1.0 Introduction
As part of the Weill Cornell Medicine (WCM) Environmental Health and Safety (EHS) Program Manual, a Hazardous Energy Control (Lockout/Tagout) Program has been established. The Lockout/Tagout Program has been created to promote a safe work atmosphere and to comply with the Occupational Safety and Health Administration (OSHA) Control of Hazardous Energy (Lockout/Tagout) Standard (29 Code of Federal Regulations 1910.147).

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3.0 Objective
The objective of the Hazardous Energy Control (Lockout/Tagout) Program is to protect employees from exposure to all forms of hazardous energy while performing maintenance or work on WCM equipment, systems, and/or utilities. Through the use of specific procedures that involve applying locks and tags, equipment is isolated from energy sources and injuries to workers are prevented. This program provides guidance to managers, supervisors, employees and contractors in complying with the Hazardous Energy Control Program.

4.0 Applicability
The Hazardous Energy Control Program has been developed to prevent the accidental startup of machines or equipment, and to prevent the release of stored energy during servicing or maintenance. The Program must be adhered to whenever it is necessary to work on any equipment that may release hazardous energy including, but not limited to, electrical, rotational, mechanical, chemical, hydraulic, or pneumatic energy, while the equipment is shut down. The energy switches for new equipment or equipment that has undergone major repairs, renovation, or modification after January 2, 1990 must accept a lockout device.

The lockout / tagout program consists of the following components:
- Energy control procedures
- Employee training
- Periodic inspections

4.1 PROGRAM EXCLUSIONS
The Hazardous Energy Control Program does not apply to:
- Cord and Plug-Connected Electrical Equipment if unplugging the equipment from the energy source controls the exposure to hazardous energy. The plug must also be under the exclusive control of the employee performing service or maintenance. Pneumatic tools may also fall into this category provided that they can be completely isolated from their energy source.
- Hot Tap Operations that involve transmission and distribution systems for gas, steam, water, or petroleum products when these activities are performed on pressurized pipelines; when continuity of service is essential, and shutdown of the system is impractical. Employees must then be provided with an alternative type of protection that is equally effective.

5.0 Roles and Responsibilities

5.1 ENVIRONMENTAL HEALTH AND SAFETY (EHS)
- Educate, train, and enforce the Hazardous Energy Control Program (Lockout/Tagout) at WCM.
- Coordinate and perform annual review of the Hazardous Energy Control Program.
- Develop annual report detailing institutional compliance with this program to all departments responsible for implementing Hazardous Energy Control Program.
- Investigate any incidents and cases of non-compliance.
- Provide regulatory and safety guidance to E&M, Capital Planning, and other members of the WCM community.
5.2 ENGINEERING & MAINTENANCE (E&M)

- Supervise and manage staff in proper implementation of the Hazardous Energy Control Program.
- Develop written Energy Control Procedures for all equipment (where required by Section 6.0) prior to de-energizing or performing maintenance work.
- Ensure all affected and authorized employees have been appropriately trained. Identify all new employees requiring training at time of hire. Coordinate appropriate Hazardous Energy Control Program training for employees with EHS.
- Provide all necessary energy isolation devices to authorized employees.
- Coordinate group lockout procedures and maintain compliance with this program.
- Coordinate Lockout / Tagout operations with employees over shift changes.

5.3 CAPITAL PLANNING AND OTHER DEPARTMENTS SUPERVISING CONTRACTORS

- Ensure all contractors and sub-contractors performing energy control work have written Hazardous Energy Control Programs (Lockout/Tagout) and that these programs are available onsite at all times.
- Ensure all contractors perform work in accordance with this program and in compliance with all applicable OSHA regulations.
- Provide contractors with a copy of the Weill Cornell Medical College Hazardous Energy Control (Lockout/Tagout) Program.
- Ensure all contractors and sub-contractors employees engaged in hazardous energy control work maintain documentation of all regulatory required training.
- Coordinate all Energy Control work on house systems with WCM E&M.

5.4 CONTRACTORS

- Develop, implement and maintain a company specific Hazardous Energy Control (Lockout/Tagout) Program in accordance with all applicable OSHA regulations. A copy of this program must be maintained on-site at all times.
- Ensure proper use of locks and energy isolation equipment.
- Maintain documentation of regulatory required training for all authorized and affected employees onsite.
- Coordinate all energy control work and work on WCM systems and utilities with WCM Capital Planning or E&M.

5.5 PROGRAM RESPONSIBILITIES

The Hazardous Energy Control Program establishes specific roles for employees involved in the energy control of equipment, utilities, and systems. Employees involved in hazardous energy control are categorized into two groups; Affected or Authorized. Only Authorized Employees may lockout or tagout equipment. Authorized Employees must always notify Affected Employees before the procedure is used and when the machine or equipment is returned to service. The specific responsibilities associated with each role are detailed below.

5.5.1 Affected Employees

Affected employees are responsible for operating machinery or equipment upon which energy control (Lockout/Tagout) is being applied. These employees must stay apprised of all energy control in their work areas or on equipment they operate. Affected employees are responsible for:

- Complying with all requirements of this program manual.
- Staying apprised of systems that have been de-energized. Employees must not use these systems until they have been energized by the appropriate authorized employee.
- Obtaining Hazardous Energy Control Program training for affected employees.

5.5.2 Authorized Employees

Authorized employees are those responsible for implementing Hazardous Energy Control Procedures in the field. These employees must demonstrate a competency in hazardous energy control, be trained in the use of energy control procedures, and the contents of this program manual. Authorized employees are responsible for:

- De-energizing and isolation of mechanical equipment or building systems in accordance with the WCM Hazardous Energy Control Program.
- Coordinating work activities with all Affected and Authorized Employees when conducting group lockouts or shift change operations.
- Utilizing the proper energy control procedures for all energy control (lockout /tagout) operations.
- Obtaining Hazardous Energy Control training for Authorized Employees.

6.0 Written Energy Control Procedures

Energy control procedures must be developed, documented, and utilized to control potentially hazardous energy sources whenever workers perform activities covered by the standard. Energy control procedures may not need to be developed for each individual piece of equipment and may be developed for groups of like equipment. However, employees must be adequately protected from all hazardous energy posed by the service or maintenance of the equipment.

At a minimum the energy control procedures must include, but are not limited to, the following elements:

- A statement on how the procedure will be used.
- The procedural steps needed to shut down, isolate, block, and secure machines or equipment.
- The steps designating the safe placement, removal, and transfer of lockout/tagout devices and which employee has the responsibility for the lockout/tagout devices.
- The specific requirements for testing machines or equipment to determine and verify the effectiveness of locks, tags, and other energy control measures.

Written energy control procedures are not required for work that meets all of the criteria below.

6.1 WRITTEN ENERGY CONTROL PROCEDURE EXCLUSIONS

- The machine or equipment has no potential for stored or residual energy or re-accumulation of stored energy after shut down which could endanger employees.
- The machine or equipment has a single energy source which can be readily identified and isolated.
- The isolation and locking out of that energy source must completely de-energize and deactivate the machine or equipment.
- The machine or equipment is isolated from that energy source and locked out during servicing or maintenance.
- A single lockout device achieves a locked-out condition.
- The lockout device is under the exclusive control of the Authorized Employee performing the servicing or maintenance.
- The servicing or maintenance does not create hazards for other employees.
- The department, in utilizing this exception, has had no accidents involving the unexpected activation or re-energization of the machine or equipment during servicing or maintenance.

7.0 Lockout / Tagout Procedure

The Lockout/Tagout procedure must be utilized on all equipment prior to the start of any servicing or maintenance. If the equipment is not capable of being locked out, employees must still de-energize the equipment and apply safety tags. The general procedures for bringing machines and equipment to a neutral or zero energy state and subsequent lockout / tagout are below.

7.1 PREPARATION FOR SHUTDOWN

Before an Authorized or Affected Employee turns off a machine or piece of equipment, the Authorized Employee will 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. Additionally, the Authorized Employee will notify Affected Employees that the machinery, equipment or process will be out of service and again notify Affected Employees when the interruption in service has concluded.

7.2 MACHINE OR EQUIPMENT SHUTDOWN

An Authorized or Affected employee must turn off or shut down machine or equipment using established or manufacturer specific procedures for that equipment.

7.3 MACHINE OR EQUIPMENT ISOLATION

An Authorized Employee must physically locate and operate all energy-isolating devices to isolate the machine from its energy source(s).

7.4 INSPECTION OF LOCKOUT / TAGOUT DEVICE
Prior to the application of any lockout / tagout device, the Authorized Employee will inspect each Lockout / Tagout device for damage. If a device is determined to be damaged the Authorized Employee will obtain a new device from the supervisor. The damaged device will be surrendered to the supervisor and the supervisor will discard such device. Under no circumstances will a device be borrowed from another employee or will a device not specified for lockout / tagout be used.

7.5 LOCKOUT / TAGOUT DEVICE APPLICATION
An Authorized Employee must lock out (or tag out for machines and equipment that cannot be locked out) and apply a tag at each energy isolation point.

- Lockout devices must be affixed in a manner that will hold the energy isolating devices in a “safe” or “off” position.
- Tagout devices must be affixed in a manner that will clearly indicate that the operation or movement of energy isolating devices from the “safe” or “off” position is prohibited. The tag must explain why it was applied and be affixed in a manner that it can not easily be removed (e.g., zip tie).
- If the tagout device cannot be affixed directly to the energy isolating device, the tagout device must be located as close as safely possible to the device, in a position that will be immediately obvious to anyone attempting to operate the device.

7.6 STORED ENERGY
After the energy-isolating device has been locked out and tagged or tagged out, all potentially hazardous stored energy must be relieved, disconnected, restrained, or otherwise rendered safe.

7.7 VERIFICATION OF ISOLATION
Prior to starting work on machines or equipment that have been locked and tagged, an Authorized Employee must verify that isolation or de-energization of the machine or equipment has been accomplished.

7.8 WORK MAY NOW BEGIN
The procedure Hazardous Energy Control has now been completed. Work or servicing may now begin on the equipment that has been de-energized.

8.0 Removal of Lockout / Tagout Devices
The following procedures must be followed when removing lockout/tagout devices:

8.1 RELEASE FROM LOCKOUT OR TAGOUT
Before removing lockout or tagout devices and restoring energy, Authorized Employees must take these steps:

1. Inspect the work area to ensure that nonessential items have been removed and that the equipment components are intact.
2. Check the work area to make sure all employees are safely away from the equipment and:
   - All tools have been removed.
   - Any debris has been removed.
   - All guards have been replaced.
   - All employees are free from any hazard before the lock and tag are removed and the machinery, equipment, or process, are returned to service.
   - A check of the equipment/area has been completed.
3. Notify Affected Employees before removing lockout or tagout devices and before energizing machines or equipment.
4. Notify Affected Employees after removal of lockout or tagout devices and before starting a machine.

8.2 LOCKOUT OR TAGOUT DEVICES REMOVAL
The employee that applied the device must remove each lockout or tagout device from each energy-isolating device.
8.2.1 Exception

When the employee that applied the lockout/tagout device is not available and the device must be removed, the following procedure must be used:

1. A supervisor must verify that the employee has left the campus.
2. The supervisor determines that the equipment or area is safe before the lockout/tagout is removed.
3. The supervisor must remove the lockout/tagout device.
4. All reasonable efforts must be made to contact and inform the employee that performed the initial lockout that the lockout/tagout device has been removed.
5. The supervisor must ensure that the employee has been informed that the lockout/tagout device has been removed before the employee resumes work.

8.3 EQUIPMENT START-UP

The lockout is complete. The authorized employee may now start-up the equipment and operate under normal conditions.

9.0 Personnel or Shift Changes

Many servicing and maintenance operations may extend across one or more work shifts. In such cases it is crucial that energy control procedures ensure that all hazardous energy is continuously maintained in a safe, de-energized condition. To maintain continuity in the protection provided to those involved in the lockout and tagout procedure, and for the orderly transfer of the lockout and tag device, the steps below are necessary when personnel or shifts change.

9.1 PERSONNEL CHANGE

The arriving Authorized Employee’s lock and tag shall be applied before the departing Authorized Employee’s lock and tag are removed. The departing employee is responsible for informing the arriving employee of the status of the equipment, energy control in place, and the work in progress.

9.2 SHIFT CHANGE

The lock and tag of at least one Authorized Employee on the arriving shift shall be applied before any locks and tags of the departing shift are removed. The departing crew will inform the arriving crew of the status of the equipment and the work in progress.

10.0 Testing or Positioning of Machines or Equipment

If lockout devices and tags must be temporarily removed from energy-isolating devices in order to energize and test the equipment or to reposition any of its components, the Authorized Employee will:

1. Clear the equipment of tools and materials and have employees leave the equipment area.
2. Remove employees from the machine or equipment area in accordance with normal start-up procedures.
3. Remove the lockout devices and tags from the energy-isolating devices in accordance with the procedure set forth in this program.
4. Energize the equipment, and then proceed with testing the equipment or repositioning the components.
5. De-energize all systems and replace all lockout devices and tags on the equipment.
6. Continue with service or maintenance.

11.0 Group Lockout / Tagout Procedure

During all group lockout/tagout operations where the release of hazardous energy is possible, the following procedures must be followed:

- A group lockout/tagout must afford each employee a level of protection equivalent to that provided by the implementation of a personal lockout or tagout device.
- A single Authorized Employee must be given primary responsibility for a set number of employees working under the protection of a group lockout or tagout device. This employee is to be known as the “Primary Authorized Employee”.
- The Primary Authorized Employee must determine the exposure status of individual group members.
• If there will be more than one crew, department, or group involved in the activity, a Single Authorized Employee must be designated to coordinate Affected Workforces and to ensure continuity of protection.
• Each Authorized Employee must affix a personal lockout/tagout device to the machine or equipment when work begins and remove it when work is completed.

12.0 Outside Personnel or Contractors
All non-WCM personnel or contractors involved in service or maintenance operations that meet the applicability of this program are required to have a written Hazardous Energy Control (Lockout / Tagout) Program. Contractors must have all regulatory required training to perform energy control work. Records of this training are to be kept onsite at all times. Hiring departments will be responsible for ensuring contractors have these programs in place and all work is compliant with applicable regulatory guidelines. Contractors without a written program will not be permitted to perform control of hazardous energy.

Contractors and WCM employees conducting work requiring hazardous energy control are responsible for informing each other of the work being conducted and the procedures being utilized. The WCM department representative supervising the contractor will ensure that all affected College employees understand the outside contractor lockout/tagout procedures and that no hazards are posed to these employees by outside contractor work. College employees are also responsible for informing outside contractors of the procedures used to control hazardous energy and ensuring no contractor is exposed to hazardous energy as a result of WCM work. Contractors must indicate on tags the company name and project the work is related to, in addition to reason for and the system under energy control.

13.0 Protective Materials and Hardware
Employees must be provided with the necessary protective materials and hardware to perform energy control (lockout/tagout). This may include locks, tags, chains, wedges, key blocks, adapter pins, self-locking fasteners, or other hardware. All devices used for lockout/tagout must be properly identified and must not be used for any other purposes. Lockout/tagout devices must also meet the requirements below.

13.1 LOCKOUT DEVICES
Authorized Employees will be provided with individually keyed padlocks by their supervisor. Each employee’s lock will be uniquely keyed and only the employee will be provided keys to open the locks. The employee keys will not be able to open any other employee’s locks. Employees are only permitted to use their own individually assigned locks. Sharing or borrowing of locks is not permitted.

Lockout devices must be substantial enough to prevent removal without the use of excessive force or unusual techniques, such as with the use of bolt cutters or other metal cutting tools.

13.2 DANGER TAGS
Authorized Employees will be provided with standardized warning tags to identify equipment that has been locked out. Tags must be affixed to all points where energy has been isolated. Tagout devices must warn against hazardous conditions if the machine or equipment is energized and include wording such as: “Do Not Start. Do Not Open. Do Not Close. Do Not Energize. Do Not Operate.” At a minimum, tags must also contain the following information (See also Appendix A):
• Signature or initials of person applying tag and energy control.
• Date (including year) energy control initiated.
• The system or service that has been isolated.
• Reason for the energy control

Tagout devices must be substantial enough to prevent inadvertent or accidental removal and must be constructed so that exposure to weather conditions or wet and damp locations will not cause the tag to deteriorate or the message on the tag to become illegible. Tagout devices must be attached with nylon cable ties that are non-reusable, self-locking. Authorized Employees are not permitted to affix or remove another employees tag.
13.3 ENERGY ISOLATION DEVICES
A lockable energy isolation device must be placed on all equipment or utilities prior to the start of service or maintenance, which could result in a release of hazardous energy. Required energy isolation devices will be identified in the appropriate energy control procedure. Energy isolation devices can then be obtained from the Authorized Employee’s supervisor.

14.0 Training
Training for WCM employees will be conducted based on their responsibilities under the Program. All Authorized and Affected WCM employees must receive initial and annual refresher training. EHS will coordinate and track training requirements for the campus. All training will be recorded and logged in the EHS Training Database. EHS can be contacted to arrange training or for the training status of any employee.

14.1 AUTHORIZED EMPLOYEES
Authorized employees will be given an initial training at the time of hire to address recognition of hazardous energy sources, energy isolation, and controls. Supervisors must contact EHS to schedule training any time a new employee is hired. Training must be conducted before the employee can be designated as “Authorized” and perform lockout/tagout work. An annual training session will be conducted for all Authorized Employees to review the Hazardous Energy Control Program and refresh the items given in the initial training.

14.2 AFFECTED EMPLOYEES
Affected Employees will receive training that addresses the purpose and use of energy control, the WCM Hazardous Energy Control Program, and the hazards associated with trying to energize equipment that has been locked/tagged out.

14.3 RE-TRAINING
Re-training will be provided for employees whenever there is a change in job assignment, a change in machines, equipment, or process that presents a new hazard, or a change in this lockout/tagout program. Incidents or injuries that result from a failure to adhere to the requirements set forth in the program will trigger retraining for all involved employees and supervisors. Supervisors must alert EHS of any changes in job assignments or incidents that would require retraining. EHS will then coordinate a training session with the supervisor. Retraining will also be provided whenever regular inspection or the annual program review identifies a deficiency in the program.

15.0 Record Retention, Availability and Revisions

15.1 ENERGY CONTROL PROCEDURES
Supervisors are responsible for maintaining and distributing energy control procedures for all pieces (meeting the requirements of Section 2.0) of equipment under their supervision. Energy Control procedures are to be available and utilized by all authorized employees while performing Lockout/Tagout. Energy Control Procedures must be maintained as long as the specific piece of equipment is on campus. The procedures must be made available upon request.

15.2 TRAINING RECORDS
EHS maintains all Hazardous Energy Control Training records. Training records will be reviewed on an annual basis to ensure compliance with this program. Training records will be available upon request.

Contractors are responsible for maintaining records for any contractor engaging in hazardous energy control of all applicable training records onsite. These records must be available to WCM for review at any time. Contractors without hazardous energy control/LOTO training will not be permitted to do energy control work at WCM.

15.3 REVISIONS
An annual review will be conducted of the Hazardous Energy Control Program. Program revisions will be made should any deficiencies be identified during the annual review. Updates to the OSHA Control of Hazardous Energy Standard (29 CFR 1910.147) will trigger a review of the program and any necessary revisions will be made during the program review.
16.0 Definitions

Affected Employees: Those employees that operate machinery or equipment upon which lockout/tagout is required under this program or whose job requires work in an area in which such servicing or maintenance is being performed.

Authorized Employees: An employee responsible for implementing the Control of Hazardous Energy Procedure on equipment. These employees are trained on an annual basis on how to recognize hazardous energy, using energy control procedures, and safely applying energy isolation devices.

Capable of being locked-out: An energy-isolating device that 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 devices 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 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 ungrounded supply conductors, and, in addition, no pole can be operated independently;
- A line valve;
- A block;
- Any similar device used to block or isolate energy.
- Push buttons, selector switches and other control circuit type device are not energy isolating devices.

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

Energy Control Procedure: A written documentation that contains those items of information an authorized employee needs to know in order to safely control hazardous energy during servicing or maintenance of machines or equipment.

Energy Control Program: A program intended to prevent the unexpected energizing or the release of stored energy in machines or equipment on which servicing and maintenance is being performed by employees. The program consists of energy control procedure(s), an employee training program, and periodic inspections.

Hiring Department: A department that procures the services of a contractor who will be involved in energy control work. The hiring department is responsible for ensuring the contractor meet the requirements of this program.

Hot tap: A procedure used in the repair, maintenance and services activities which involves welding on a piece of equipment (pipelines, vessels or tanks) under pressure, in order to install connections or accessories. It is commonly used to replace or add sections of pipeline without the interruption of service for air, gas, water, steam, and petrochemical distribution systems.

House System: A building system or utility that contains or has the potential to expose employees to hazardous energy. House systems are systems in full operation and under control of WCM E&M. Some examples of house systems included electric, natural gas, steam, etc.

Lockout: The placement of a lockout device on an energy-isolating device (e.g., circuit breaker or electrical power disconnect), 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.

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. This prevents unauthorized personnel from turning on a machine or equipment while it is being serviced.

Normal production operations: The utilization of a machine or equipment to perform its intended production function.
**Primary Authorized Employee:** An authorized employee who supervises energy control with multiple authorized employees. This function has overall responsibility for meeting the requirements of this program.

**Servicing and/or maintenance:** 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.

**Setting up:** Any work that prepares a machine or a piece of equipment to regain its normal production operation.

**Tag:** The placement of a tagout device in addition to a lockout 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:** Tagout alone is permitted when the energy isolating devices are not lockable. Special procedures must be developed when a device cannot be locked out. **Note:** The energy switches for new equipment or equipment that has undergone major repairs, renovation, or modification after January 2, 1990 must accept a lockout device.

**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.

### 17.0 References

**American National Standards Institute**
Control of Hazardous Energy - Lockout/Tagout and Alternative Methods – ANSI 244.1-2003

**National Fire Protection Association**
Standard for Electrical Safety in the Workplace – NFPA 70 E

**Occupational Safety and Health Administration**
Control of Hazardous Energy (Lockout / Tagout) Standard (29 CFR 1910.147)
Control of Hazardous Energy (Lockout / Tagout) Standard for Construction (29 CFR 1926.416)
Appendix A – Example Tag

Front

DANGER

DO

NOT

OPERATE

This lock/tag may only be removed by:

Name ____________________________

Dept. ____________________________

Date ____________________________

Back

DANGER

This energy source has been LOCKED OUT!

Unauthorized removal of this lock/tag may result in immediate discharge.

Remarks: ____________________________

Signature ____________________________

Date (including year) energy control initialed

Department or company performing energy control

Hazard Warning

Area to describe service isolated, and reason for lockout.