



SIMMONS

**CONTROL OF HAZARDOUS ENERGY
(LOCKOUT/TAGOUT) PROGRAM**

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Table of Contents

1.0	INTRODUCTION	1
2.0	ROLES AND RESPONSIBILITIES.....	1
2.1	Employees	1
2.1.1	Authorized Employees.....	1
2.1.2	Affected Employees.....	2
2.2	Department Directors, Managers or Supervisors	2
2.3	Director of EH&S	2
3.0	LOCKOUT/TAGOUTPROCEDURES.....	2
3.1	Preparation for Lockout or Tagout.....	2
3.2	Lockout or Tagout System Procedures.....	2
3.2.1	Electrical	3
3.2.2	Hydraulic or Pneumatic	3
3.2.3	Fluids and Gases	3
3.2.4	Mechanical	3
3.3	Testing or Positioning.....	4
3.4	Restoration	4
3.5	Procedures Involving More than One Person	4
3.6	Removal of Devices by Others than Authorized Employee.....	5
4.0	SHIFT OR PERSONNEL CHANGES.....	5
5.0	INFORMING OUTSIDE CONTRACTORS	5
6.0	PERIODIC INSPECTIONS	5
7.0	TRAINING.....	5
8.0	ADDITIONAL ELECTRICAL LOCKOUT/TAGOUT	6
8.1	Lock and Tag Requirements	6
8.2	Electrical Test Verification.....	6
8.3	Work on Energized Circuits	6
9.0	ACCIDENTS CONCERNING LOCKOUT/TAGOUT	6
10.0	REFERENCE	6

FIGURES

Figure 1 – Example of a Hasp

TABLES – None

APPENDICES

Appendix A – List of Authorized Lockout/Tagout Employees

Appendix B – List of Affected Employees by Job Titles

Appendix C – Energy Source Determination Checklist for New Equipment and Machines

Appendix D – Lockout/Tagout Procedures

Appendix E – Key Points for Lockout/Tagout Training Program

1.0 INTRODUCTION

All equipment shall be locked out or tagged out to protect against accidental or inadvertent operation during any servicing or maintenance activity. Anyone operating or attempting to operate any switch, valve, or other energy isolating device that is locked or tagged out will be disciplined by the supervisor for the department.

The Occupational Safety and Health Administration (OSHA) has promulgated two standards that require lockout/tagout (LOTO) of machinery and equipment. They are:

1. Control of Hazardous Energy (Lockout/Tagout) - 29 Code of Federal Regulations (CFR) 1910.147.
2. Electrical Selection and Use Work Practices - 29 CFR 1910.333.

Lockout is the preferred method of isolating machines or equipment from energy sources and shall be used whenever possible. The four types of energy sources are:

1. Electrical (most common form);
2. Hydraulic or pneumatic;
3. Fluids and gases; and
4. Mechanical (including gravity).

If tags are used additional steps shall be taken as necessary to provide the equivalent safety available from the use of a lockout device.

Equipment obtained or modified after January 2, 1990, will be equipped with lockout capability. The terminology used in this instruction is derived from the OSHA standards.

The purpose of these instructions are to ensure that before any employee performs any servicing or maintenance on machinery or equipment, where the unexpected energizing, start up or release of any type of energy could occur and cause injury, the machinery or equipment will be rendered safe to work on by being locked out or tagged out.

This program will be reviewed on an annual basis unless there is an accident which warrants reviewing this program.

2.0 ROLES AND RESPONSIBILITIES

Employees are responsible for adhering to the LOTO policies and procedures outlined in this manual. Below outlines specific responsibilities for certain individuals within Simmons.

2.1 Employees

Any employees who could be exposed to hazardous energy sources shall be instructed in the safety significance of the lockout or tagout procedure.

2.1.1 Authorized Employees

These employees are responsible for following established LOTO procedures. An authorized employee is defined as 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 and maintenance LOTO activities. Appendix A is a list of names and job titles of employees authorized to lockout and tagout.

2.1.2 Affected Employees

They are responsible for insuring that they do not attempt to restart or re-energize machines or equipment that are locked out or tagged out. An affected employee is defined as a person whose job requires him/her to operate or use a machine and/or equipment on which servicing and maintenance is being performed under LOTO, or who job requires him/her to work in an area in which such servicing or maintenance is being performed. Job titles, which have affected employees, are provided in Appendix B.

2.2 Department Directors, Managers or Supervisors

Department managers or supervisors are responsible for enforcing the program and insuring compliance with the procedures in their departments. In addition, they are responsible for implementing the LOTO program.

2.3 Director of EH&S

The Director of Environmental Health and Safety (EH&S) is responsible for:

- Assisting in the development of or developing LOTO procedures for machines and equipment.
- Monitoring the compliance of this program.
- Conducting the annual inspection.
- Conducting LOTO training for affected and authorized employees.

The Director of EH&S may hire a consultant to help with her responsibilities.

3.0 LOCKOUT/TAGOUT PROCEDURES

This procedure establishes the minimum requirements for the lockout or tagout of energy isolating devices. Note Specific Procedures for control of hazardous energy sources must be developed for any equipment or machinery before any maintenance or servicing is performed on it. New machines and equipment shall be evaluated using Appendix C, The Energy Source Determination Checklist for New Equipment and Machines. The procedures developed shall be documented in Appendix D.

More than one energy source may be utilized on some equipment and the proper procedure must be followed in order to identify energy sources and appropriate lockout/tagout procedure.

3.1 Preparation for Lockout or Tagout

The "authorized" employee shall make a survey using Appendix C to locate and identify all isolating devices to be certain which switch(s), valve(s), or other energy isolating devices apply to new equipment and machines to be locked or tagged out. More than one hazardous energy source and/or means of disconnect (electrical, mechanical, or others) may be involved. Consult Appendix D for specific procedures and then follow the specified procedure. If specific procedures have not been developed and documented in Appendix D they shall be developed and documented before work is begun. No work can proceed until Director of EH&S or designee writes and provides the authorized person with a specific procedure.

3.2 Lockout or Tagout System Procedures

Notify all affected employees that a lockout or tagout system is going to be utilized and the reason thereof. The authorized employee shall know the type and magnitude of energy that the machine or equipment utilizes and shall understand the hazards thereof. Below are the procedures for the four sources of energy sources.

Number lock sequentially locks will be color coded by the Department and the numbers and colors will be listed on the form in Appendix A to identify the employees assigned to the locks. All locks will be of one brand. If the brand is no longer available, then an alternative brand will be used. Tags will always be secured by a nylon self-locking tie, which will require cutting the nylon tie to remove it. Other methods of identifying locks and tags may be acceptable. Any alternative method must be approved in advance by the Director of EH&S or Director of Buildings and Grounds.

3.2.1 Electrical

1. Shut off power at machine and at the disconnect switch.
2. Disconnecting means must be locked or tagged.
3. Press start button to confirm that correct systems are locked out.
4. All controls must be returned to their safest position (off, stop, etc).
5. Points to remember:

If a machine or piece of equipment contains capacitors, they must be drained of stored energy. Possible disconnecting means include the power cord, power panels (look for primary and secondary voltage), breakers, the operator's station, motor circuit, relays, limit switches, and electrical interlocks. Some equipment may have a motor isolating shut-off and a control isolating shut-off. If the electrical energy is disconnected by simply unplugging the power cord, the cord must be kept under the control of the authorized employee or the plug end of the cord must be locked out or tagged out.

3.2.2 Hydraulic or Pneumatic

1. Shut off all energy sources (pumps and compressors) if the energy sources are dedicated to the equipment being serviced. If the pumps and compressors supply energy to more than one piece of equipment, lockout or tagout the valve supplying energy to the piece of equipment being serviced.
2. Stored pressure from hydraulic/pneumatic lines shall be drained/bled when release of stored energy could cause injury to employees.
3. Make sure controls are returned to their safest position (off, stop, standby, inch, jog, etc.).

3.2.3 Fluids and Gases

1. Identify the type of fluid or gas and the necessary personal protective equipment.
2. Close valves to prevent flow, and lockout/tagout.
3. Determine the isolating device, then close and lockout/tagout.
4. Drain and bleed lines to zero energy state.
5. Some systems may have electrically controlled valves. If so, they must be shut off and locked/tagged out.
6. Check for zero energy state at the equipment.

3.2.4 Mechanical

Mechanical energy includes gravity activation, energy stored in springs, etc.

1. Block out.
2. Lockout or tagout safety device.
3. Shut off, lockout or tagout electrical system.
4. Check for zero energy state.
5. Return controls to safest position.

3.3 Testing or Positioning

In situations which lockout or tagout devices must be temporarily removed from the energy isolating device and the machine or equipment energized to test or position the machine, equipment or component thereof, the following sequence of actions shall be followed:

1. Clear the machine or equipment of tools and materials.
2. Remove employees from the machine or equipment area.
3. Remove the lockout or tagout devices.
4. Energize and proceed with testing or positioning.
5. Deenergize all systems and reapply energy control measures in accordance with the requirements set forth in this instruction.

3.4 Restoration

1. Inspection: Make certain the work is completed and inventory the tools and equipment that were used. Clean-up: Remove all towels, rags, work-aids, etc.
2. Replace guards: Replace all guards possible. Sometimes a particular guard may have to be left off until the start sequence is over due to possible adjustments. However, all other guards should be put back into place.
3. Check controls: All controls should be in their safest position.
4. The work area shall be checked to ensure that all employees have been safely positioned or removed and notified that the lockout/tagout devices are being removed.
5. Remove locks/tags. Remove only your lock or tag.

3.5 Procedures Involving More than One Person

In the preceding steps, if more than one individual is required to lockout or tagout equipment, each shall place his/her own assigned lockout device or tagout device on the energy isolating device(s). When an energy isolating device cannot accept multiple locks or tags, a multiple lockout or tagout device (hasp) may be used. Refer to Figure 1 for an example of a hasp.



Figure 1 – Example of a Hasp

If lockout is used, a single lock may be used to lockout the machine or equipment with the key being placed in a lockout box or cabinet which allows the use of multiple locks to secure it. Each employee will then use his/her own assigned lock to secure the box or cabinet. As each person no longer needs to maintain his or her lockout protection, that person will remove his/her lock from the box or cabinet.

3.6 Removal of Devices by Others than Authorized Employee

Lockout/Tagout devices shall be removed from each energy isolating device by the employee who applied it, EXCEPT:

- Lockout/tagout devices may be removed by Director of Buildings and Grounds if the authorized employee who applied it is not available and it is verified that the authorized employee who applied the device is not at the facility;
- All reasonable efforts were made to contact the authorized employee to inform him/her that his/her lockout or tagout device has been removed and;
- The authorized employee has this knowledge before he/she resumes work at that facility.

4.0 SHIFT OR PERSONNEL CHANGES

In the case of shift or personnel changes, a changeover period will be established so that the authorized employees may exchange their assigned locks/tags. Authorized personnel assuming control of lockout of equipment shall be fully briefed in the scope and stage of the work by those whom are being relieved.

5.0 INFORMING OUTSIDE CONTRACTORS

Outside contractors shall be advised that Simmons has and enforces the use of LOTO procedures. They will be informed of the use of locks and tags and notified about the prohibition of attempts to restart or re-energize machines or equipment that are locked out or tagged out.

The Project Manager overseeing the contractor will obtain information from the contractor about their LOTO procedures and advise affected employees of this information.

6.0 PERIODIC INSPECTIONS

Periodically (at least annually) the effectiveness of the entire program will be evaluated by an authorized employee(s) other than the one(s) utilizing the energy control procedure being inspected. Any deviations or inadequacies shall be documented and corrected. These annual evaluations will be conducted as part of the Buildings and Grounds EH&S inspections.

7.0 TRAINING

Training shall be given to all authorized, affected and other personnel as required by 29 CFR 1910.147(c)(7) and 29 CFR 1910.332. Appendix E provides Key Points for Lockout/Tagout Training Program and shall be used as a training outline along with the appropriate sections of the standard.

The Director of EH&S, designee, or a contractor will conduct training and prepare a record and certify that the employee training has been accomplished. Training certifications will be provided to the trainees. The Director of EH&S, designee, or a subcontractor will conduct retraining for employee(s) 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.

Additional retraining shall also be conducted whenever the periodic inspection reveals, or whenever there is reason to believe, that there are deviations from or inadequacies in the employee's knowledge or use of the energy control procedures.

8.0 ADDITIONAL ELECTRICAL LOCKOUT/TAGOUT

This section outlines the requirements when working with electricity under 29 CFR 1910.333.

8.1 Lock and Tag Requirements

Electrical work requires a lock and a tag to be used together. However, a tag can be used by itself only if the electrical disconnecting source does not have lockout capabilities.

Locks can be placed without a tag only under the following conditions:

- Only one circuit or piece of equipment is de-energized.
- The lockout period does not extend beyond the work shift.
- Employees exposed to the hazards associated with re-energizing the circuit or equipment are familiar with this procedure.

8.2 Electrical Test Verification

A person trained in LOTO shall use test equipment to test the circuit elements and electrical parts of equipment to which employees will be exposed and shall verify that the circuit elements and equipment parts are de-energized. The test shall also determine if any energized condition exists as a result of inadvertently induced voltage or unrelated voltage back-feed even though specific parts of the circuit have been de-energized and presumed to be safe. If the circuit to be tested is over 600 volts, nominal, the test equipment shall be checked for proper operation immediately before and immediately after this test.

8.3 Work on Energized Circuits

Approval must be obtained from supervisor prior to any work on energized circuits.

Director of Buildings and Grounds will verify that by de-energizing circuits that it will create additional or increased hazards or it is infeasible due to equipment design or operational limitations.

NOTE: Working on energized parts requires the wearing of appropriate personal protective equipment. The Director of EH&S will be responsible for specifying appropriate personnel equipment to be used, to ensure compliance with 29 CFR 1910.335.

Personnel protective equipment for electrical hazards shall meet, be used and maintained in accordance with American National Standard Institute (ANSI) Z87.1.

9.0 ACCIDENTS CONCERNING LOCKOUT/TAGOUT

The Director of EH&S or Director of Buildings and Grounds will be responsible for fully investigating all lockout/tagout accidents, and reporting the cause of such accident to Public Safety. If the accident involved the control of hazardous energy with a single lockout source, a specific procedure will be written and included in Appendix D before work is continued.

If the accident involved a specific procedure for a piece of equipment, the lockout/tagout specific procedure will be evaluated and modified (if necessary) prior to authorizing work to continue.

10.0 REFERENCE

The sample written program for LOTO on OSHA's webpage was used to develop this program.

APPENDIX C

ENERGY SOURCE DETERMINATION CHECKLIST FOR NEW EQUIPMENT AND MACHINES

DATE: _____ **CONDUCTED BY:** _____

In order to determine all energy sources for each piece of equipment, all of the following questions must be answered. Both actual and potential sources of energy need to be considered when responding to these questions. Check off “YES” or “NO” or provide in the column labeled Additional Information. If the question does not apply, then check off N/A.

BUILDING: _____ **ROOM NUMBER:** _____

EQUIPMENT NAME: _____

EQUIPMENT ASSET NUMBER (if applicable): _____

MANUFACTURER: _____ **SERIAL NUMBER:** _____

LOCATION IN ROOM (be specific): _____

LOCKOUT/TAGOUT PROCEDURE NUMBER: _____

QUESTION	YES	NO	N/A	ADDITIONAL INFORMATION
Electrical Power				
Does this equipment have electrical power (including battery)? <ul style="list-style-type: none"> • If yes, please provide the number of the electrical panel and the breaker number • If yes, please provide the battery location. 				
Does it have the LOTO device(s) for electrical power?				
Mechanical Power				
Does it have mechanical power?				
Engine driven? <ul style="list-style-type: none"> • If yes, please provide switch or key location. • Is the LOTO device installed? If no, please provide the method of preventing operation. 				
Spring loaded? <ul style="list-style-type: none"> • If yes, if there a method of preventing spring activation? • If no, how can the spring tension be safely released or secured? 				
Counter weight(s)? <ul style="list-style-type: none"> • If yes, does it have a method of preventing movement? <ul style="list-style-type: none"> ○ If yes, can it be locked? ○ If no, how can it be secured? 				
Flywheel? <ul style="list-style-type: none"> • If yes, does it have a method of preventing movement? <ul style="list-style-type: none"> ○ If no, how can it be secured? 				

QUESTION	YES	NO	N/A	ADDITIONAL INFORMATION
<p>Hydraulic power?</p> <ul style="list-style-type: none"> • If yes, please provide the location of main control/shut-off valve. • Can control/shut off valve be locked in “off” position? <ul style="list-style-type: none"> ○ If no, location of closest manual shut-off valve. ○ Does this shut-off valve have a lockout device? 				
<p>Pneumatic energy?</p> <ul style="list-style-type: none"> • If yes, please provide the location of the main control/shut off valve. • Can the shut off valve be locked in “off” position? <ul style="list-style-type: none"> ○ If no, please provide location of closest manual shut-off valve. • Does manual shut-off valve have lockout device? <ul style="list-style-type: none"> ○ If no, what is needed to lock valve closed? • Is there a bleed or drain valve to reduce pressure to zero? <ul style="list-style-type: none"> ○ If no, what will be required to bleed off pressure? 				
<p>Chemical system?</p> <ul style="list-style-type: none"> • If yes, please provide the location of the main control/shut-off valve. • Can control/shut-off valve be locked in the off/closed position? <ul style="list-style-type: none"> ○ If no, location of closest manual shut-off valve. • Does manual shut-off valve have lockout device? <ul style="list-style-type: none"> ○ If no, what is needed to lock valve closed? • Is there a bleed or drain valve to safely reduce system pressure and drain system of chemicals? <ul style="list-style-type: none"> ○ If no, how can system be drained and neutralized? • What personal protective equipment is required for equipment? 				
<p>Thermal energy?</p> <ul style="list-style-type: none"> • If yes, please provide the location of the main control/shut-off valve. • Can control/shut-off valve be locked in “off” or closed position? <ul style="list-style-type: none"> ○ If no, please provide location of closest manual shut-off valve. • Does manual shut-off valve have lockout device? 				

QUESTION	YES	NO	N/A	ADDITIONAL INFORMATION
Gravitational energy? <ul style="list-style-type: none"> • If yes, please provide the location of main control/shut-off valve. • Is there a device to restrain or control the gravitational energy? <ul style="list-style-type: none"> ○ If no, what will be required to control or restrain the gravitational energy? • Can the device used to restrain or control the gravitational energy be locked in a position that will prevent gravitational energy from being released? 				
Other Sources of Energy? <ul style="list-style-type: none"> • Are there any other actual or potential energy sources? • If yes, please provide the location of main control/shut-off valve. • Can control /shut-off valve be locked in an off or closed position? • Is there a way to drain or bleed off pressure? <ul style="list-style-type: none"> ○ If no, how can energy be controlled or neutralized? • Is personal protective equipment or an engineering control required to protect employees from the energy source? <ul style="list-style-type: none"> ○ If yes, please specify. ○ If no, what is needed to lock valve closed? • Is there a bleed or drain valve to safely reduce system pressure and temperature and drain system? <ul style="list-style-type: none"> ○ If yes, please provide the location of the valve. ○ If no, how can the system's pressure and temperature be drained and reduced? 				
Special precautions not noted in the preceding questions or statements. (e.g., fire hazards, chemical reactions, required cool down periods).				
Recommendations or Comments				
Completed By (Signature and Printed Name):			Date:	
Reviewed By (Signature and Printed Name):			Date:	
Approved By (Signature and Printed Name):			Date:	

APPENDIX D
LOCKOUT/TAGOUT PROCEDURES

List of Lockout/Tagout Procedures

1. Generic
2. Cord and plug
3. Water treatment
4. Air handling equipment
5. Water pumps
6. Sump Pumps
7. Space heaters
8. Air Compressors
9. A/C units and heat pumps
10. Gas fired hot water heaters
11. Chillers
12. Boilers
13. Electric Hot Water Heaters
14. Water Tanks
15. Gas Furnaces

Lockout/Tagout Procedure Number 1

Equipment: Generic

Procedure

1. Verify the location of energy isolating devices and the magnitude of the energy.
2. Notify the affected employees and work control.
3. Shut down by the normal stopping procedure.
4. De-activate the energy isolating device(s).
5. Lock out the energy isolating device(s) with assigned individual lock(s).
6. Dissipate or restrain residual or stored energy.
7. Verify the isolation by attempting to start or by testing.
8. Perform the service.
9. Ensure that nonessential items have been removed and that the equipment is intact.
10. Check the work area to ensure that all employees have been safely positioned or removed from the area.
11. Verify that the controls are in neutral.
12. Remove the lockout devices and reenergize the machine or equipment.
13. Notify affected employees.

Lockout/Tagout Procedure Number 2

Equipment: All cord and plug equipment and tools.

1. Verify identity of energy sources and isolation devices.
 - a. Energy source is 110 volt electric.
 - b. No isolation device.
 - c. Cord and plug.
 - d. This unit might have a starting capacitor.
2. Notify the affected employees.
3. Shut down. Turn off the switch on the unit. Wait until all mechanical parts have stopped moving.
4. De-activate. Unplug the equipment from the outlet.
5. Lock out. Not necessary to lockout the equipment if it is going to be under your control the entire time. If you must leave the area for any reason, then you must attach your lock and tag to a plug lock on the plug.
6. Dissipate. Dissipate the capacitor if the unit has one.
7. Verify. Verify that the unit is de-energized by attempting to start the equipment using the on/off switch.
8. Perform the service.
9. Ensure that nonessential items have been removed and that the equipment is intact.
10. Check the work area to ensure that all employees have been safely positioned or removed from the area.
11. Verify that the controls are in neutral or off position.
12. Remove the lockout devices and reenergize the machine or equipment.
13. Notify affected employees.

Lockout/Tagout Procedure Number 3

Equipment: All water treatment systems.

1. Verify location of energy isolating devices and magnitude of energy.
 - a. 120 volt electricity
 - b. Treatment chemicals
 - c. Water
2. Notify the affected employees and work control.
3. Shut down: Shut down the equipment by turning off the switch on the unit.
4. De-activate the energy isolating device(s).
 - a. Unplug the equipment from the outlet
 - b. Turn off all water valves
 - c. Bleed water pressure by cracking open the line
 - d. Remove chemical suction hose from the container
 - e. Allow to drain back into the container
5. Lock out the energy isolating device(s) with assigned individual lock(s). Not necessary to lockout the equipment if it is going to be under your control the entire time. If you must leave the area for any reason, then you must attach your lock and tag to a plug lock on the plug.
6. Dissipate or restrain residual or stored energy. This unit does not have stored or residual energy.
7. Verify the isolation by attempting to start or by testing. Verify that the unit is de-energized by attempting to start the equipment using the on/off switch.
8. Perform the service.
9. Ensure that nonessential items have been removed and that the equipment is intact.
10. Check the work area to ensure that all employees have been safely positioned or removed from the area.
11. Verify that the on/off switch is in the off position.
12. Remove the lockout devices and reenergize the machine or equipment.
13. Notify affected employees.

Lockout/Tagout Procedure Number 4

Equipment: Air Handlers

1. Verify location of energy isolating devices and the magnitude of energy.
 - a. Electric – 120 to 480 volts
 - b. Starting capacitor (on some units)
 - c. Hot water
 - d. Cold water
2. Notify the affected employees and work control.
3. Shut down by the normal stopping procedure.
 - a. Turn off power at the control point
 - b. Turn off at breaker or toggle switch if equipped
 - c. Wait until fan has stopped moving
 - d. Shut off all water valves if necessary (this step usually isn't necessary)
4. De-activate the energy isolating device(s). Throw the disconnect to the off position.
5. Lock out the energy isolating device(s) with assigned individual lock(s).
6. Dissipate or restrain residual or stored energy. Some fan units have a starting capacitor. Bleed of stored electricity from the capacitor if equipped.
7. Verify the isolation by attempting to start or by testing.
8. Perform the service.
9. Ensure that nonessential items have been removed and that the equipment is intact.
10. Check the work area to ensure that all employees have been safely positioned or removed from the area.
11. Verify that the controls are in neutral or off position.
12. Remove the lockout devices and reenergize the machine or equipment.
13. Notify affected employees.

Lockout/Tagout Procedure Number 5

Equipment: Water Pumps

1. Verify location of energy isolating devices and the magnitude of energy.
 - a. Most pumps operate on 110 or 220 volt electricity.
 - b. Some pumps have knife switches for disconnects.
 - c. Some pumps may have starting capacitors.
 - d. Hot water pumps have hot water in and out. Gate or ball valves control water flow.
 - e. Cold water pumps have cold water in and out. Gate or ball valves control water flow.
2. Notify the affected employees and work control.
3. Shut down by the normal stopping procedure. Turn off the pump by opening the switch closest to the unit.
4. De-activate the energy isolating device(s).
 - a. If the pump has a knife switch, throw the switch to the off (open) position.
 - b. Move the breaker to the off (open) position.
 - c. Close all water valves, in and out.
5. Lock out the energy isolating device(s) with assigned individual lock(s).
 - a. Apply lock to knife switch. If not equipped with a knife switch, apply breaker lock to breaker.
 - b. Apply valve locks to water valves.
6. Dissipate or restrain residual or stored energy.
 - a. Dissipate the capacitor.
 - b. Drain water in lines.
 - c. Allow hot water lines to cool first.
7. Verify the isolation by attempting to start or by testing.
8. Perform the service.
9. Ensure that nonessential items have been removed and that the equipment is intact.
10. Check the work area to ensure that all employees have been safely positioned or removed from the area.
11. Verify that the controls are in neutral or off position.
12. Remove the lockout devices and reenergize the machine or equipment.
13. Notify affected employees.

Lockout/Tagout Procedure Number 6

Equipment: Sump Pumps

1. Verify location of energy isolating devices and the magnitude of energy.
 - a. Most units are 120 to 3 phase 480 volt electric cord and plug.
 - b. Most units have switches operated by a float ball.
2. Notify the affected employees and work control.
3. Shut down by the normal stopping procedure. Make sure toggle switch is in off (open) position.
4. De-activate the energy isolating device(s). Unplug the unit.
5. Lock out the closest disconnecting energy isolating device(s) with assigned individual lock (s). Not necessary to lockout the equipment if it is going to be under your control the entire time. If you must leave the area for any reason, then you must attach your lock and tag to a plug lock on the plug.
6. Dissipate or restrain residual or stored energy. Allow water to drain from the discharge line into the sump pit.
7. Verify the isolation by attempting to start or by testing.
8. Perform the service.
9. Ensure that nonessential items have been removed and that the equipment is intact.
10. Check the work area to ensure that all employees have been safely positioned or removed from the area.
11. Verify that the controls are in neutral.
12. Remove the lockout devices and reenergize the machine or equipment.
13. Notify affected employees.

Lockout/Tagout Procedure Number 7

Equipment: Electric space heaters

1. Verify location of energy isolating devices and the magnitude of energy.
 - a. Most heaters operate on 120 or 208 volts electric.
 - b. Most have toggle switches and breakers.
2. Notify the affected employees and work control.
3. Shut down by the normal stopping procedure. Turn off the unit by placing the switch or breaker in off (open) position.
4. De-activate the energy isolating device(s). Place breaker in off (open) position.
5. Lock out the energy isolating device(s) with assigned individual lock(s).
6. Dissipate or restrain residual or stored energy. There is no residual energy.
7. Verify the isolation by attempting to start or by testing.
8. Perform the service.
9. Ensure that nonessential items have been removed and that the equipment is intact.
10. Check the work area to ensure that all employees have been safely positioned or removed from the area.
11. Verify that the controls are in neutral.
12. Remove the lockout devices and reenergize the machine or equipment.
13. Notify affected employees.

Lockout/Tagout Procedure Number 8

Equipment: Air Compressors

1. Verify location of energy isolating devices and the magnitude of energy.
 - a. Most air compressors operate on 120 to 480 volts electric.
 - b. Some compressors have toggle switches, some have push button controls, some have knife switch disconnects.
 - c. Compressed air in the line.
2. Notify the affected employees and work control.
3. Shut down by the normal stopping procedure.
4. De-activate the energy isolating device(s).
 - a. Throw the breaker to the off (open) position.
 - b. Throw the d/c to the off (open) position (if equipped).
5. Lock out the energy isolating device(s) with assigned individual lock(s).
6. Dissipate or restrain residual or stored energy.
 - a. Dissipate the capacitor.
 - b. Bleed off any air in the line.
7. Verify the isolation by attempting to start or by testing.
8. Perform the service.
9. Ensure that nonessential items have been removed and that the equipment is intact.
10. Check the work area to ensure that all employees have been safely positioned or removed from the area.
11. Verify that the controls are in neutral.
12. Remove the lockout devices and reenergize the machine or equipment.
13. Notify affected employees.

Lockout/Tagout Procedure Number 9

Equipment: A/C Units, Heat Pumps

1. Verify location of energy isolating devices and the magnitude of energy.
 - a. Most A/C units and heat pumps operate on 120 to 3 phase 480 volts electric.
 - b. Most have starting capacitors.
 - c. Refrigerant in the lines under pressure.
2. Notify the affected employees and work control.
3. Shut down by the normal stopping procedure.
4. De-activate the energy isolating device(s).
 - a. Throw knife switch to off (open) position.
 - b. Throw breaker to off (open) position.
5. Lock out the energy isolating device(s) with assigned individual lock(s).
6. Dissipate or restrain residual or stored energy.
 - a. Dissipate the capacitor.
 - b. Depending on the work to be performed, refrigerant lines may need to be drained and recovered.
7. Verify the isolation by attempting to start or by testing.
8. Perform the service.
9. Ensure that nonessential items have been removed and that the equipment is intact.
10. Check the work area to ensure that all employees have been safely positioned or removed from the area.
11. Verify that the controls are in neutral.
12. Remove the lockout devices and reenergize the machine or equipment.
13. Notify affected employees.

Lockout/Tagout Procedure Number 10

Equipment: Gas Fired Hot Water Heaters

1. Verify location of energy isolating devices and the magnitude of energy.
 - a. 120 volt electricity Natural gas with gas valves
 - b. Some units have electronic ignition
 - c. Hot water
 - d. Cold water
2. Notify the affected employees and work control.
3. Shut down by the normal stopping procedure.
4. De-activate the energy isolating device(s).
 - a. Turn gas cock to off (closed) position.
 - b. Throw switch to off (open) position.
 - c. Turn water valves to off (closed position)
5. Lock out the energy isolating device(s) with assigned individual lock(s).
6. Dissipate or restrain residual or stored energy.
 - a. Bleed any gas. BE SURE THERE ARE NO IGNITION SOURCES NEAR THE UNIT.
 - b. Bleed off water lines. LET HOT WATER COOL BEFORE BLEEDING.
7. Verify the isolation by attempting to start or by testing.
8. Perform the service.
9. Ensure that nonessential items have been removed and that the equipment is intact.
10. Check the work area to ensure that all employees have been safely positioned or removed from the area.
11. Verify that the controls are in neutral.
12. Remove the lockout devices and reenergize the machine or equipment.
13. Notify affected employees.

Lockout/Tagout Procedure Number 11

Equipment: Chiller Units

1. Verify location of energy isolating devices and the magnitude of energy.
 - a. 120 volt control circuit
 - b. 220, 480 or 4160 volt motor current
 - c. Refrigerant in the lines under pressure
2. Notify the affected employees and work control.
3. Shut down by the normal stopping procedure.
4. De-activate the energy isolating device(s).
 - a. Throw knife switch to off (open) position.
 - b. Throw breaker to off (open) position.
5. Lock out the energy isolating device(s) with assigned individual lock(s). Apply tags to all valves, switches, or other isolating devices
6. Dissipate or restrain residual or stored energy. Depending on the work to be performed, refrigerant may need to be recovered.
7. Verify the isolation by attempting to start or by testing.
8. Perform the service.
9. Ensure that nonessential items have been removed and that the equipment is intact.
10. Check the work area to ensure that all employees have been safely positioned or removed from the area.
11. Verify that the controls are in neutral.
12. Remove the lockout devices and reenergize the machine or equipment.
13. Notify affected employees.

Lockout/Tagout Procedure Number 12

Equipment: Boilers

1. Verify location of energy isolating devices and the magnitude of energy.
 - a. Most boilers have 110 volt control circuit and/or pilot ignition
 - b. D/C is usually a breaker
 - c. Fans can be 110 or 220 volt
 - d. Natural gas with ball valves
 - e. Fuel oil with outside stem and yoke (OSY)
 - f. Hot water with ball valves or OSY Feed water with ball valves or OSY
 - g. Steam with OSY
2. Notify the affected employees and work control.
3. Shut down by the normal stopping procedure.
 - a. Specific boilers may have different procedures – Refer to the operation and maintenance manual for details
 - b. Stop the burner
 - c. Shut off feed water pumps
 - d. Shut of condensate pumps
 - e. Shut of makeup valve to condensate pumps
 - f. Allow time to cool down
 - g. Isolate all valves
 - i. Feed water
 - ii. Condensate
 - iii. Steam stop
 - iv. Gas valves (Main, Pilot)
 - v. Fuel oil valves
 - h. Isolate pumps
 - i. Water feeds
 - ii. Condensate pumps
 - iii. Fuel pumps
 - i. Turn off control circuit
 - j. Isolate fans (ID FD)
 - k. Unplug water treatment pumps
4. De-activate the energy isolating device(s). This was done as part of shutdown procedure.
5. Lock out the energy isolating device(s) with assigned individual lock(s).
 - a. Apply tags to all valves, switches, or other isolating devices.
 - b. If boiler is down for the season or for major repair, tags are acceptable.
 - c. LOCKS MUST BE USED IF BOILER IS DOWN FOR SHORT REPAIR.
6. Dissipate or restrain residual or stored energy.
 - a. Fans may have capacitors, dissipate capacitors if equipped.
 - b. Drain steam, gas, water, oil lines as necessary.
7. Verify the isolation by attempting to start or by testing.
8. Perform the service.
9. Ensure that nonessential items have been removed and that the equipment is intact.

10. Check the work area to ensure that all employees have been safely positioned or removed from the area.
11. Verify that the controls are in neutral.
12. Remove the lockout devices and reenergize the machine or equipment.
13. Notify affected employees.

Lockout/Tagout Procedure Number 13

Equipment: Electric hot water heaters

1. Verify location of energy isolating devices and the magnitude of energy.
 - a. Energy is 110 volt electricity
 - b. Usually only isolating device is a breaker
 - c. Cold water in – ball or gate valve
 - d. Hot water out – ball or gate valve
2. Notify the affected employees and work control.
3. Shut down by the normal stopping procedure.
4. De-activate the energy isolating device(s).
5. Lock out the energy isolating device(s) with assigned individual lock(s).
6. Dissipate or restrain residual or stored energy. Drain water.
7. Verify the isolation by attempting to start or by testing.
8. Perform the service.
9. Ensure that nonessential items have been removed and that the equipment is intact.
10. Check the work area to ensure that all employees have been safely positioned or removed from the area.
11. Verify that the controls are in neutral.
12. Remove the lockout devices and reenergize the machine or equipment.
13. Notify affected employees.

Lockout/Tagout Procedure Number 14

Equipment: Water Tanks

1. Verify location of energy isolating devices and the magnitude of energy.
 - a. Usually the only source of energy will be from water, either hot or cold.
 - b. Gate, ball, or outside stem and yoke (OSY) valves.
2. Notify the affected employees and work control.
3. Shut down by the normal stopping procedure.
4. De-activate the energy isolating device(s).
 - a. Close all valves.
 - b. Allow to cool.
5. Lock out the energy isolating device(s) with assigned individual lock(s).
6. Dissipate or restrain residual or stored energy. Drain water.
7. Verify the isolation by attempting to start or by testing.
8. Perform the service.
9. Ensure that nonessential items have been removed and that the equipment is intact.
10. Check the work area to ensure that all employees have been safely positioned or removed from the area.
11. Verify that the controls are in neutral.
12. Remove the lockout devices and reenergize the machine or equipment.
13. Notify affected employees.

Lockout/Tagout Procedure Number 15

Equipment: Gas Furnace

1. Verify location of energy isolating devices and the magnitude of energy.
 - a. Either 110 or 220 electric – toggle switches and circuit breakers
 - b. Natural gas – gas valve
2. Notify the affected employees and work control.
3. Shut down by the normal stopping procedure.
4. De-activate the energy isolating device(s).
5. Lock out the energy isolating device(s) with assigned individual lock(s).
6. Dissipate or restrain residual or stored energy.
7. Verify the isolation by attempting to start or by testing.
8. Perform the service.
9. Ensure that nonessential items have been removed and that the equipment is intact.
10. Check the work area to ensure that all employees have been safely positioned or removed from the area.
11. Verify that the controls are in neutral.
12. Remove the lockout devices and reenergize the machine or equipment.
13. Notify affected employees.

APPENDIX E

KEY POINTS FOR LOCKOUT/TAGOUT TRAINING PROGRAM

Procedures developed, documented, and utilized for control of potentially hazardous energy.

Employer has provided locks, tags, chains, wedges, key block adapter pins, self-locking fasteners, or other hardware to isolate, secure, or block machines or equipment.

Lockout/tagout (LOTO) devices singularly identified.

LOTO devices are used only for controlling energy.

LOTO devices are not used for other purposes.

Durable LOTO devices must be capable of withstanding the environment to which they are exposed for the maximum period of time that exposure is expected.

Standardized LOTO devices must be standardized with each facility in at least color, shape, or size.

For tagout devices, also standardized print and format.

Tags must be legible and understandable.

Identifiable LOTO devices must indicate the identity of the employee applying the devices.

When major modifications are made to machinery electrical systems or when new machinery is installed, the energy source must be designed to accept a LOTO device.

Inspections are conducted annually by authorized employee other than those utilizing the LOTO procedures.

Inspections are designed to correct any deviations or inadequacies observed.

Inspections include a review of each authorized employee's responsibilities under the procedure(s). If tagout used, then they include a review of the limitations of tags.