



THE UNIVERSITY OF NORTH CAROLINA  
AT CHAPEL HILL  
**CHILLED WATER DEPARTMENT  
ENERGY CONTROL PROCEDURE**

The purpose of this document is to establish minimum requirements for the manual isolation and securing of energy sources for the purpose of service and/or maintenance for Chilled Water Systems Department equipment. (Reference OSHA Standard 29 CFR 1910.147). The Health and Safety Office of The University of North Carolina at Chapel Hill has issued an Industrial, Maintenance and Construction Safety Manual that establishes the minimum lockout and tagout requirements for all University Departments. Due to the complexity of the Chilled Water System's operation it has been determined that additional requirements are needed.

#### **DEFINITIONS APPLICABLE TO THIS PROCEDURE**

**Affected employee** - An employee whose job requires him to operate or use a machine or equipment on which servicing or maintenance is being performed under Lockout/Tagout or Tagout, or whose job requires him to work in an area in which such servicing or maintenance is being performed.

**Authorized employee** - A person 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 servicing or maintenance covered under this section.

**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 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; and any similar device used to block or isolate energy. **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, or other energy.

**Lockout** - The placement of a lockout device on an energy isolating device, 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 box** - A box use to hold keys to multiple Lockout/Tagout devices. Following steps in this procedure, it can be used for convenience when several employees are isolating multiple pieces of equipment.

**Lockout device** - A device that utilizes a positive means such as a lock to hold an energy isolating device in the safe position and prevent the energizing of a machine or equipment. Included are blank flanges and bolted slip blinds.

**Lockout/Tagout Device** – A device that consist of both a Lockout Device and a Tagout Device.

**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 performed to prepare a machine or equipment to perform its normal production operation.

**Tagout** - The placement of a tagout device on 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.

**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.

## **SCOPE OF ENERGY ISOLATING PROCEDURE**

This policy will ensure that machines/equipment are isolated from all potentially hazardous energy which may include electrical, mechanical, hydraulic, pneumatic, chemical and thermal, and are locked out or tagged out before individuals perform any servicing or maintenance during which an unexpected energizing, start-up or release of stored energy could cause an injury. All employees performing work requiring Lockout/Tagout or Tagout must comply with this procedure.

The preferred method of isolation is Lockout/Tagout, using department issued locks and tags. Tagout shall only be used when an energy isolating device is not capable of being locked. A Chilled Water Supervisor must provide *written* approval of the use of Tagout alone instead of the preferred Lockout/Tagout.

- Locks used for locking out energy isolating devices under this procedure will be issued by the Chilled Water Department and will be red in color.
- Locks must be accompanied by a department issued tag that is dated, signed legibly in dark ink by the employee who applied it and be understandable by employees whose work operations are or may be in the area.
- Tags used for locking out energy isolating devices under this procedure will read "Locked Out" "Do Not Operate".
- This combination of lock and tag is referred to as a Lockout/Tagout device.
- When a Lockout/Tagout or Tagout device is attached to an energy-isolating device, it is not to be removed without authorization of the individual who signed it, and it is not to be bypassed, ignored or otherwise defeated.
- Each employee must apply his own personal Lockout/Tagout or Tagout device on the energy isolating device. No one can apply another employee's Lockout/Tagout or Tagout device.
- Only the employee who attached the Lockout/Tagout or Tagout device or the employer, in the employee's absence and upon completion of this procedure's Absentee Tagout or Lockout/Tagout Removal Report may remove an employee's Lockout/Tagout device.
- Each tag of a Lockout/Tagout or Tagout device must have a current date for each day the employee is physically working on the isolated equipment. The employee will use a Department issued label to apply to the Tagout device where the date is indicated. This label can then be replaced or covered with a new label with a new date.
- For each lock that is assigned to an employee, one key will be kept by the employee and a second key will be kept in a key lockbox under the direction of the Maintenance Superintendent.

- Lockout or tagout devices shall be singularly identified; shall be the only devices used for controlling energy and shall not be used for purposes other than described in this procedure. All lockout and tagout devices will be issued by the Chilled Water Safety Coordinator.
- Lockout devices, where used, shall be affixed in a manner that will hold the energy isolating devices in a "safe" or "off" position.
- Tagout devices, where used, shall be affixed in such a manner as will clearly indicate that the operation or movement of energy isolating devices from the "safe" or "off" position is prohibited.
- Lockout/Tagout or Tagout tags must be securely attached to energy-isolating devices so that they cannot be inadvertently or accidentally detached during use.
- Lockout/Tagout or Tagout tags and their means of attachment must be made of materials which will withstand the environmental conditions encountered in the workplace.

## **LOCKOUT/TAGOUT OR TAGOUT SEQUENCE (CWS STAFF)**

### **1) Preparation for Shutdown**

Before an authorized employee turns off a machine or piece of equipment, they shall 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.

### **2) Machine or Equipment Shutdown**

The machine or equipment shall be turned off or shut down using the procedures established for the machine or equipment. An orderly shutdown must be utilized to avoid any additional or increased hazard(s) to employees as a result of equipment de-energization.

### **3) Machine or Equipment Isolation**

All energy-isolating devices that are needed to control the energy to the machine or equipment shall be physically located and operated in such a manner as to isolate the machine or equipment from the energy source(s). Operate the switch, valve, or other energy-isolating device so that each energy source (electrical, mechanical, hydraulic, etc.) is disconnected or isolated from the equipment. Stored energy such as capacitors, springs, elevator machine members, rotating flywheels, hydraulic systems and air, gas, steam or water pressure, etc. must also be dissipated or restrained by methods such as grounding, blocking, repositioning, bleeding down, etc.

### **4) Notification of employees**

Affected employees shall be notified by the employer or authorized employee of the application and removal of energy control devices. Notification shall be given before the controls are applied, and after they are removed from the machine or equipment.

### **5) Lockout/Tagout or Tagout Device Application:**

#### **Lockout/Tagout**

Lockout devices shall be affixed to each energy-isolating means by authorized individuals and shall be affixed in a manner that will hold the energy in a "safe" or "off" position. Attach with the lockout device an approved lockout tag containing the name, date and contact information for the person performing the lockout/tagout. Locks shall not be attached without tags.

#### **Tagout**

Tagout shall only be used when an energy isolating device is not capable of being locked. A Chilled Water Supervisor must complete a [\*Tagout Authorization\*](#) form to provide his approval of the use of Tagout alone instead of the preferred Lockout/Tagout.

Tags are essentially warning devices and do not provide the physical restraint on energy-isolating devices that are provided by lockout. They therefore may evoke a false sense of security.

Tagout devices shall be affixed to each energy-isolating means by authorized individuals and shall be affixed in such a manner as will clearly indicate that the

operation or movement of the energy-isolating means from the "safe" or "off" position is prohibited. The tagout device shall be located as close as safely possible to the means, in a position that will be immediately obvious to anyone attempting to operate the device.

To provide as much safety as possible when using the tagout system, the employee shall demonstrate full compliance with all of the tagout-related provisions above together with all reasonable 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 energization.

#### **6) Release of Stored Energy**

Following the application of Lockout/Tagout or Tagout devices to energy-isolating devices, all potentially hazardous stored energy shall be relieved, disconnected, restrained, and otherwise rendered safe. If there is a possibility of re-accumulation of stored energy to a hazardous level, verification of isolation shall be continued until the servicing or maintenance is completed, or until the possibility of such accumulation no longer exists.

#### **7) Verification of Isolation**

Prior to starting work on machines or equipment that have been isolated and de-energized using Lockout/Tagout or Tagout, the authorized employee shall verify that isolation and de-energization of the machine or equipment has been accomplished. After ensuring that no personnel are exposed, operate the push button or other normal operating controls to make certain the equipment will not operate. **CAUTION: Return operating control(s) to 'neutral' or 'off' position after the test.**

On equipment that has remote DCS control, isolation with DCS control alone is not acceptable. Lockout/Tagout or Tagout must also be performed on the energy source(s).

#### **8) Shift or Personnel Changes**

In the case of shift or personnel changes, a changeover period will be established so that individuals may exchange their assigned energy control devices. Individuals assuming control of the Lockout/Tagout or Tagout of equipment shall be fully briefed in the scope and strategy of the work by those who are being relieved.

#### **9) Release From Lockout/Tagout or Tagout**

Before the energy control devices are removed and energy is restored to the machine or equipment, procedures shall be followed and actions taken by the authorized individual(s) to ensure that:

- 1) The work area is inspected to ensure that nonessential items have been removed.
- 2) That machine or equipment components are operationally intact.
- 3) That the work area is checked to ensure that all employees have been safely positioned or removed.

#### **10) Lockout/Tagout or Tagout Device Removal**

Each energy control device shall be removed from each energy-isolating means by the individual who applied it. After energy control devices have been removed and before a machine or equipment is started, affected individuals shall be notified that the device(s) have been removed.

#### **11) Removal of Lockout/Tagout or Tagout When Individual Is Not Available**

When the individual who applied the energy control device is not available to remove it, that device may be removed under the direction of the employer. The specific procedure shall include the following elements:

- 1) Verification by the employer that the authorized individual who applied the device is not at the facility.
- 2) The employer will make all reasonable efforts to contact the individual to inform him that his energy control device is to be removed.
- 3) The supervisor removing the device will initiate an Absentee Lockout/Tagout or Tagout Removal Report.
- 4) The supervisor who initiated the Absentee Lockout/Tagout or Tagout Removal Report will assure that the individual who initially applied the energy control device has signed off on the report signifying that he is aware that his device has been removed by the employer before he resumes work at the facility.

#### **12) Testing or Positioning of Machines, Equipment, or Components**

In situations where energy control devices must be temporarily removed from the energy-isolating means and the machine or equipment energized to test or position the equipment or component, the following sequence of actions shall be followed:

- 1) Follow procedure as described above in Release From Lockout/Tagout or Tagout.
- 2) Follow procedure as described above in Lockout/Tagout or Tagout Device Removal.
- 3) Energize and proceed with testing or positioning.
- 4) De-energize all systems and reapply energy control devices as outlined above to continue the servicing and/or maintenance.

## **LOCKOUT/TAGOUT OR TAGOUT SEQUENCE (GROUPS)**

In lieu of the individual lockout/tagout procedure when servicing and/or maintenance is performed by a crew, craft, department or other group, the following procedure may be utilized which affords the individuals a level of protection equivalent to that provided by the implementation of a personal lockout/tagout device. This shall be accomplished by:

- 1) One primary authorized employee of a work crew, or a supervisor with the knowledge of the crew, locking out equipment for the whole crew. In such cases it shall be the responsibility of that individual to carry out all steps of the lockout/tagout procedure and inform the crew when it is safe to work on the equipment. This individual will attach his lockout/tagout device to a multi-lock accepting device.
- 2) Each affected and authorized individual, once satisfied that the equipment has been properly isolated from all potentially hazardous energy, shall affix a personal lockout/tagout device to the multi-lock accepting device when they begin work, and shall remove those devices when they stop working on the machine or equipment being serviced or maintained.
- 3) If multiple pieces of equipment are being locked out, multiple lockout/tagout devices may be used to lockout the machine or equipment with the keys being placed in a lockout box that allows the use of multiple locks to secure it. Each individual will then use his own Lockout/Tagout device to secure the box. As each person no longer needs to maintain his lockout protection, that person will remove his Lockout/Tagout device from the box.

## **PERIODIC INSPECTION**

The employer shall conduct a periodic inspection of the energy control procedure at least annually to ensure that the procedure and the requirements of this standard are being followed.

The periodic inspection shall be performed by an authorized employee other than the ones(s) utilizing the energy control procedure being inspected.

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

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

The employer shall certify that the periodic inspections have been performed. The certification shall identify the machine 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.

## **LOCKOUT/TAGOUT OR TAGOUT SEQUENCE (CONTRACTORS)**

Whenever outside servicing personnel are to be engaged in activities covered by the scope and application of this standard, the on-site employer and the outside employer shall inform each other of their respective energy control procedures.

The on-site employer shall ensure that his employees understand and comply with the restrictions and prohibitions of the outside employer's energy control program.

If the outside employer has no documented energy control procedures, or if their procedure allows tagout in lieu of lockout/tagout, they shall ensure that their personnel understand and comply with the procedures established in this program.

The outside employer shall contact the Chilled Water Maintenance Superintendent and Chilled Water Operations to line up his work activities. Chilled Water personnel will initially isolate and lockout the appropriate equipment and log the placement of their lockout devices in the appropriate plant's Lockout/Tagout Registry book. The outside employee shall then install his lockout device and log its placement in the Lockout/Tagout Registry book.

Once work is completed, the outside employee will remove his lockout device and inform the Chilled Water Maintenance Superintendent and Chilled Water Operations of its completion and log the removal of his lockout device in the Lockout/Tagout Registry book. At this time, if no other work is to be performed on the equipment, Chilled Water personnel will remove their lockout devices and log their removal in the Lockout/Tagout Registry book.

## **TRAINING**

The employer shall provide training to ensure that the purpose and function of the energy control program are understood by employees and that the knowledge and skills required for the safe application, usage, and removal of the energy controls are acquired by employees.

Each authorized employee shall receive training in the recognition of applicable hazardous energy sources, the type and magnitude of the energy available in the workplace, and the methods and means necessary for energy isolation and control.

Each affected employee shall be instructed in the purpose and use of the energy control procedure.

All other employees whose work operations are or may be in an area where energy control procedures may be utilized, shall be instructed about the procedure, and about the prohibition relating to attempts to restart or re-energize machines or equipment which are locked out or tagged out.

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 in the energy control procedures.