I. PURPOSE

The purpose of this Lockout/Tagout (LOTO) Program is to protect individuals servicing and maintaining machinery and equipment from the unexpected energizing or startup of the machinery/equipment or the release of stored energy that could cause injury. This Lockout/Tagout Program has been written to achieve compliance with the Michigan Occupational Safety and Health Administration (MIOSHA) General Industry Standards Part 85 The Control of Hazardous Energy Sources and Part 40 Safety-Related Work Practices.

II. SCOPE AND APPLICATION

This Lockout Tagout Program applies to all Eastern Michigan University (EMU) workers servicing and/or maintaining machinery and equipment. Outside contractors must comply with their company's LOTO program or EMU's program.

III. DEFINITIONS

Affected Employee - An employee whose job requires him/her to operate or use a machine or equipment on which servicing or maintenance is being performed under lockout or tagout or whose job requires him/her to work in the immediate area in which such servicing or maintenance is being performed.

Authorized Employee - An employee who locks out or tags out machines or equipment in order to perform servicing or maintenance on that machine or equipment. An affected employee becomes an authorized employee when that employee's duties include performing service or maintenance covered under this program.

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.

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

Energy Isolating Device - A mechanical device which 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 ungrounded supply conductors, a line valve, a block and any similar device used to block or isolate energy. **NOTE: Push buttons, selector switches and other control circuit type devices are not energy isolating devices.**

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

Lockout - The placement of a lockout device on any energy isolating device, in accordance with this program, which ensures the energy isolating device and the equipment being controlled cannot be operated until the lockout device is removed.

Lockout Device - A device utilizing a positive means such as a lock, either key or combination type or hold an energy isolating device in a safe position and prevent the energizing of a machine or equipment. This includes blank flanges and bolted slip blinds.

Lockout/Tagout - The term indicates both a lock and tag are used to remove and isolate energy/equipment from service. Only locks and tags approved for Lockout/Tagout are to be used.

Qualified Person - One who, by possession of a recognized degree, certificate, or professional standing, or who by extensive knowledge, training, and experience, has successfully demonstrated their ability to solve or resolve problems relating to the subject matter, the work or the project.

Servicing and/or Maintaining - Workplace activities such as constructing, installing, setting up, adjusting, inspecting, modifying and 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.

Tagout - The placement of a tagout device on any energy isolating device, in accordance with this program to indicate the energy isolating device and the equipment being controlled may not be operated until the tagout device is removed.

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 this program to indicate the energy isolating device and the equipment being controlled may not be operated until the tagout device is removed.

IV. RESPONSIBILITIES

A. Deans, Directors & Department Heads

1. Provide the leadership and the management systems necessary to ensure safe working conditions are maintained in their Colleges, Schools and Departments

2. Ensure the means to comply with lockout/tagout procedures are provided.

3. Motivate and provide support to faculty, forepersons, managers and supervisors to implement and comply with lockout/tagout procedures.

4. Require faculty and staff to attend all applicable training sessions.

5. Ensure disciplinary actions are taken when violations of the lockout/tagout safety program are egregious and or repetitive.

B. Faculty

1. Implement the Lockout/Tagout Safety Program in their work area.

2. Train students on the Lockout/Tagout Safety Program and document the training.

3. Must obtain and care for the locks, devices and tags required to comply with the lockout/tagout procedures.

4. Must not operate any equipment without prior training and authorization.

5. Must report any lockout/tagout job related injuries or illness and near misses to their department head and seek prompt medical treatment.

C. Supervisors

1. Ensure training for new employees and periodically retrain employees on lockout/tagout procedures.

2. Ensure the locks, tags, and other devices required for compliance with lockout/tagout procedures are provided to their employees.

3. At least annually, supervisors must conduct and document site visits of each employee to ensure the lockout/tagout procedures are being followed.

4. Must promptly investigate and document all lockout/tagout related on-the job accidents and/or near misses. Copies of these reports must be sent to Environmental Health and Safety and Risk Management.

5. Communicate EMU lockout/tagout procedures to outside contractors and receive and communicate outside contractor information to EMU personnel.

6. Document all lockout/tagout training and periodic inspections, sending a copy to Environmental Health and Safety.

7. Ensure compliance with the lockout/tagout procedures including the use of disciplinary action where necessary.

D. Employees

1. Must comply with lockout/tagout procedures.

2. Must consult with their supervisors or other appropriate knowledgeable management personnel whenever there are any questions regarding their safety or required job tasks.

3. Must obtain and care for the locks, tags and other devices required to comply with lockout/tagout procedures.

4. Must not operate any equipment without prior training and authorization.

5. Must report any lockout/tagout job related injuries or illness and near misses to their supervisor and seek prompt medical treatment.

E. Environmental Health & Safety (EHS)

1. Periodically conducts site visits to ensure compliance with lockout/tagout procedures throughout the University.

2. Maintains documentation of lockout/tagout training and periodic inspections.

3. Assists departments with lockout/tagout compliance.

4. Periodically reviews and updates the Lockout/Tagout Program.

V. LOCKOUT/TAGOUT DEVICES

A. Lockout/tagout devices must not be used for other purposes.

B. Locks used for lockout/tagout must be a keyed lock*, individually identified with the employees' name. Each Physical Plant shop has additional locks engraved with the shop name for locking out of devices for emergency purpose prior to making the repairs by individuals. Shop locks are removed and replaced by the individuals lock at the time of actual repair or the individuals lock may be added to the group lockout/tagout device along with the shop lock.

*Master Lock ™ brand locks are recommended.

C. If the task is reassigned to another employee and the equipment must remain locked out, the employee must remove his/her lock and a generic shop lock must be applied until the job is reassigned. Only with direction from the supervisor can the shop lock be removed by another employee prior to placing his/her lockout device on the equipment.

D. Group lockout devices are used for projects where more than one individual/trade must lockout an energy source or piece of equipment.

E. Tags used for tagout and lockout/tagout must be "Danger Do Not Operate" or "Danger Do Not Use" tags on which the following information must be written: Employee Name, Department and Projected Project Completion. In the space for additional comments, the date the lockout/tagout device was applied must be provided. These tags must be affixed to the energy isolating device using plastic tie wrap fasteners or attached to the lock. Chains, blocks, wedges, etc. for blocking and locking out specific items must be supplied to lockout equipment as necessary. Please see specific procedures for additional information.

VI. PROCEDURES

A. General Rules

1. Before machinery/equipment is shut down for large-scale projects, the project supervisor must notify the zone manager(s) and the building administrator(s) in the affected areas of the shutdown. When ventilation systems are being serviced in buildings with fume hoods (Briggs, Coatings Research, Mark Jefferson, Marshall, Rackham, Roosevelt, Sherzer and Sill), additional notification is necessary. Except for emergencies, advanced notice of the intended shutdown must be given to the building occupants.

2. Prior to shutting down the machinery/equipment, the authorized employee must have knowledge of the type and magnitude of the energy, the hazards of the energy to be controlled and the method or means to control the energy.

3. The machinery/equipment must be shut down using standard operating procedures established for the machinery/equipment. An orderly shutdown must be utilized to avoid any additional or increased hazard(s) to employees as a result of the equipment shutdown.

4. All energy isolating devices necessary to control the machinery/equipment energy must be physically located and operated in such a manner as to isolate the machinery/equipment from the energy sources(s).

5. The appropriate lockout/tagout devices must be affixed to each energy isolating device by each authorized employee working on the machinery/equipment. The authorized employee must utilize both lockout and

tagout whenever possible. The lockout and tagout devices must be attached to the energy isolation devices to meet the following requirements.

a. Lockout devices must be attached in a manner holding the energy isolating devices in the "safe" or "off" position.
b. Tagout devices must be attached in such a manner to clearly indicate the operation or movement of the energy isolating devices from the "safe" or "off" position is prohibited.
c. Where tags are used in conjunction with locks, the tags must be affixed at the same point as the lock.
d. Where a tag cannot be affixed directly to the energy isolating device, the tag must be located in a position that would be immediately obvious to anyone attempting to operate the device.

6. When the machinery/equipment design does not allow for affixing locks and/or tags for lockout/tagout procedures, alternative methods must be employed to effectively isolate the energy source. For example, removing control handles to prevent operation, blocking of a control switch, etc.

B. Limitations of Tags

1. Tags are essentially warning devices affixed to energy isolating devices and do not provide the physical restraint on those devices that is provided by a lock.

2. Tags must be securely attached to energy isolating devices so that they cannot be inadvertently or accidentally detached during use.

3. Tags are never to be bypassed, ignored or otherwise defeated.

4. Tags must be legible and understandable by all authorized employees, affected employees and all other workers whose job operations are or may be in the area.

5. Tags and their means of attachment must be made of materials that will withstand the environmental conditions encountered in the workplace.

6. When a tag is attached to an energy isolating device, its removal must follow release from lockout/tagout procedures.

7. Tags may evoke a false sense of security. Their meaning needs to be understood as part of the overall energy control program.

C. Control of Stored Energy

1. Following the application of lockout or tagout devices, all potentially hazardous stored or residual energy must be relieved, disconnected and/or restrained to render the equipment safe for servicing and maintenance. If there is a possibility of re-accumulation of stored energy to a hazardous level, verification of isolation must be continued until the servicing or maintenance is completed or until the possibility of such accumulation no longer exists. To render machinery/equipment safe from stored and or residual energy, the following steps should be implemented as necessary.
    a. Ensure the equipment is disconnected from the energy source(s) by first checking that no personnel are exposed.
    b. Inspect machinery/equipment to verify all parts have stopped moving.
    c. Verify the main disconnect switch or circuit breaker cannot be moved to the on position.
    d. Use appropriate test equipment to check for residual stored energy.
    e. Press all start buttons and other activating controls on the equipment itself.
    f. Relieve any built up pressure.
    g. Release the tension on springs or block the movement of spring-driven parts.
    h. Block or brace parts that could fall because of gravity.
    i. Block parts in hydraulic and pneumatic systems that could move from loss of pressure, and bleed the lines, leaving the vent valves open.
    j. Drain process piping systems and close valves to prevent the flow of hazardous materials.
    k. If a line must be blocked where there is no valve, use a blank flange.
    l. Purge reactor tanks and process lines.
    m. Dissipate extreme cold or heat or wear protective clothing.
    n. If stored energy can re-accumulate, monitor it to make sure it stays below hazardous levels.
    o. Turn off all machine controls when the testing is completed.

2. In situations where the energy isolating devices are locked/tagged out and where there is a need to test or position the equipment, the following steps must be followed to safely remove and replace energy lockout/tagout devices.

    a. Clear the machinery/equipment of tools and nonessential items to ensure the machinery/equipment components are operationally intact.
    b. Ensure all employees are out of the work area and notify all employees in the immediate area of the removal of the lockout/tagout devices prior to startup of the equipment.
    c. Lockout/tagout devices must be removed from each energy isolating device by the employee who applied the device. For exceptions to this rule, see release from lockout or tagout procedures.
    d. Energize and proceed with testing or positioning.

e. De-energize all systems and reapply energy control measures following the general rules procedures above in order to continue servicing the equipment.

D. Release from Lockout/Tagout

1. Before lockout/tagout devices are removed and energy is restored to the machinery/equipment the authorized employee must perform the following:

   a. The work area must be inspected to ensure nonessential items have been removed and the machinery/equipment components are operationally intact.
   b. Before the lockout/tagout devices are removed and before machinery or equipment are energized, affected employees must be notified that the lockout or tagout device(s) have been removed. The work areas must be checked to ensure all affected employees have been safely positioned or removed from the work area. Zone supervisors and building administrators must be notified of completion of large-scale projects affecting a substantial area.
   c. Each lockout or tagout device must be removed from each energy isolating device by the employee who applied the device. EXCEPTION: When the authorized employee who applied the lockout or tagout device is not available to remove it, that device may be removed by the supervisor, using the following procedures:
      i. Verification by the supervisor that the authorized employee who applied the device is not at the University.
      ii. All reasonable efforts must be made to contact the authorized employee to inform him/her that his/her lockout or tagout device has been removed; and
      iii. Ensure the authorized employee has this knowledge upon his/her return to work at the University.
      iv. The Lockout/Tagout Supervisors Release Form (emu-dps-ehs-f071), Attachment B must be completed for each lockout/tagout device removed.

E. Group Lockout/Tagout

1. When service and/or maintenance is performed by a crew, craft, department or other group, they must utilize a procedure which affords the employees a level of protection equivalent to that provided by the implementation of a personal lockout or tagout device. Group lockout or tagout devices must be used in accordance with the general lockout/tagout procedures including but not limited to the following specific requirements:

   a. One authorized employee must be designated to manage a group lockout/tagout project.

b. The above-authorized employee must coordinate and determine that all necessary lockout/tagout devices are properly installed.
c. Each authorized employee must affix a personal lockout or tagout device to the group lockout device, group lockbox, or comparable mechanism when he/she begins work, and must remove those devices when he/she stops working on the machinery or equipment being serviced or maintained.

F. Shift or Personnel Changes

1. Specific procedures must be utilized during shift or personnel changes to ensure the continuity of lockout or tagout protection, including providing for the orderly transfer of lockout or tagout device protection between off-going and oncoming employees, to minimize exposure to hazards from the unexpected energization or start-up of the machinery or equipment or the release of stored energy.

2. If an employee is called off the job and the equipment must remain locked out, the employee must remove his/her lock and a generic shop lock must be applied until the job is reassigned. Only with instruction from the supervisor can the shop lock be removed by another employee prior to placing his/her lockout/tagout device on the equipment.

G. Outside Contractors

1. Whenever outside servicing personnel will engage in activities covered by the scope and application of the LOTO standard, the on-site supervisor and the outside contractor must inform each other of their respective lockout or tagout procedures.

2. The supervisor must ensure his/her employees understand and comply with the restrictions and prohibitions of the outside contractor’s lockout/tagout program and vice versa.

H. Periodic Inspections

1. Supervisors must conduct periodic inspections of the energy control procedures at least annually to ensure the procedures and the requirements of this program are being followed.

2. The periodic inspection must be conducted to correct any deviations or inadequacies identified.

3. Where lockout is used for energy control, the periodic inspection must include a review, between the inspector and each authorized employee, of that employee's responsibilities under the energy control procedure being inspected.

4. Where tagout is used for energy control, the periodic inspection must include a review, between the inspector and each authorized employee, of that employee's responsibilities under the energy control procedure being inspected and the training requirements.

5. The supervisor must document performance of the periodic inspections, using the Lockout/Tagout Periodic Inspection Form (emu-dps-ehs-f070), Appendix A. The inspections must identify the machinery or equipment on which the energy control procedure was being utilized, the date of the inspection, the employees included in the inspection and the person performing the inspection. A copy of the completed inspection form should be sent to EHS.

I. Training

1. The supervisor must provide training to ensure employees understand the purpose and function of this lockout/tagout program and that the knowledge and skills required for the safe application, usage and removal of the energy controls are acquired by employees. The training must include the following:

    a. All affected employees must receive training regarding the Lockout/Tagout Program, including recognition of lockout/tagout devices and the purpose of their use. All employees must be trained not to remove a lockout and/or tagout device unless it is their own.
    b. Each authorized employee must receive training in the recognition of applicable hazardous energy sources, the type and magnitude of the energy available in the workplace, the methods necessary for energy isolation, the purpose and use of lockout/tagout procedure and control and the limitations of the tags.
    c. LOTO training must be documented. The Lockout/Tagout Documentation Form (emu-dps-ehs-f072), Appendix C, can be used to document training.
    d. Retraining must be provided for all authorized and affected employees whenever there is a change in their job assignments, a change in machinery, equipment or processes that present a new hazard or when there is a change in the lockout/tagout procedures.
    e. Additional retraining must also be conducted whenever a periodic inspection reveals or whenever the supervisor or EHS has knowledge that there are deviations from or inadequacies in the employee's knowledge or use of the energy control procedures.
    f. The retraining must reestablish employee proficiency and introduce new or revised control methods and procedures.

J. Specific Lockout/Tagout

1. Cord & Plug Equipment

    a. Machinery/equipment where the only source of energy is from connection to an electrical outlet through cords and plugs must be considered to be in compliance with lockout/tagout procedure if the following conditions are met:
        i. The plug is removed from the electrical source.
        ii. The person servicing the equipment can be in control of the plug at all times during the servicing.
        iii. All affected employees must be notified of the equipment servicing.
    b. An alternative means of compliance is to have a plug cap device on which lockout/tagout devices are affixed to the plug.

2. Steam, Water & Gas Lines

    a. For routine servicing and maintenance of steam, water and gas lines, zone managers and building administrators must be notified in advance of the necessary shutdown for large-scale projects affecting a substantial area. Notification must be provided as much as possible during emergency shutdowns.
    b. Lockout of steam, water and gas lines must consist of turning off the main valve, chaining it in the off position and affixing the lockout and tagout devices to the chain. For systems where lockout is not possible, tagout must be used.
    c. Steam, water and gas lines must not be reenergized until the work areas have been checked to ensure all employees in the immediate area have been safely positioned or removed from the work area. Means of egress must remain accessible throughout servicing and repair.

3. Powered Electrical Equipment (Saws, Lathes, Drills, Presses, etc.)
   Powered electrical equipment must be powered off at the equipment control switch and locked and tagged out at the circuit breaker or disconnect. For hard-wired equipment, the equipment must be locked and tagged out at circuit breakers or disconnect.

4. Kitchen Equipment (Slicers, Mixers, Garbage Disposals, etc.)
   Cord and plug equipment must be unplugged and tagged out of service. Hard wired equipment must be locked and tagged out at the circuit breaker or disconnect.

5. Laboratory Equipment (X-ray Machines, Centrifuges, etc.)
   Equipment with plug in connectors must adhere to the cord and plug procedures for service. All other equipment must be powered off at the equipment control switch and locked and tagged out at the circuit breaker or disconnect. All hard wired equipment must be locked and tagged out at the

circuit breaker or disconnect. Tagout of circuit breakers and disconnects is acceptable when lockout is not feasible.

6. Hydraulic Lifts, Elevators and Weighed Objects
   Lockout/tagout must be followed when servicing all hydraulic lifts. Whenever work requires entry under or on top of the lift, elevator or weighted objects, the lift, elevator and/or weighted objects must be secured by blocks, locking pins and/or other suitable securing mechanisms to prevent crushing. The equipment must be tagged out of service and locked out if possible.

7. Electrical Isolation

   a. Live parts to which an employee may be exposed must be de-energized before the employee works on or near them, unless the supervisor approves and can demonstrate that de-energizing introduces additional or increase hazards or is infeasible due to equipment design or operational limitations. Live parts that operate at less than 50 volts to ground need not be de-energized if there will be no increased exposure to electrical burns or to explosion due to electric arcs.
   b. Only qualified employees may work on electric circuit parts or equipment that have not been de-energized. Such persons must be capable of working safely on energized circuits and must be familiar with the proper use of special precautionary techniques, personal protective equipment, insulating and shielding materials and insulated tools.
   c. If work is to be performed near overhead power lines, the lines must be de-energized and grounded or other protective measures must be provided before work is started, following these procedures:
      i. If the lines are to be de-energized, arrangements must be made with the person or organization that operates or controls the electric circuits to de-energize and ground them.
      ii. If protective measures are provided, such as guarding, isolating, or insulating, these precautions must prevent an employee from directly contacting such lines with any part of their body and from indirect contact through conductive materials, tools or equipment. The work practices used by qualified persons who install insulating devices on overhead power transmission or distribution lines are not regulated by these rules.
      iii. Unqualified persons are prohibited from performing this type of work.
   d. Working in confined spaces; conductive materials, equipment, articles; and use of interlocks;
      i. When an employee works in a confined or enclosed space, such as a manhole or vault, that contains exposed energized parts, the supervisor must provide, and the employee must use, protective shields, protective barriers, or insulating materials as necessary to avoid inadvertent contact with these parts. Doors and hinged panels must be secured to prevent them from swinging into an employee and causing the employee to contact exposed energized parts.

ii. Conductive materials and equipment that are in contact with any part of an employee's body must be handled in a manner that will prevent them from contacting exposed energized conductors or circuit parts. If an employee must handle long dimensional conductive objects, such as ducts and pipes, in areas with exposed energized parts, the employer must institute work practices, such as the use of isolation, guarding and material handling techniques, which will minimize the hazard.
iii. Portable ladders must have non-conductive side rails if they are used where an employee or the ladder could contact exposed energized parts.
iv. Conductive articles of jewelry and clothing, such as watchbands, bracelets, rings, key chains, necklaces, metalized aprons, cloth with conductive thread or metal headgear, must not be worn unless rendered non-conductive by covering, wrapping, or other insulating means if they might contact exposed energized parts.
v. Where energized parts present an electrical contact hazard, an employee must not perform housekeeping duties at a distance that is close enough to the parts to create the possibility of contact, unless adequate safeguards, such as insulating equipment or barriers, are provided. Electrically conductive cleaning materials, including conductive solids, such as steel wool, metalized, cloth, and silicon carbide, and conductive liquid solutions, must not be used in proximity to energized parts unless procedures are followed which will prevent electrical contact.
vi. Only a qualified person who follows the requirements of working on or near exposed parts may defeat an electrical safety interlock, and then only temporarily while he or she is working on the equipment. The interlock system must be returned to its operable condition when work is completed.

8. Switchgear & High-Voltage Equipment

a. Only qualified personnel must be allowed to service or maintain switchgear equipment, building electrical supply feeds and transformers.
b. Trained Energy Center operators can reset switches in the Energy Center once per incident. If the initial reset does not resolve the problem, Electric Shop personnel must be contacted to isolate the problem and reset the necessary switches.

K. Recordkeeping

1. Supervisors must document all lockout/tagout training and retraining, using the Lockout/Tagout Training Form (emu-dps-ehs-f072), Appendix C. A copy of the training form must be sent to the EHS.

2. Supervisors must conduct periodic inspections for compliance with lockout/tagout procedures. Inspection documentation must be kept on the Lockout/Tagout Periodic Inspection Form (emu-dps-ehs-f070), see Appendix A. A copy of the completed inspection form must be sent to EHS.

VII. REFERENCES

A. MIOSHA - Part 85. The Control of Hazardous Energy Sources
B. MIOSHA - Part 40. Electrical Safety-related Work Practices

VIII. APPENDICES

A. LOTO Periodic Inspection Form (emu-dps-ehs-f070)
B. LOTO Supervisor Release Form (emu-dps-ehs-f071
C. LOTO Training Attendance Sheet (emu-dps-ehs-f072)

IX. HISTORY

Revision	Date	Change(s)
0	2/1/1996	Original release
1	1/29/2021	Updated format, hyperlinks added