



Florida Tech
Control of Hazardous Energy
Lockout/Tagout Plan

Florida Institute of Technology (Florida Tech)

Environmental Health & Safety (EH&S)

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REVISION HISTORY

Revision Number	Revision Date	Revised By	Description of Change
00	8/15/19	Charles Cherrito	Initial creation and implementation.
01	9/9/2020	Selvin McLean	Document review against Federal Register for updates to the Code of Federal Regulation, completed.
02	9/17/2020	Charles Cherrito	Updated Appendix D.
03	8/30/2022	Selvin McLean	Document updates

INTRODUCTION

The purpose of this plan is to establish methods for safely isolating machines or equipment from energy sources during routine maintenance and servicing of those machines and equipment at Florida Institute of Technology (Florida Tech). Those who service and maintain machinery or equipment are especially vulnerable because the machinery or equipment might become energized while being serviced, or stored energy might be unexpectedly released. Utilizing the Lockout/Tagout system ensures personnel safety. The Lockout/Tagout system is commonly referred to as “LOTO”.

REFERENCES

This plan supports compliance with the Occupational Safety and Health Administration (OSHA) Control of Hazardous Energy (Lockout/Tagout) standard, as found in [29 CFR 1910.147](#).

ELIGIBILITY

This plan applies to all Florida Tech employees and contractors who are authorized to perform maintenance activities on equipment that present energy hazards, and to any employees who are affected by these activities.

RESPONSIBILITIES

Environmental, Health & Safety

- Ensure and administering this program in accordance with all applicable federal, state and local lockout/tagout requirements;
- Assist in conducting LOTO training to Florida Tech employees;
- Maintain training records;
- Ensure each department's LOTO compliance through periodic evaluations.

Maintenance Supervisors (Departments)

- Comply with this written LOTO plan;
- Ensure that all employees who are authorized to service equipment within the facility have received training on appropriate LOTO procedures and energy control procedures;
- Complete equipment specific LOTO procedures for each specific piece of equipment or process within the facility;
- Assure that appropriate energy-isolating devices are available for all equipment and processes within the facility;
- Assign locks to authorized employees only;
- Coordinate activities of contractors that may affect LOTO and energy control procedures on Florida Tech's equipment.

Authorized Employees

- Comply with this written LOTO plan;
- Follow all safe shutdown and startup procedures;
- Communicate activities to all affected employees and other authorized employees;
- Ensure the security of their own locks and keys.

Affected Employees

- Comply with this written LOTO plan;
- Advise their supervisor when equipment needs servicing;
- Report any concerns to their supervisor;
- Follow the direction of the authorized employee.

Contractors

- All contractors or other outside personnel working on or around energized equipment **must** always follow LOTO procedures. No exceptions.

DEFINITIONS

Affected Employee

An employee whose job requires them to operate or use equipment on which service or maintenance is being performed under LOTO or whose job requires them to work in an area in which such procedures are being performed. Affected employees must be informed when LOTO is being performed.

Authorized Employee

A person who locks and tags machines or equipment to perform service or maintenance on it.

Authorized Group Leader

An individual who coordinates multiple work groups under group LOTO.

Energy-Isolating Device

A mechanical device that physically prevents the transmission or release of energy. Examples include: a manually operated electrical circuit breaker, a disconnect switch, a line valve, a block, and any similar device used to block or isolate energy.

Lockout

The process used to identify, cut off, and secure all energy sources before beginning repair, adjustment or maintenance. A lockout device is used to secure equipment or machinery in the “off” position, ensuring that it cannot be operated.

Lockout Device

A lock (either key or combination type) that holds an energy-isolating device in a safe position and prevents the machine or equipment from energizing.

Machine Specific Lockout/Tagout Procedures

Written LOTO Procedures which detail the steps to be taken for a machine/similar machines. These can be kept at the machine or in a book. They must be updated/tested/evaluated annually.

Servicing and/or Maintenance

Workplace activities that require LOTO on the equipment before beginning the activity because employees may be exposed to the unexpected energy or startup of the equipment or the release of hazardous energy. Servicing and/or maintenance includes constructing, installing, setting up, adjusting, inspecting, modifying, lubricating, cleaning, or unjamming and making tool changes.

Tagout

Attaching a tag to the lock on the power source that has been shut off, indicating the time and reason for the lockout, and the name of the person doing the work. The tag acts as a warning not to restore energy to the equipment or machinery.

Tagout Device

A prominent warning sign, such as a tag, that can be securely fastened to an energy-isolating device to indicate that the energy-isolating device and the equipment it controls can't be operated until the tagout device is removed.

Zero-Energy State

All energy has been controlled in the machine or equipment.

ENERGY CONTROL PROGRAM

Florida Tech is required to develop, document, and use specific procedures to control potentially hazardous energy when employees are servicing equipment or machinery. This is known as an Energy Control Program, and it consists of three core components:

- ❖ Energy Control Procedures
- ❖ Employee Training
- ❖ Periodic Inspections

It is the policy of Florida Tech to provide a place of employment free from recognized hazards that cause or are likely to cause death or serious physical harm to employees or the public. Therefore, all energized machines and equipment must be locked out and/or tagged out before any maintenance or servicing is performed.

When hazards exist that cannot be eliminated, then engineering practices, safe work practices, Personal Protective Equipment (PPE), combined with and proper training regarding LOTO, will be implemented. These measures will be implemented to minimize those hazards to ensure the safety of employees and the public.

ENERGY CONTROL PROCEDURES

An energy control procedure must accompany each piece of equipment requiring LOTO. It will identify all energy-isolation points to be locked and/or tagged as well as specific information required to safely achieve a zero-energy state. Employees will follow these specific procedures when performing LOTO. The following Appendices may be used to assist in compliance and proper procedure.

APPENDIX A: LOTO CHECKLIST

This document will assist Authorized Employees in ensuring steps are not inadvertently skipped during the LOTO process.

APPENDIX B: SPECIFIC ENERGY CONTROL PROCEDURE RECORD

This document is specific for each equipment/process and is meant to be used in conjunction with Appendix A.

Forms of Energy

All equipment that contains energy of any form will be locked out prior to being serviced or maintained. Examples of energy sources of concern are:

- ✓ Electrical
- ✓ Hydraulic
- ✓ Pneumatic
- ✓ Fluids and Gases
- ✓ Mechanical
- ✓ Thermal

The following methods and devices can be used to LOTO the following energy sources.

- 1) Electrical
 - a. Unplug machine and use an electrical plug lockout or use a disconnect switch with padlocks, lockouts, and tags.
 - b. Stored electrical energy must be bled to obtain zero energy state.
 - c. Use a tester to ensure that all circuits are dead.
- 2) Pneumatic
 - a. Release pressure to reach zero energy state.
 - b. Use chains, energy isolation air valves, shut off valves, padlocks, blinds, slip-blinds, and lockouts to lockout the energy source.
- 3) Hydraulic
 - a. Release pressure to reach zero energy state.

- b. Use lockout valves, chains, padlocks, blinds, slip-blinds and lockouts to lockout energy source.
 - c. Beware of release of mechanical weight creating hydraulic pressure in a cylinder or system when other parts or release.
- 4) Fluids (Including Chemicals) and Gases
- a. Use lockout valves, chains, padlocks, blinds, slip-blinds and lockouts to lockout energy source.
 - b. Consider type of gas and whether it can be vented. Is it explosive? Is it an asphyxiant? Can it be vented to building? Can it be vented to system downstream? Can it be vented to atmosphere? Can it be burned off? Do not simply release without consideration of process.
 - c. Consider use of double blocking when methods for shut-off may fail. For instance, a valve may leak imperceptibly which may be ok for some gases but not for explosive or asphyxiant gases. Double blocking uses two valves or a valve and a block to separate dangerous or high-pressure gases from where work is performed.
- 5) Mechanical
- a. Release all stored mechanical energy or block the energy. Be aware of gravity, springs, tension, and other sources of energy that are not always obvious.
 - b. Use mechanical blocks to restrain energy. Make sure they are properly sized for job.
 - c. Padlocks, lockouts, and tags should also be used to lockout and tagout mechanical energy.
- 6) Thermal
- a. The same methods used for electrical or hydraulic (whichever is more applicable).

Preparation for Shutdown

Before a machine or a piece of equipment is turned off, the employee performing LOTO must have the knowledge of the type and magnitude of the energy, the hazards of the energy to be controlled, and the methods or means to control the energy.

Machine or Equipment Shutdown

The machine or equipment must be shut down in as orderly fashion as possible to avoid any additional or increased hazard to employees as a result of de-energization. The initiating employee inspects the work area to ensure that all non-essential items have been removed and to ensure that machine or equipment components are operationally intact. Ensure all employees have been safely positioned or removed from the scene.

Machine or Equipment Isolation

All energy isolating devices that are needed to control the energy to the machine or equipment must be located and operated in such a manner as to isolate the machine or equipment from all energy sources.

LOTO Device Application

During a LOTO procedure, it is critical to determine who is going to apply the LOTO device (Authorized) and who will be the user (Affected). A LOTO device must be affixed to each energy isolating device by the persons performing the LOTO. These must be placed in a manner, so they will hold the energy isolating device in a de-energized position. Each LOTO device/tag is labeled with the name of the Authorized Individual.

Tags clearly indicate that the operation or movement of energy isolating devices from the de-energized position is prohibited. The tag must be attached when the piece of equipment is de-energized. Tags are affixed directly to the lock in such a way they cannot be removed without cutting (cable tie) or removing the lock. In addition, the tag is filled out each time it is used with the date, equipment locked out, and name of person performing the LOTO procedure (reusable tags are permitted). The key for each lock is kept in the possession of the Authorized Employee.

LOTO devices must meet the following criteria to ensure that they are effective:

- LOTO devices must be designated by color, shape, or size.
- LOTO devices must be strong enough that they can't be removed inadvertently.
- LOTO devices must work under the environmental conditions in which they are used.
- Tagout device warnings must remain legible even when they are used in wet, damp, or corrosive conditions.
- Tagout devices must have a standardized print and warning format.
- Tagout devices must be attached with a single-use, self-locking material (e.g. nylon cable tie).
- Employee who sees a LOTO device must be able to recognize who attached it and its purpose.
- Each lock must have a unique key or combination.

Stored Energy Isolation

Following the application of LOTO devices to energy isolating devices, all potentially hazardous stored or residual energy is released, disconnected, restrained, or otherwise made safe. If there is a danger that stored energy will re-accumulate to a hazardous level, isolation must continue to be verified until the servicing is completed or until the possibility of such accumulation no longer exists.

Verification of Isolation

Before starting work on a machine or equipment, the employee must verify that the isolation and de-energizing of the machine or equipment has been effective. This is done by trying to activate the energy source. If the machine does not activate, the operator may proceed. For work where the presence of electric, hydraulic, pneumatic, or other energy source may be worked on directly, it may also be necessary to check voltage, pressure, or other source with an appropriate testing device at an appropriate testing location with appropriate PPE for the task. For electrical aspects, it may also be

necessary to ensure that electric voltage is not on the ground prior to work. When energy sources are shown to be zero, work may commence.

Release from LOTO

Before removing LOTO devices, the Authorized Employee inspects the work area to ensure that all non-essential items have been removed from around the machine and ensures that the machine or equipment components are operationally intact. Make sure all employees have been safely positioned or removed from the scene. Notify all employees involved that the LOTO is to be removed, and the equipment will be re-energized. Remove the lockout or tagout device and re-energize the equipment.

Special LOTO Conditions

When an energy-isolating device is under LOTO and it is necessary to test or position equipment, do the following:

1. Remove unnecessary tools and materials.
2. Ensure that all other employees are out of the area.
3. Remove locks or tags from energy isolating devices.
4. Proceed with test.
5. De-energize equipment and lockout or tagout energy-isolating devices.
6. Operate equipment controls to verify that the equipment is de-energized.

Group Lockout

If more than one person is required to LOTO equipment, each person will place their own lock and tag on the energy-isolating device. When an energy-isolating device cannot accept multiple locks and tags, a multiple lockout device or hasp shall be used.

Shift Changes

When work involving LOTO extends beyond a single shift, the AUTHORIZED EMPLOYEE going off-shift shall not remove their lock and tag until an AUTHORIZED EMPLOYEE coming on-shift has placed their lock and tag on the energy-isolating device(s).

Out of Service Equipment

When equipment is to be taken out of service for an extended period (e.g. Out of Service), an AUTHORIZED GROUP LEADER will also place a lock and tag on the energy-isolating device(s) until all work is completed and all other Authorized Employees' locks and tags have been removed.

TRAINING

Employees who may be exposed to hazardous energy will be trained to ensure they understand this program and have skills to apply, use, and remove energy controls. *APPENDIX C: LOTO TRAINING RECORD* may be used to record such training.

Retraining will 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, when there is a change in the energy control procedures; or whenever a periodic inspection reveals, or whenever the employer has reason to believe that there are deviations from or inadequacies in the employee's knowledge or use of the energy control procedures.

❖ **Affected Employees**

Will be trained in the purpose and use of energy-control procedures, will be trained about the procedures and the prohibition against starting machines under LOTO.

❖ **Authorized Employees**

Will be trained to recognize hazardous energy sources, the type and magnitude of energy in the workplace, the methods and means necessary for isolating and controlling energy, and the means to verify that the energy is controlled.

Records Retention

Current training records will be maintained by the area supervisor for each authorized and affected employee. The training records will contain, at minimum: the employee's name, training date, purpose of training, and the employee's role (e.g. Affected or Authorized employee).

INSPECTIONS

Inspections of this plan will be conducted to ensure compliance with regulatory standards. The inspections of work sites can be in any form that is via in person; electronic document review; no notice inspection; scheduled inspection or a combination of all.

APPENDIX D: LOTO INSPECTION RECORD may be used to record inspections.

Documentation of inspections will include the following:

- ✓ The equipment on which the procedure is used;
- ✓ The date of the inspection;
- ✓ The employees included in the inspection;
- ✓ The inspector;
- ✓ The inspection results.

If it is found that employees are not following LOTO procedure or that the procedure is not protecting them, employees must be retrained, and the procedure's deficiencies corrected. The EH&S office will ensure that the inspections have been performed through periodic inspections.

APPENDIX A: LOTO CHECKLIST

The below checklist is an example of best practices for ensuring steps are followed during Lockout/Tagout (LOTO) procedures.

General Lockout Steps			
#	Step	Instruction	Task Completed?
1	Notify Employees	Notify all affected employees what machine/equipment will be involved in LOTO.	
2	Review Procedures	Ensure each person performing LOTO understands the type and magnitude of the energy present, the associated hazards, and the proper methods of control.	
3	Shutdown Equipment	If the machine or equipment is operating, shut it down by the normal procedure.	
4	Isolate Energy Source	Disconnect/de-activate the energy isolating devices(s) so the machine or equipment is isolated from the energy source(s).	
5	Lockout Controls	Lockout and tag out the energy isolating device(s).	
6	Release Energy	Release and/or dissipate any stored or residual energy.	
7	Verify	Verify the energy source has been isolated.	
Lockout Release Steps			
#	Step	Instruction	Task Completed?
1	Notify Employees	Notify affected employees that the equipment is to be re-energized.	
2	Inspect Area	Check the immediate area to ensure all employees have been safely positioned, and nonessential items have been removed.	
3	Verify Controls	Verify that operating controls are off (not on).	
4	Re-energize	Remove the lockout device(s) and activate the energy isolating device(s) to re-energize the equipment.	
5	Startup Equipment	Startup equipment and monitor for several operating cycles to ensure it is functioning properly.	
6	Final Employee Notification	Notify affected employees the servicing or maintenance is completed, and the equipment is ready for use.	

Authorized Employee (Print)

Authorized Employee (Sign)

Date

APPENDIX B: ENERGY SPECIFIC CONTROL PROCEDURE RECORD

This form is a part of the Florida Tech's Lockout/Tagout Plan and may be utilized by all Authorized Employees performing Lockout/Tagout (LOTO) as a machine/process specific LOTO procedures. Each portion is to be described thoroughly so that all Affected Employees fully understand the LOTO procedures for the specific machine/process. Additionally, it is recommended that diagrams/pictures be utilized for further explanation.

Date: Enter Date Here
Authorized Employees: Enter Name(s) Here
Contact Phone/Email: Enter Phone Here / Enter Email Here
Equipment ID: Enter Name(s) Here

Process/Equipment Description:

Enter Text Here

Equipment Intended Use:

Enter Text Here

Energy Sources:

Enter Text Here

Shut Down Procedure:

Enter Text Here

Machine/Equipment Isolation Procedure:

Enter Text Here

Lockout /Tagout Devices Utilized:

Enter Text Here

Verification of Isolation Procedure:

Enter Text Here

LOTO Release Procedure:

Enter Text Here

Restoring Energy Procedure:

Enter Text Here

Group LOTO Details:

Enter Text Here

APPENDIX C: LOTO TRAINING RECORD

Employees need to be trained to ensure that they know, understand, and follow the applicable provisions of the hazardous energy control procedures per OSHA 29CFR 1910.147. The training must cover at least three areas: aspects of the employer’s energy control program; elements of the energy control procedure relevant to the employee’s duties or assignment; and the various requirements of the OSHA standards related to lockout and Tagout.

Training Date: Enter Date Here
Instructor Name: Enter Name(s) Here
Trainee Name: Enter Name(s) Here
Trainee Phone/Email: Enter Phone Here / Enter Email Here

Trainee Role: Enter Name(s) Here
Course Name: Enter Text Here
Description:

EXAMPLE: This training will discuss Florida Tech’s Energy Control Program; elements of the energy control procedure relevant to the employee’s duties; and the various OSHA LOTO requirements.

Confirmation

By signing the below, the trainee acknowledges that they fully understand the contents of the training provided. Additionally, they agree to abide by all Florida Tech SOP’s, Policies, Manuals, and Plans pertaining to this training; and all Federal, State, and Local regulations to ensure compliance.

Trainee Name (Print) _____
Trainee Name (Signature) _____
Date

Trainer Name (Print) _____
Trainer Name (Signature) _____
Date

APPENDIX D: LOTO INSPECTION RECORD

Inspections of LOTO procedures are a requirement per OSHA 1910.147(c)(6)(i). The employer may group together separate machine specific LOTO procedures into one procedure for purposes of complying with the LOTO standard, so long as the machines or equipment in the group have the same or similar types of control measures.

General Information

Date: Enter Date Here
Inspector: Enter Name(s) Here
Employees(s): Enter Name(s) Here
Process/Equipment Details: Enter Text Here
Process/Equipment Details: Enter Text Here

Inspection Details

Has there been a change in job assignments, machines, equipment or processes?

N/A NO YES

If so, have employees been re-trained when job assignments, equipment, or processes have changed?

N/A NO YES

Are the locks uniquely identified, uniquely keyed, and only used for the purpose of LOTO?

N/A NO YES

Does the tag used with the lock identify the worker servicing the machine or equipment?

N/A NO YES

Have equipment and machine specific LOTO procedures been documented in writing?

N/A NO YES

Does the employee know where the written LOTO procedures are located?

N/A NO YES

Does the Authorized Employee notify Affected Employees before starting the LOTO procedure?

N/A NO YES

Can the employee identify all hazardous energy sources for the equipment to be locked out?

N/A NO YES

Does the employee follow the proper LOTO procedures?

N/A NO YES

Inspection Notes

Enter Text Here