BOWDOIN COLLEGE
LOCKOUT/TAGOUT PROGRAM

Purpose
This document meets the requirements outlined in OSHA Title 29 CFR 1910.147 (Control of Hazardous Energy) for the development, implementation, and maintenance of a written lockout/tagout (LOTO) program. The purpose of the program is to provide information, monitoring, and training to designated employees of Bowdoin College regarding the potential hazards of unexpected equipment energization, startup or releases of stored energy during servicing and maintenance, and the isolation procedures to prevent same.

Scope
The lockout/tagout program applies to designated authorized and affected employees (current LOTO Authorized Employees List attached) who are being or may be occupationally exposed to releases of hazardous energies, as outlined below.

Program Components

1. **Program Administrator.** The Manager of Environmental Health and Safety (EHS) will be the LOTO program administrator.

2. **Hazard Determination.** Supervisors are responsible for reviewing their operations and job requirements to determine where equipment-specific lockout/tagout procedures are necessary (Major Equipment Inventory, attached). Upon determination of a controlled energy hazard, the Supervisor will provide the employee with appropriate locks and tags, PPE, written work practices specific to the task and location, and conduct work area surveillance during the performance of the task. **WORK MAY NOT PROCEED UNTIL ENERGY CONTROL PROCEDURES HAVE BEEN TAKEN – OBSERVED INSTANCES TO THE CONTRARY WILL BE REPORTED IMMEDIATELY TO THE EMPLOYEE’S SUPERVISOR.**

3. **Authorized and Affected Employees.** Employees authorized to perform service or maintenance on equipment will be issued, and receive training in the proper use of, energy isolation devices (locks and tags). Employees who could reasonably be expected to work around or near locked-out equipment during servicing or maintenance will be given awareness-level training of the potential hazards involved.

4. **Equipment Selection.** Selected LOTO devices shall be:
   - Identified and labeled specifically for LOTO use, not used for any other purposes, and be the only devices used for those purposes at the facility;
   - Durable under wet or corrosive conditions, and substantial enough to prevent unauthorized (lock) or accidental (tag) removal;
   - Standardized by type, color, shape, size, etc. throughout the facility;
   - Capable of identifying the name of employee applying the device; and
   - Periodically inspected for condition and function.

   **Locks** shall be either a key or combination type that hold an isolating device (i.e., blank flange or bolted slip blind) in a safe position.

   **Tags** shall be non-reuseable, attachable by hand, self locking, non-releasable, with a breaking strength of at least 50 pounds (i.e., industrial cable tie).

5. **Energy Control Procedures.** The following checklist will be employed where lockout/tagout has been deemed necessary for safe operations:
Preparation and Shutdown

Authorized employees will notify affected employees of the intention to lock or tag out a particular piece of equipment prior to the maintenance or service commencing. The equipment will be shut down and its power isolated as appropriate to the manufacturer’s specifications; multiple energy sources may need to be identified and isolated.

Device Application

Lockout will be employed where the machine, valve, switch, or otherwise energized equipment is capable of being locked out without being dismantled, rebuilt, or otherwise modified. Each worker involved will apply a separate but standardized and distinguishable device to the lockout point.

Tagout will be employed where the equipment is not capable of being locked out as outlined above; OR, if it can be attached at the same location as the lock would have been, and it can be demonstrated that the tag provides the same functional level of protection as a lock (i.e., by using additional means of isolation such as the removal of a circuit block, control switch, valve handle, etc., to prevent re-energization). In addition:

- Tags must be securely attached, and legible and understandable by other employees in the workplace.
- Once in place and signed, a tag may not be removed without the expressed permission of the authorized person who applied it.

Release of Stored Energy

After application of LOTO device(s), all potential stored or residual energy shall be relieved, disconnected, restrained, or otherwise rendered safe, and isolation verified by testing. If there is a possibility of re-accumulation of stored energy, continuous verification of isolation will be employed for the duration of the maintenance or service.

Restoring to Service

Before LOTO restrictions are lifted and the equipment re-energized:

- Equipment and surrounding area will be inspected to confirm that it is operationally intact and ready to safely perform its function; and
- Affected employees in the area will be safely positioned or removed.

Each LOTO device must be removed by the authorized employee who applied it; if that employee is not available, their Supervisor may approve removal of the device(s) after: (1) all reasonable efforts have been made to contact the authorized employee; and (2) all reasonable safety precautions have been taken to assure that re-energization does not present a hazard. LOTO devices that need to be left in place over more than one shift shall be reported to the authorized employee’s Supervisor.

Contractors and Groups

Facility personnel and outside contractors shall inform each other of their LOTO procedures, and coordinate their efforts as needed on specific pieces of equipment, including the use of a Group Lockout/Tagout in which multiple authorized persons apply their devices to the same piece of equipment, and must coordinate their removal before re-energization is possible. The same technique may be applied for work by multiple shops.
NOTE that equipment-specific procedures need not be developed or documented, so long as ALL of the following points apply:

- Equipment has no potential for stored or residual energy;
- Equipment has a single energy source which is readily identifiable and isolatable;
- Energy isolation and lockout will completely de-energize and deactivate the equipment;
- A single LOTO device will achieve lockout condition, and is under the exclusive control of the authorized employee performing the work; and
- The service or maintenance being conducted does not and has not previously presented hazards, including to other employees.

This exemption will apply to all equipment at the facility, unless otherwise noted and documented in the Major Equipment Inventory.

6. Arc Flash Protection. The provisions of NFPA 70E are enforceable under OSHA’s General Duty Clause. Arc flash protection consists of:

- Hazard Determination. General ratings of 0 (50-240V), 1 (240-480V), 2 (480-1,000V+), or 3-4 (extremely high voltage and/or live line work), based on the matrix provided in the standard (130.7). **College employees will not perform work on panels or equipment exceeding 480V**. Panels and equipment with specific hazards will be labeled for same, and inventoried for reference (attached).

- Calculating Approach Boundaries. Radial distances from the live contact will be calculated as needed based on the matrix provided in the standard (130.2). **The default boundary distances for circuits <600V is 1-inch (prohibited), 1-ft (restricted), 3-ft (limited), and 10-ft (safe)**.

  - Prohibited – Qualified Persons Only, PPE Required
  - Restricted – Qualified Persons Only
  - Limited – Qualified Supervision Required
  - Flash Protection – Safe Distance
  - Diagnostic/Nonhazardous – No direct contact involved

- Selecting Personal Protective Equipment. Minimum PPE is selected based on the Rating outlined above (130.7).

  - Rating 0 – Longsleeved 100% cotton Shirt and denim Pants, Hard Hat, Safety Glasses, Leather Gloves, Safety Shoes, and Insulated Tools.
  - Rating 1 – As above, with the addition of a Face Shield, Rubber Gloves, and Longsleeved Fire Resistant Coveralls (or FR shirt and pants).

- Establishing a Safe Work Condition. A six-step process (120.1)is required to declare a safe work condition:

  - Determine all sources of energy from drawings, tags, and labels
  - Interrupt the load and open all disconnecting devices
  - Visually verify that all disconnecting devices are open
  - Apply lockout-tagout procedures
  - Use adequately rated voltage testers to verify absence of voltage on contact points
  - Ground the phase conductors if there is a possibility of induced voltage or stored energy

- Issuing a Hot Work Permit. If the activity plan indicates a potential electrical hazard exclusive of the established lockout-tagout procedures, a hot work permit (attached) will be issued by the Qualified Person prior to work commencing.
7. **Employee Training.** The EHS Manager will coordinate and/or provide annual training for LOTO designated employees. Records of training will be kept by the EHS Office and Human Resources for the duration of employment. Training shall include (at a minimum) the following components:

- Recognition of controlled energy hazards, such as electrical, hydraulic, pressurized lines, moving parts, springs, etc.
- Consequences of improper protection, and methods and means of isolation and control, such as de-energizing, line purging, securing, etc.
- Difference in use and effectiveness between locks (physical restraint) and tags (warning only); and
- General provisions of OSHA 29 CFR 1910.147 and NFPA 70E.

8. **Exemptions.** The following situations are exempt from LOTO requirements:

- Work on cord/plug connected equipment which may be neutralized by unplugging, where the plug is under the exclusive control of the employee performing the servicing or maintenance.
- Hot tap or similar operations on pressurized steam, gas, or similar pipelines, where it can be demonstrated that continuity of service is essential and its shutdown is impractical, so long as documented safety procedures are being followed and appropriate safety equipment is provided and used.
- Servicing or maintenance taking place under normal operating conditions, so long as no guards or other safety devices are being bypassed, and no body part is being placed within any danger zone associated with the machine’s operation.
- Work involves only minor tool changes or adjustments that are routine, repetitive, and integral to normal operations.

9. **Documentation.** The tear-tag from each LOTO procedure will be maintained on file by the shop that conducted the work for at least one year, or until the next annual review.

**Program Review**

The program will be audited by the EHS Manager at least annually in coordination with training of authorized employees, and the periodic inspections by Supervisors of the energy control procedures in practice at the facility. Supervisors of authorized employees shall inform the EHS Manager of any changes in usage or energy-control needs associated with major equipment.