to an energy source or containing residual or stored energy.

3.5 Energy isolating device -- A mechanical device that physically prevents the transmission or release of energy, including but not limited to the following: a manually operated electrical circuit breaker; a disconnect switch; a manually operated switch by which the conductors of a circuit can be disconnected from all supply conductors, and, in addition, no pole can be operated independently; a line valve; a block; and any similar device used to block or isolate energy. Push buttons, selector switches and other control circuit type devices are not energy isolating devices.

3.6 Energy source -- Any source of electrical, mechanical, hydraulic, pneumatic, chemical, thermal, or other energy.

3.7 Lockout -- The placement of a lockout device on an energy isolating device, in accordance with an established procedure, ensuring that the energy isolating device and the equipment being controlled cannot be operated until the lockout device is removed.

3.8 Lockout device -- A device that utilizes a positive means such as a lock, either key or combination type, to hold an energy isolating device in a safe position and prevent the energizing of a machine or equipment. Lockout devices must meet OSHA requirements.

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

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

3.11 Setting up -- Any work performed to prepare a machine or equipment to perform its normal production operation. The Supervisor will determine the extent that machine or piece of equipment will be locked out while performing this function.

3.12 Tagout -- The placement of a tagout device on an energy isolating device, in accordance with an established procedure, to indicate that the energy isolating device and the equipment being controlled may not be operated until the tagout device is removed.

3.13 Tagout device -- A prominent warning device, such as a tag and a means of attachment, which can be securely fastened to an energy isolating device in accordance with an established procedure, to indicate that the energy isolating device and the equipment being controlled may not be operated until the tagout device is removed. Tagout devices must meet OSHA requirements.

4.0 GENERAL REQUIREMENTS

4.1 This guideline applies to control of energy during servicing and/or maintenance of machines and equipment. Servicing and/or maintenance that takes place during normal production operations is covered by this guideline, only if: a) worker is required to remove or bypass a guard or other safety device, or 2) worker is required to place any part of his/her body into the point of operation or danger zone.

4.2 Only authorized employees will perform lockout/tagout. The cognizant supervisor or manager will authorize the employee to perform this work and ensure that they are adequately trained.

4.3 Affected employees will not attempt to operate equipment after it has been locked or tagged out without authorization from the employee who performed the lockout/tagout.

4.4 When machinery or equipment is capable of being locked out, lockout will be used in favor of tagout.

4.5 Locks will be assigned individually to authorized employees. Only the authorized employees will have keys to their assigned locks.

4.6 No master or duplicate keys will be maintained by other individuals.

4.7 Lockout/tagout is not needed for cord and plug connected electric equipment for which exposure to the hazards of unexpected energization or start up of the equipment is controlled by unplugging the equipment from the energy source and by the plug being under the exclusive control of the employee performing the servicing or maintenance.

5.0 ENERGY SOURCE EVALUATION

5.1 An energy source evaluation will be performed for each machine and piece of equipment within the facility to determine potential sources of energy that may require control during maintenance
and/or servicing. An example Source Evaluation Worksheet is provided in Appendix A. The evaluation will be performed in the following manner for each piece of equipment that requires lockout/tagout:

- Describe each piece of equipment
- Analyze equipment and record the potential energy source
- Identify the appropriate control measure for the energy source
- Sign and date the Source Evaluation Worksheet.

5.2 Based on the results of the energy source evaluation, a specific lockout/tagout procedure will be developed for each applicable piece of equipment or system. NOTE: Under certain conditions (1910.147(c)(4)(i)), this may not be needed – contact the EH&S Office for details (x3347).

5.3 Lockout/tagout procedures will be posted on all applicable equipment or maintained in the immediate work area. The cognizant supervisor or manager will approve the procedures, which may include manufacturer’s procedures as appropriate.

6.0 PREPARATION FOR LOCKOUT/TAGOUT

6.1 The authorized employee(s) performing the lockout/tagout will notify all affected employees that a lockout/tagout is being performed.

6.2 Affected employees will be informed of the following:

- The equipment being locked/tagged out;
- The type and magnitude of the energy utilized by the machinery or equipment and their hazards;
- The expected duration of the lockout/tagout; and,
- Not to attempt to operate or reenergize the equipment until informed by the authorized employee that the lockout/tagout is complete.

6.3 Locate the lockout/tagout procedure for the equipment/system being serviced and identify all energy sources.

7.0 PERFORMING THE LOCKOUT/TAGOUT

7.1 A lockout/tagout checklist is provided in Appendix B.

7.2 If the machine or equipment is operating, shut it down using normal stopping procedures.

7.3 Ensure that all stored energy, e.g., springs, elevated machine parts, flywheels, hydraulic systems, air, gas, electricity, and steam or water pressure, is dissipated or properly restrained.

7.4 Operate the energy isolating device(s) so that the equipment is completely isolated from its energy source(s).

7.5 Authorized employees will attach assigned lock(s) and/or tag(s) to the energy isolating device(s). Complete the information required on the tag. Only approved lockout and tagout devices may be used. Lockout devices shall be affixed in a manner that will hold the energy isolation device(s) in a safe or off position.
7.6 After ensuring that no personnel are exposed, confirm that the equipment is at a zero-energy state by attempting to start it using normal operating procedures and by confirming that all stored energy has been dissipated or restrained.

7.7 When the zero-energy state is confirmed and the equipment is locked/tagged out, the maintenance or service work may proceed.

8.0 RESTORING EQUIPMENT TO NORMAL OPERATION

8.1 Remove all tools and other equipment used to service the machine/system.

8.2 Replace all guarding devices.

8.3 Inform all affected employees that the lockout/tagout is complete and that the equipment will be returned to normal operation.

8.4 Ensure that no personnel are exposed to injury.

8.5 Remove all lock(s) and/or tag(s) and operate energy isolating devices to restore energy to the equipment.

8.6 Start the equipment (if applicable) using normal startup procedures.

9.0 PROCEDURES INVOLVING MULTIPLE EMPLOYEES

9.1 If more than one employee will work on the equipment being locked/tagged out, each must place their locks and/or tags on the energy isolating device(s).

9.2 If the energy isolating device(s) cannot accept multiple locks, a multiple lockout device (hasp) will be used to accommodate all locks.

9.3 The equipment will not be returned to normal operation until all authorized employees and/or cognizant supervisor or manager have removed their locks and/or tags.

10.0 TAGOUT PROCEDURE

10.1 De-energized equipment must be locked out wherever possible. If lockout cannot be achieved using lockout devices, a tag alone may be used under the following conditions:

- The tagout device is applied by authorized employees, who have been trained in this procedure.
- Only approved tagout devices may be used.
- The tagout devices shall be affixed in a manner that clearly indicates that operation of energy isolation devices from the safe or off position is prohibited.
- Tagout devices must be placed as closely as safely possible to the energy isolation device.
- Approval to use tagout devices, rather than lockout devices, is obtained from the cognizant supervisor or manager.
10.2 If work on the equipment will extend over multiple work shifts, this procedure must be performed and/or verified before each shift begins.

11.0 ELECTRICAL TEST VERIFICATION OF DE-ENERGIZED CIRCUITS

11.1 When electrical circuits are de-energized for servicing and/or maintenance, a qualified person will verify that circuit elements and equipment parts have been de-energized.

11.2 The test will also determine if any voltage including possible stored energy remains and presents a hazard to employees.

11.3 If the circuit to be tested exceeds 600 volts, the test equipment will be checked for proper operation immediately before and after the test.

12.0 WORK ON ENERGIZED CIRCUITS

12.1 Work on energized circuits is prohibited unless de-energizing the circuit creates additional hazards or is not feasible due to equipment design or operational limitations.

12.2 Prior to working on an energized circuit, approval must be obtained from the cognizant supervisor or manager and proper controls shall be implemented.

13.0 SHIFT OR PERSONNEL CHANGES

13.1 Prior to a shift or personnel change, authorized employees will arrange a time to exchange locks and/or tags to continue work on equipment or systems. NOTE: Shipboard operations may utilize applicable lockout/tagout procedures in the Safety Management Manual.

13.2 To ensure continuity of the lockout/tagout, incoming personnel will attach their locks and/or tags prior to the removal of locks and/or tags of outgoing personnel.

13.3 Removal of locks and/or tags by individuals other than the employee who performed the lockout/tagout is prohibited unless work is completed and the authorized employee who performed the lockout/tagout cannot be located.

13.4 Every attempt will be made to locate the employee who performed the lockout/tagout including, but not limited to, paging, telephone (work, home, mobile), and physically searching the facility.

13.5 If, after all attempts to locate the employee have failed, cognizant supervisor or manager may authorize the removal of locks and/or tags using the procedures established in Section 8.0 of this Guideline.

13.6 The employee who performed the lockout/tagout will be informed of the removal of the lockout/tagout, as soon as possible, by the cognizant supervisor or manager.
14.0 OUTSIDE CONTRACTORS

The cognizant supervisor or manager will ensure that all outside contractors are aware of and comply with the requirements of this Guideline, or use an equivalent procedure.

15.0 ACCIDENTS INVOLVING LOCKOUT/TAGOUT

15.1 The cognizant supervisor or manager will be responsible for investigating all accidents and near misses involving lockout/tagout and will inform the EHS Manager.

15.2 The investigation will include a review of the specific procedures and equipment involved. If necessary, procedures and/or equipment will be modified prior to the continuation of work.

16.0 TRAINING

16.1 All authorized employees will be initially trained in the requirements of the lockout/tagout program and this guideline by the EH&S Office.

16.2 All affected employees, including temporary employees whose work operations are in an area where energy control procedures are used, will be provided with familiarization training by the EH&S Office that emphasizes the concepts of lockout/tagout and the prohibition against energizing machines and equipment that have been locked or tagged out.

16.3 Retraining will be provided for all authorized and affected employees by the EHS Office under the following conditions:
   - Whenever the cognizant supervisor or manager has reason to believe that there are deviations from or inadequacies in the employee knowledge or use of this Guideline
   - Whenever a periodic program evaluation reveals deviations from or inadequacies in the employee knowledge or use of this Guideline
   - Every three years

16.4 All training will be documented and records will be maintained in the EHS Office.

17.0 PERIODIC PROGRAM EVALUATION

17.1 Per OSHA 29CFR1910.147, an annual evaluation of the Lockout/Tagout Program will be performed by the EH&S Office or an authorized employee other than those utilizing the energy control procedure being inspected.

17.2 The evaluation will include:
   - A review of the written lockout/tagout program.
   - A review, between the inspector and each authorized employee, of that employee's responsibilities under the lockout/tagout program.
   - A review of the limitations of tags when used without locks.

17.3 If necessary this Guideline will be revised based on the results of the evaluation.
APPENDIX A - Example Source Evaluation Worksheet

<table>
<thead>
<tr>
<th>Evaluator:</th>
<th>Date:</th>
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1.0 EQUIPMENT

<table>
<thead>
<tr>
<th>Equipment No:</th>
<th>Location:</th>
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<tbody>
<tr>
<td>Description:</td>
<td></td>
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2.0 HAZARDOUS ENERGY SOURCES

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
<th>Control Measure(s)</th>
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<tbody>
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3.0 ADDITIONAL SAFETY MEASURES:

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## APPENDIX B - Example Lockout/Tagout Checklist

<table>
<thead>
<tr>
<th>Name:</th>
<th>Date:</th>
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<table>
<thead>
<tr>
<th><strong>Equipment Shutdown</strong></th>
<th><strong>Equipment Startup</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Inform all employees in the area of the lockout/tagout.</td>
<td>Remove all tools and other equipment used during servicing/maintenance.</td>
</tr>
<tr>
<td>Identify all energy sources (review source evaluation worksheet) and implement the equipment specific lockout/tagout procedure.</td>
<td>Replace all guarding devices.</td>
</tr>
<tr>
<td>Shut down equipment using normal or proper stopping procedures (if required).</td>
<td>Inform all employees in the area that the lockout/tagout is being removed.</td>
</tr>
<tr>
<td>Ensure that all stored energy is dissipated and/or restrained.</td>
<td>Remove all locks and tags.</td>
</tr>
<tr>
<td>Operate energy isolating device(s).</td>
<td>Operate energy isolating devices to restore energy.</td>
</tr>
<tr>
<td>Attach assigned lock and/or tag. Complete information required on tag.</td>
<td>Start equipment using normal procedures.</td>
</tr>
<tr>
<td>Confirm zero energy state.</td>
<td></td>
</tr>
<tr>
<td>Begin work.</td>
<td></td>
</tr>
</tbody>
</table>

The above procedures MUST be completed in order.

Only authorized employees may perform lockout/tagout.