



The College of
WILLIAM & MARY

Office of the Associate Vice President for Facilities Management

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Date: January 28, 2014

SUBJECT: Facilities Lock-out/Tag-out (LOTO) Policy

PURPOSE: The purpose of this procedure is to establish minimum guidelines to ensure the safety and health of personnel who may be required to work on any type of equipment capable of being energized or containing stored energy. This program will be used to ensure that a machine or equipment is stopped and isolated from all potentially hazardous energy sources, and locked out before employees perform any servicing or maintenance where the unexpected energizing, start-up of the machine/equipment, or release of stored energy could cause injury.

CANCELLATION: Policy to be reviewed on an annual basis as part of the LOTO annual review.

POLICY:

I. Scope

This procedure applies to all staff and personnel at the College of William and Mary and on-site contractors who may be required to work on this type of equipment or otherwise be exposed to the unexpected energization of this equipment.

New construction and building renovation is covered under the Contractors Lock-out/Tag-out (LOTO) program with oversight provided by Facilities, Planning, Design and Construction (FPDC).

II. Purpose

The purpose of this procedure is to establish minimum guidelines to ensure the safety and health of personnel who may be required to work on any type of equipment capable of being energized or containing stored energy. This program will be used to ensure that a machine or equipment is stopped and isolated from all potentially hazardous energy sources, and locked out before employees perform any servicing or maintenance where the unexpected energization, start-up of the machine/equipment, or release of stored energy could cause injury.

III. Definitions

Revision 4, January 24, 2014

Affected Employee – An employee whose job requires them to operate or use a machine or equipment on which service is being performed under the LOTO program, or whose job requires them to work in an area where such service is being performed.

Authorized Employee – A person who locks or tags out machines or equipment in order to perform work on that machine or equipment. Facilities Maintenance personnel and their contractors are the only College personnel who can be Authorized Employees under this procedure. For new construction and building renovations the general contractor is responsible for having their own LOTO program. FPDC is responsible for oversight in these cases.

Energy Isolation Device – A mechanical device that physically prevents the transmission or release of energy.

Energy Source – electrical, pneumatic, hydraulic, mechanical, chemical, steam etc.

Lock-out – the placement of a lock-out device (usually a lock) on an energy isolating device to ensure that the energy isolating device and the equipment being controlled may not be operated until the lock-out device is removed.

Qualified employee – One who has the skills and knowledge related to the construction and operation of the equipment and installation and has received safety training to recognize and avoid the hazards involved.

Tag-out – the placement of a tag-out on an energy isolating device to indicate that the energy isolating device and the equipment being controlled may not be operated until the tag-out device is removed. Note: Tag-out device attachment means shall be of a non-reusable type, attachable by hand, self-locking, and non-releasable with a minimum unlocking strength of no less than 50 pounds and having the general design and basic characteristics of being at least equivalent to a one-piece, all environment-tolerant nylon cable tie.

IV. References

- A. OSHA 29CFR 1910.147: Control of Hazardous Energy; Lock-out / Tag-out
- B. OSHA 29CFR 1926.417: Lock-out and Tagging of Circuits

V. Attachments

- A. Attachment 1: Contractor LOTO Review/Signature Form
- B. Attachment 2: Stop Work
- C. Attachment 3: LOTO Log
- D. Attachment 4: LOTO Flow Chart
- E. Attachment 5: LOTO Shutdown Procedure Checklist

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- F. Attachment 6: Multiple Source LOTO
- G. Attachment 7: Removal of LOTO Device

VI. Responsibilities

A. Director, Operations & Maintenance (O&M), Facilities Management:

The Director of Facilities Operations and Maintenance (OM) is responsible for implementation of this procedure. All managers will be cognizant of the requirements established for implementation of this procedure. The Director OM will assure that the locks, tag and other devices required for compliance with LOTO procedures are provided to employees.

B. Maintenance Supervisors:

Maintenance Supervisors are to ensure that personnel assigned to perform work requiring a LOTO are formally trained to do so and strictly comply with all requirements established in this procedure, including all references. Supervisors will do so by maintaining accurate records of all trained personnel and ensure all new personnel are trained prior to any work and existing employees attend required refresher training.

C. Principle Investigator (PI) or Project Director (PD)

The person responsible for the programmatic and financial oversight of a sponsored program. The term PI and PD are synonymous.

D. Environment, Health and Safety Office (EHSO):

The EHSO will monitor implementation of this procedure for compliance. Non-compliance will be reported to responsible supervision for appropriate action.

EHSO shall perform an annual inspection of departmental energy control programs/practices to ensure that requirements of this procedure are being followed. Non-compliance will be noted in a written report to the Associate Vice President of Facilities Management.

The EHSO is responsible for providing general LOTO training to all authorized and affected personnel, and shall ensure copies of the training content and attendee sign-in sheets are maintained with the EHSO for recordkeeping

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The EHSO shall provide a list of trained individuals to the warehouse to reference for LOTO equipment authorization and distribution.

E. Employee/Staff:

Employees/staff performing work tasks covered by this LOTO procedure are required to comply with the requirements set forth in this procedure and training provided.

F. Senior Trades Supervisors, the Associate Director of Energy and Utilities, and Principle Investigators

Senior Trades Supervisors, the Associate Director of Energy and Utilities, and Principle Investigators are responsible for developing equipment-specific training and procedures for College and/or experimental equipment that have multiple energy sources. This training shall be fully integrated with the general training provided by the Senior Safety Engineer and documented. Records of this training and attendees shall be made available upon request.

G. Project Manager (FPDC)/Contract Administrator (Facilities):

Shall review contractor LOTO policy and provide copy of their policy to the EHSO. (See attachment #1)

Shall inform the contractor of College LOTO program expectations and compliance with requirements. FPDC should consider this in building renovations where existing College personal locks may be in place.

Shall coordinate the LOTO of equipment with the relevant maintenance supervisor. FPDC shall coordinate any LOTO of equipment if there will be an impact to locations other than those under renovation or under new construction.

Shall coordinate the LOTO of equipment with the building occupants (refer to Facilities Management Building Coordinator list)

Shall provide oversight of contractor work requiring LOTO to ensure equipment de-energizing/re-energizing requirements are followed. FPDC has responsibility for oversight on work being conducted in renovation or new construction.

Shall initiate a Stop Work action where failure to follow the elements of this document result in a potentially unsafe condition and immediately notify EH&S. Any employee has the right to initiate a stop work if they believe that

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actions are dangerous, this includes activities on renovations and new construction. (See attachment #2)

Shall inform contractors that any de-energizing of College of William and Mary equipment is to be approved by the project manager (FPDC) or other responsible College of William and Mary supervisory employee having project oversight responsibilities.

Shall inform contractors that the entire LOTO process to include the placement of energy isolation devices, verification of zero energy state utilizing appropriate personal protective equipment (PPE), notification regarding the re-energizing, and removal of the isolation devices is their responsibility. The College will not provide personnel, material, or PPE to perform these steps for the contractor. If the items needed to perform a LOTO are not present the contractors will need to obtain them through their own resources and not through the College.

Shall inform contractors that any individual working in the capacity of a LOTO at the College shall be NFPA 70E trained. PMs should verify this training for any contractor working on a renovation/construction project prior to the start of work. Documentation of this training shall be readily available and can be requested at any time by a College representative.

Contract personnel who are found to be in violation of the College LOTO Policy or NFPA 70E will be asked to vacate the College premises immediately.

H. Facilities Management Warehouse:

The Facilities Management warehouse is responsible for stocking LOTO materials for College workers. The selection of stocked material is done so in coordination with the maintenance supervisors and input from faculty/staff. The warehouse shall verify that individuals have had LOTO training prior to allowing material to be procured by them from the warehouse.

VII. Training

- A. All affected personnel must receive training on the purpose of this procedure to ensure they have a clear understanding of the meaning of equipment locks and tags, and that locks/tags are not to be altered in any way. Affected workers training will be provided by the EHSO office.
- B. All technicians authorized to lock/tag equipment must receive formal training on the requirements of this procedure before they perform LOTO tasks so that they can effectively LOTO equipment as needed, ensuring for safety of themselves and others who may be in the immediate area. Authorized workers training on specific

equipment/systems will be provided by the trades supervisor (i.e. electrician, plumber, HVAC) or the principal investigator.

The training will include the following:

- How to recognize energy sources, the type and magnitude of the energy available in the workplace.
 - How to perform an equipment shutdown
 - How to isolate equipment.
 - How to safely release stored energy to reach a zero energy state.
 - Verification of zero energy.
 - How to apply and remove lock-out/tag-out devices.
 - Procedures/requirements for over-ride removal of lock-out/tag-out devices.
- C. Retraining shall be provided for all authorized and affected employees whenever there is a change in their job assignments, a change in machines, equipment or processes that present a new hazard, or when there is a change to this LOTO policy. Retraining shall also be provided when the annual inspection reveals, or whenever there is reason to believe that there are inadequacies in employees' knowledge or use of the energy control procedures.
- D. Trades supervisors (i.e. electrician, plumber, HVAC) and the principal investigators shall provide the EHSO copies of training sign-in sheets upon completion of authorized training.
- E. Documentation of all FM personnel training will be maintained by the EHSO.

VIII. Energy Isolating Devices (Locks and Tags)

A. Lock

- Locks used for the purpose of isolating an energy source shall not be used for any other purpose. Locks must be individually keyed, and while in use, the key shall remain in the possession of the individual who placed the lock.

B. Tags

- Each tag must contain the name and phone number of the employee locking out the equipment; time and date disconnection took place, what type of work is being done, and the estimated duration of lockout.
- Only the individual tag holder may apply and remove his/her tag.
- Tag out device attachment means shall be of a non-reusable type, attachable by hand, self-locking, and non-releasable with a minimum unlocking strength of no less than 50 lbs. and having the general design and basic characteristics of being at least equivalent to a one-piece, all environment-tolerant nylon cable tie.
- The use of locks and tags shall be "Logged" in with the respective maintenance supervisor. (see attachment #3)

IX. Isolation

- A. The maintenance supervisor or principle investigator should indicate the need for a LOTO when work is assigned to employees. If additional expertise is needed the team supervisor should consult the appropriate trades supervisor (i.e. electrical, plumbing, HVAC). The principle investigator can contact the EHSO for advice and guidance on application of LOTO. The LOTO flow chart may be used to help determine the need. (see attachment #4)
- B. The machine or equipment to be isolated shall be turned off or shut down using the procedures established for the machine or equipment. The LOTO shutdown procedures checklist shall be completed and a copy given to the EHSO, the principle investigator, or the related trades/maintenance supervisor. (see attachment #5)
- C. All energy sources that energize the piece of equipment to be serviced are to be identified and physically located.
- D. The authorized and trained staff is to lock out all energy sources involved by applying his/her lock and personal tag. De-energizomg may include, but not limited to, pulling a plug, opening a disconnect switch, removing a fuse, closing a valve, bleeding the line, or placing a block in the equipment. If multiple sources LOTO are required than the procedure must be documented and returned to the maintenance supervisor or principle investigator (see attachment #6). If an energy isolating device is not capable of being locked out, a tag out (alone) may be utilized. In these cases, additional safety measures such as the removal of an isolating circuit element, blocking of a controlling switch, opening of an extra disconnecting device, or the removal of a valve handle to reduce the likelihood of inadvertent energizomg should be taken if possible.
- E. If several people are needed to work on a piece of equipment, each person must apply their own lock. This prevents any accidental start-ups while other staff may still be working on the machinery. In this case, staff will need to use a lockout hasp that accepts multiple locks.
- F. Each staff's lockout devices will be individually keyed, there are no additional keys.
- G. There are specific requirements for testing and troubleshooting outlined in NFPA 70E with regard to distance boundaries and required personal protective equipment. In the event that work must be conducted on an energized circuit, approval must be received through the supervisory chain of command with inclusion of the EHSO. If this activity is necessary contact the EHSO office for guidance. For facilities employees refer to Facilities Directive 786 for any work other than testing/trouble shooting that cannot accommodate LOTO.

X. Safe Release of Stored Energy

- A. Equipment is to be at “zero energy state” before servicing. All potentially hazardous stored or residual energy shall be relieved, disconnected, restrained, and otherwise rendered safe.
- Drain all valves, bleed off air from a system, and eliminate stored hydraulic pressure. In addition, you may need to use other safe method to release existing energy. These procedures may be found in the operating procedure/manual for each piece of equipment.
 - Test the machine to assure that all energy was disconnected or released. (Ensure all employees are safely positioned away from equipment)
 - Follow the equipment’s maintenance manual where guidance is provided regarding release of stored energy.

XI. Verification of Isolation

- A. Following de-energizing of the power source(s) and application of LOTO, one should attempt to activate/operate the equipment to confirm that it has been de-energized. (Ensure all staff are secured away from equipment.)

XII. Removing Lockout and Tag out Devices

- A. After servicing is finished, tools & material are to be cleared away and guards replaced.
- B. The area is to be cleared, as warranted, in case re-energizing does not go as planned.
- C. All locks and tags and other isolation devices are to be removed.
- D. After lockout devices have been removed and before a machine or equipment is started, affected staff shall be notified that the lockout device(s) have been removed and the equipment is to be re-energized.
- E. The equipment is to be restarted, following the standard operating procedure and/or manufacturer guidelines for that piece of equipment.

XIII. Equipment Connected via Cord and Plug

- A. Machinery/equipment where the only source of energy is from connection to an electrical outlet cord and plug shall be considered to be in compliance with LOTO procedure if the following conditions are met:
- The plug is removed from the electrical source.
 - The person servicing the equipment can be in control of the cord and plug, at all times during the servicing. “In control” means that the servicing personnel must have the cord and plug in their line of sight at all times while performing work on the equipment. If this is not possible, for example the cord and plug is located behind

personnel servicing the equipment or the servicing personnel leave the area momentarily, then a lockout cap and personal lock shall be applied over the plug.

- All affected employees shall be notified of the equipment being serviced.
- An alternative means of compliance is to have a plug cap device in which lockout/tag out devices are affixed to the plug.

XIV. Override Safety Lock/Tag Removal

- A. In the event that staff cannot be reached to remove his/her personal lock and it is necessary to unlock the equipment, obtain a "Lock Removal" form from the respective supervisor or principal investigator. Complete the form and return to the supervisor or principle investigator who will then remove the lock provided the form is complete. (See attachment #7)
- B. The following sequence of events should take place before the emergency removal of someone else's lock.
 - Attempt to determine the location of the employee and exhaust all reasonable efforts to have the lockout removed via the normal process. The supervisor or principle investigator will be responsible for contacting the employee ASAP to advise him/her of the removal of his/her lock and tag.
- C. Disciplinary action may be imposed for an unauthorized removal of another person's lock or tag.

XV. Shift Change

- A. If the piece of equipment is locked out at shift change, the person on the next shift must apply his/her LOTO before the staff member who is leaving can remove his/her LOTO from the locking device.

XVI. Outside Contractors

- A. Contractors are to follow a LOTO procedure in full compliance with OSHA 1910.147 (see attachment #1). For new construction and renovation FPDC shall be provided a copy of the company's LOTO plan for review and submit it to the EHSO.
- B. Each outside contractor working in areas on campus shall be contractually informed that they are responsible for the safety of their employees. This includes contractors on new construction and renovation jobs overseen by FPDC and contractors performing work under Operations and Maintenance supervision.
- C. Project Managers (FPDC)/Contract Administrators (Facilities) shall inform contractors that any de-energizing of College of William and Mary equipment is to be approved by

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the project manager or other responsible College of William and Mary supervisory employee having project oversight responsibilities as designated by the Director, FPDC.

- D. The project manager or maintenance supervisor shall coordinate the LOTO of equipment with the trade supervisor as appropriate. On new construction and renovations these actions are handled by the general contractor unless the LOTO of equipment will interfere with operating equipment outside the scope of their project.

XVII. Machine Shop

- A. This LOTO procedure applies except for minor tool changes or adjustments, when the on/off and/or isolation switch is within arm's reach of and under the exclusive control of the operator. This exception is for machine shop tool operations only. The supervisor is responsible for determining the need for LOTO and pursuing training with the assistance of the EHSO.

XVIII. Specific Procedures for Individual Equipment and Areas

- A. Each department must develop separate energy-control procedures if their equipment has more variable conditions such as multiple energy sources, different power connections, or different control sequences that workers must follow to shut down various pieces of machinery. These procedures should be updated continuously and checked against drawings/prints each time a LOTO is performed to incorporate system modifications that may affect the isolation process. This includes academic equipment and areas.

XIX. Experimental Equipment

- A. Experimental equipment with stored energy shall comply with OSHA 1910.147 and this procedure. This includes processes involving the installation, building, and troubleshooting stages. The EHSO and FM will provide and coordinate LOTO training, assistance and direction. The principle investigator is responsible for determining the need for LOTO and pursuing the appropriate training necessary for staff and students involved.

XX. Annual Program Audit

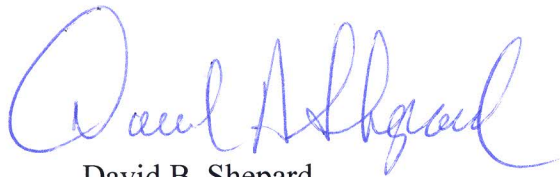
- A. The EHSO shall perform an annual audit of the College of William and Mary LOTO procedure. The EHSO shall distribute a written report to affected parties, outlining any identified deficiencies.

XXI. Authority, Interpretation, and Amendment

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This policy was approved by the Associate Vice President of Facilities Management. The Environment, Health and Safety Office interprets this policy and is directed to review this policy annually to ensure continued effectiveness.



David B. Shepard

Associate Vice President

Facilities Management