CONTROL OF HAZARDOUS ENERGY PROGRAM (LOCK-OUT/TAG-OUT)

REED COLLEGE

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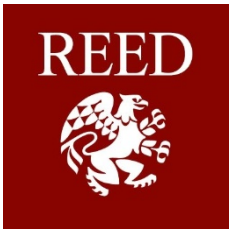

CONTROL OF HAZARDOUS ENERGY PROGRAM (LOCK-OUT/TAG-OUT)

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1.0 INTRODUCTION

This program is designed to protect employees and contractors of Reed College when performing maintenance or servicing activities on campus, and in the surrounding areas, from the unexpected start-up of equipment or the release of stored energy. It also is designed to protect Reed College employees and contractors from the unexpected start-up of equipment during tool changes and adjustments.

2.0 PURPOSE

This program establishes the minimum requirements for the Lockout or Tagout of energy isolating devices to protect Reed College employees.

> "*Energy Isolating Devices* are defined as: 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 underground supply conductors and, in addition, no pole can be operated independently, a side gate, a slip blind, a line valve, a block, and any similar device used to block or isolate energy. The term does *not* include a push button, selector switch, and other control type device."

The types of energy sources being addressed in this program are:

✓ Electrical ✓ Pneumatic ✓ Hydraulic ✓ Mechanical

Before a lockout or tagout is considered, the type of energy, magnitude of the energy and the potential hazards must be identified and addressed (see Appendix A).

3.0 RESPONSIBILITY

All employees and contractors of Reed College are required to comply with the restrictions and limitations of this program. Only *Authorized Employees* are required to perform the lockout/tagout in strict accordance with this program.

> ***All Reed College employees, upon observing a machine or piece of equipment that is locked out or tagged out to perform serving or maintenance, may NOT attempt to start, energize, or use that machine or equipment.***

ENVIRONMENTAL HEALTH AND SAFETY (EHS):

a) Assist supervisors in writing and implementing lockout/tagout program.
b) Work with supervisors in surveying the campus for systems and equipment requiring lockout/tagout during servicing and maintenance.
c) Review program annually and as needed to see that employees use the energy control procedures.
d) Modify the program as needed to address changes in regulations governing the program or through suggestions from workers and supervisors.
e) Conduct and document training sessions introducing the program to supervisors, affected employees, and new employees covered by the program.
f) Retain training records, including employee's names and date of training.

SUPERVISORS

a) Train their employees on the specific lockout/tag-out procedures required for systems and equipment serviced or maintained by their department.
b) Retain training records, including employee's names and date of training.
c) Choose and purchase devices necessary for implementing lockout/tag-out.
d) Enforce the use of lockout/tag-out procedures as part of their supervisory duties.
e) Inform contractors hired to service equipment of the lockout/tag-out procedures.
f) Work with EHS to locate systems and equipment on reed college property that require lockout/tag-out for servicing and maintenance.
g) Assist EHS with writing, implementing, updating, and evaluating the lockout/tag-out program.

AUTHORIZED EMPLOYEES

a) Are those who lock out or tag out machines or equipment in order to perform service or maintenance on that machine or equipment?
b) Attend training on recognizing, evaluating, and controlling hazardous energy.
c) Follow proper procedures when servicing or maintaining equipment or systems, which require lockout/tagout (see appendix A).
d) Work with supervisors and EHS to locate systems and equipment that require lockout/tagout for servicing and maintenance.

Authorized Employees are trained in the lockout procedures for each machine or piece of equipment that they are authorized to lock out or tag out. If an employee has not been trained on some machines or pieces of equipment, he/she may not lock out or tag out those machines or pieces of equipment.

AFFECTED EMPLOYEES

a) Are those whose job requires him/her to operate a machine or equipment on which service or maintenance is performed under lockout/tagout, or whose job requires him/her to work in an area where such service or maintenance is to be performed? An affected employee becomes an authorized employee when that employee's job requires performing service or maintenance covered by this program.
b) Attend training on the purpose and use of energy control procedures and the prohibition to attempt to restart or reenergize systems with lockout/tag-out procedures in place.

Continued...

4.0 PREPARATION FOR LOCKOUT OR TAGOUT

A survey of all equipment to locate and identify all isolating devices must be conducted by a qualified *Authorized Employee* to be certain which switch(es), valve(s), or other energy source may be involved.

Details concerning the type(s) and location(s) of energy isolating means for specific equipment can be found by reviewing that equipment's individual Lockout/Tagout Procedure (See Appendix C).

5.0 SEQUENCE OF LOCKOUT OR TAGOUT PROCEDURES - (6 STEPS)

1. All affected Reed College employees are **notified** in advance that a Lockout or Tagout system is utilized and the reason it is necessary. The *Authorized Employee* will review the type and magnitude of the energy of the specific machine or equipment and will understand the **potential hazards** prior to initiating procedures.

   Note: If at any point there is a question concerning the procedure, the Reed College ***Authorized Employee is to stop, secure the area, and immediately contact his/her immediate supervisor.***

2. If the machine or equipment is operating, the *Authorized Employee* will **shut it down** by the normal stopping procedure (depress stop button, open toggle switch, etc.).

3. In accordance with the specific machine(s) or equipment(s) Lockout/Tagout procedures, the *Authorized Employee* operates the switch, valve, or other energy isolating device(s) so that the **equipment is isolated** from its energy source(s). Stored energy (such as that in elevated machine members, hydraulic/pneumatic systems, steam, electrical capacitance) is dissipated or restrained by the following methods:

Type of Stored Energy	Methods to Dissipate or Restrain
Electrical	Shut off main disconnect, Bleed Electrical Capacitance
Pneumatic	Close valve(s), Bleed Air Pressure, Lower Machine Members
Hydraulic	Close valve(s), Bleed Fluid/Pressure, Blocking, Lower Machine Members
Mechanical	Blocking, Lower Machine Members

4. In accordance with the specific machine's or equipment's Lockout/Tagout procedure, the *Authorized Employee* will **lockout and/or tagout** the energy isolating devices with assigned individual lock(s) and tag(s). Additional safety measures may be required on specific equipment.

5. After ensuring that no Reed College employees are exposed, and conducting a **check** to ensure the disconnection of all designated energy sources, the *Authorized Employee* operates 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 Test.

6. **The equipment is now safely locked out or tagged out.**

6.0 RESTORING MACHINES OR EQUIPMENT TO NORMAL PRODUCTION OPERATION - (6 STEPS)

When the servicing or maintenance is completed and the machine or equipment is ready to return to normal operating condition, the *Authorized Employee* takes the following steps:

7. **Check the machine or equipment** and the immediate area around the machine or equipment to ensure that nonessential items have been removed and that the machine or equipment components are operationally intact.
8. **Check the work area** to ensure that all Reed College employees have been safely positioned or removed from the area.
9. **Verify** that controls are in neutral.
10. After all the above steps have been completed and the guards have been reinstalled, **remove** all Lockout and/or Tagout devices in accordance with specific procedures.
11. **Notify** affected Reed College employees that the servicing and/or maintenance is completed and the machine or equipment is ready for use.
12. **Operate** the energy isolating device(s) in accordance with normal start up procedure to restore energy to the machine(s) or equipment.

7.0 PROCEDURE INVOLVING MORE THAN ONE PERSON

If more than one individual is required to lockout or tagout equipment, each places his/her own personal 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.

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 lock to secure the box or cabinet. As each person no longer needs to maintain his/her lockout protection, that person will remove his/her own lock from the box or cabinet.

For a listing of Reed College employees who are authorized for group Lockout/Tagout, see Appendix D. (*Note: single-lock group lockout is prohibited in all industries; all locks must be unique for each qualified individual. See OR-OSHA Admin. Order 2-1990, f. 1/19/90, ef. 3/1/90 and OR-OSHA Admin. Order 12-2001, f. 10/26/01, ef. 10/26/01)

8.0 PERIODIC INSPECTIONS

An *Authorized Employee*, other than the ones utilizing the Lockout/Tagout Procedures being inspected, makes periodic inspections. These inspections are documented on the Inspection Form for Site Lockout/Tagout Procedures (See Appendix E).

9.0 LONG DURATION LOCKOUT/TAGOUT

For long duration lockout/tagout (such as new construction, major repairs, etc.), locks may be applied by maintenance personnel, Site engineers (if work is done by outside contractors), or senior maintenance managers. A tag with a short description of why the equipment is locked out and signed by the employee is attached to the lock.

Each employee must attach his/her own lock to the energy isolating device during each time he/she works on the machine or equipment, even though a "Long Duration" lock is attached.

10.0 SHIFT OF PERSONNEL CHANGES

If work has begun and carries over to the next shift, the oncoming crew attaches its own Locks and/or Tags before the outgoing crew removes theirs.

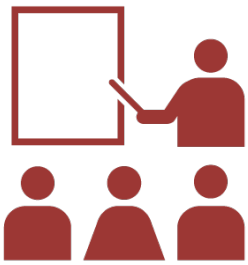
11.0 CONTRACTORS

Prior to work being performed, an *Authorized Employee* and the contractor inform each other of their respective lockout/tagout policy/procedures. If the contractor's lockout/tagout procedures are to be utilized, all affected Reed College employees are instructed on the restrictions and prohibitions of the contractor's procedures.

12.0 TRAINING

Initial Training:

1. Reed College certifies that employee training has been completed and is being kept up to date. The certification contains each employee's name and dates of training.
2. Authorized employee training includes:
   a) Recognition of hazardous energy sources.
   b) Type and magnitude of energy in the workplace.
   c) Methods for energy isolation/control.
3. Affected employee training includes:
   a) Purpose and use of energy control procedure.
   b) Procedures for proper interrupting of lockout/tagout.
   c) Prohibition on restarting machines or equipment.



Retraining:

1. Employees will retrain when:
   a) Job assignments change.
   b) Machine, equipment, or processes present new hazards.
   c) Energy control procedures change.
   d) When disciplined on not Locking out.

13.0 ADDITIONAL POINTS

1. Anyone placing his/her lock and/or tag on a machine or equipment must realize the importance of promptly removing his/her lock and/or tag when the work is completed; otherwise, delay and confusion can result until such person can be located.

Upon return to the Site, the employee who forgot to unlock his/her lockout device and/or remove his/her tag will be issued a warning for negligence.

2. If a Reed College employee needs to operate the locked/tagged equipment during normal working hours, he/she is to notify the Physical Plant at ext. 7283, giving the location of the equipment and the name or initials of the individual who signed the tag.

3. If an employee must operate the locked/tagged equipment outside of normal working hours, notify the on-call technician (pager number 817-2244), giving the location of the equipment and the name or initials of the individual who signed the tag. The on-call technician must contact the person who applied the lock/tag and the maintenance manager for permission to over-ride the lockout/tag-out.

After a complete inspection of the machine(s) and/or equipment and visually locating all Reed College employees in the machine area, he/she may unlock the energy isolating device in accordance following the steps in section 6.0 Restoring Machines or Equipment to Normal Production Operations described above.

4. Under no circumstances may any Reed College employee other than the authorized employee who placed the tag or his/her supervisor remove any locks/tags. Failure to follow these rules may result in disciplinary action.
5. Outside contractors must use lockout/tag-out procedures when working on equipment. Supervisors showing the equipment to the contractors must inform them of the procedures and supply locks and keys if necessary before work begins. The contractor must follow the "one worker, one lock, one key" policy.
6. Disciplinary Measures

Initial: First time, not serious violation, did not know procedure.	Verbal warning, along with a review of the procedure with employee. Violator will be instructed that further violations might result in formal disciplinary action.
Willful: Knowingly violating procedure.	Written warning and instruction that further violation may result in suspension and/or possible termination. Forward a copy of warning to Human Resource office to be, put in personnel file.
Suspension: Prior violation of procedure or severity of violation.	Violator is immediately sent home from work when supervisor observes violation. Consultation with Human Resources will determine how long the suspension will last.
Permanent Termination of Employment:	The next violation following suspension may result in permanent termination of employment.

14.0 EMPLOYEE SIGN OFF

I have received a copy of the Reed College Lockout/Tagout Program and have read and understood it. I also understand that failure to comply with the procedures outlined in this program will result in disciplinary action.

Employee Signature:		**Date:**	
Department:		**Shift:**	
Supervisor Signature:		**Date:**	

Appendix A

Energy Sources

Type of Energy	Magnitude of Energy	Hazards
1. Electrical		
2. Pneumatic		
3. Hydraulic		
4. Mechanical		

Appendix B *Authorized Employees* List

The following Reed College employees have been trained in the lockout procedures and are authorized to lockout any piece of equipment.

Employee Name	Job Title	Shift

The following Reed College employees have been trained in the lockout procedures related to the following equipment and may lockout only the following pieces of equipment:

Equipment:

_____

_____

_____

_____

Employee Name	Job Title	Shift

Appendix C List of Equipment, Location and Isolation Source
Lockout/Tagout Procedures Form
Procedures Form Instructions

EQUIPMENT REQUIRING LOCKOUT/TAGOUT PROCEDURES

a) Electrical:

a) Power tools and devices have electrical disconnect switches because accidental energizing could cause electrical shock or injuries. Lock out equipment at the disconnect switch mounted on the machine or down line. Locate electrical panels or sub-panels and lock out/tag off individual breakers. Lock/tag out the panel cover, as well. Check equipment for more than one energy source to lockout/tag-out. (Exception: Any work on cord and plug connected electric equipment that is controlled by the unplugging of the equipment from the energy source and the plug is under the exclusive control of the employee performing the servicing or maintenance.)

b) Table saws, band saws, radial arm saws requiring service, which do not fall under the exception noted above, must use lockout/tag-out procedures.

c) Fume hoods: Protect workers replacing belts and performing other service on fume hood motors, pulleys, fans, ducts, etc. Protect building occupants and users of the hoods. Inform the hood users in advance of the shutdown to guarantee they do not use hazardous materials in the affected hoods. Tag hoods with warning signage. Verify the effectiveness of service or corrective actions before releasing the hoods for use. Measure open sash face velocity with a velometer (available from EHS) and document airflow.

d) HVAC units: Protect workers servicing motors, fans, pulleys, etc. from electrocution and/or the accidental activation of moving parts. Warn building occupants in advance of any shutdown that will affect indoor air quality.

e) Circuit breakers to circuits: Lock out/tag-out equipment that is hard wired and cannot be unplugged. Lock out/tag out the individual circuit. In some cases, lock out/tag out the panel or sub-panel.

f) For equipment that can be unplugged, a cover can be locked in place over the plug end, or secure a tag to the plugged end.

b) Compressed air:

a) Compressed air lines may or may not have valves available in line to isolate the section of the compressed air line being serviced. However, always lock out/tag out a valve. Install a bleeder valve on the line being serviced to prevent buildup of pressure due to compressed air leaking by the shut off valve.

b) Additional note: Use a compressed air line to supply air to a liquid system. Be aware of the possibility that when the unit is shut down, some of the liquid could be sucked into the compressed air line through the open valve. Check with the Stockroom Manager or departmental contact before beginning the work.

c) Compressors: Disconnect and lockout/tag-out the electrical supply. Open valve to bleed compressed air built up in the system. Check all gauges and replace any defective gauges noted. Secure a valve cover lock over the valve or lock with a chain to lockout/tag-out the valve. Keep a bleeder valve open on the line being serviced or the unit itself.

d) Quick disconnect line-supplied equipment: Disconnect the unit and tag the quick connect point to prevent accidental plugging in of the unit while being serviced.

c) Steam:

If boiler output lines require service, bleed steam out of any line being serviced.

Two methods are:

a) Turn off two valves and open a bleeder valve between the two valves. Do this down line, from where work is being done, so no steam pressure will build up due to leakage around a closed valve. Lock out and tag out valves. Use a chain, lock, or lockable valve cover.

b) Turn off supply line valve, open the flange, and install a blank flange or plate to block any possible flow of steam. Tag the joint involved and lock out the closed valve.

d) Gas:

Tag and lock out gas valves. Shutting off gas valves requires the relighting of pilot lights in furnaces and other equipment. Bleed off residual line gas pressure outside and away from sources of ignition before beginning work.

e) Roll Up Doors and Other Fire Doors:

Roll up steel doors and drop down steel doors are located in the following buildings on campus:

a) Art building sculpture studio
b) Commons servery
c) ETC stairwells
d) Eliot elevators (smoke screens)
e) GCC Hallway near GCC 104
f) Heating plant boiler room
g) Kaul Auditorium coatroom
h) Mailroom window
i) Sport center cage
j) Vollum College Center fire separation (horizontal) door
k) Warehouse

Some of these doors are under spring tension, some are under heavy counter weights, and some are electrically driven. If work is underway, block open the doors to prevent the door from dropping down. Follow all manufacturer guidelines for working safely on this type of door.

f) Hydraulic:

a) Hydraulic systems exist on personnel lifts, forklifts, tractors, and elevators. Whenever there is a planned release of hydraulic pressure in order to work on a piece of equipment, put the equipment in its lowest or fully released position before releasing the pressure.

b) Apply the necessary stop pins and/or blocks to prevent sudden release of equipment when working on a hydraulically controlled piece of equipment in a partially or fully raised condition. Before using any blocking devices while working on equipment, make sure they are rated for the correct load weight and properly installed.

c) If, as part of the repair, you need to replace a hydraulic line or fitting, bleed down the line to remove pressure and to prevent leakage of fluid. Lockout/tag-out the power supply as specified in the six-step procedure of the lockout/tag-out program.

LIST OF OTHER EQUIPMENT, LOCATIONS AND ISOLATION SOURCES

Equipment	Location	Isolation Source

Appendix C Continues...

Appendix C (continued)

LOCKOUT/TAGOUT PROCEDURES FORM

1. **Equipment:**			
2. **General**			
a. **Energy Source(s)**	b. **Magnitude**	c. **Hazard(s)**	d. **Personal Protective Equipment**

3. **Caution!!**	*Shut-down equipment by using normal stopping procedures prior to initiating lockout/tagout procedure.*

4. **Energy Isolating Means**			
a. **Energy Source(s)**	b. **Description of Equipment**	c. **Location**	d. **Lockout/Tagout**

5. **Types of Stored Energy**		
a. **Energy Source(s) with Residual Energy**	b. **Magnitude**	c. **Methods Used to Dissipate Residual Energy**

6. **Types of Equipment to Check to Ensure Disconnections**				
a. **Description of Equipment*** ****See Previous Page for List***	b. ***Authorized Employee***	c. **Location**	d. **Method**	e. **Process / Procedure**

CAUTION: Return operating control(s) to "neutral" or "off" position after each test.

At this point, the equipment is safely locked- and/or tagged-out.

Start-up Procedures:

- After all tools have been removed from the machine(s) or equipment, guards have been reinstalled and Reed College employees are in the clear, remove all lockout and/or tagout devices in reverse order of installation.
- Operate the energy isolating device(s) in accordance with normal start-up procedure to restore energy to the machine(s) or equipment.

Appendix C Continues...

Appendix C (continued)

Instructions for Completing the Lockout/Tagout Procedures Form

1. Identify the **specific** equipment to be locked- and/or tagged-out.
2. General (Refer to Appendix G Source/Magnitude Energy Isolating Means List for assistance).
   a. Identify and list all energy sources.
   b. List magnitude for each energy source.
   c. List associated physical/health hazards relative to each energy source. Examples include electrical shock and compressed gas/fluid.
   d. For each energy source, identify personal protective equipment (PPE), if applicable, necessary to ensure employee safety while performing the procedure.
3. **Caution!!**

   These sections are awareness sections, reminding the *Authorized Employee*(s) performing the lockout/tagout of what procedures need to be performed **prior** to initializing a safe shut-down.
4. Energy Isolating Means.
   a. Assign order of importance to energy sources to ensure optimum employee safety.
   b. Describe the equipment which qualifies as an energy isolating device and its associated label.
   c. Describe the specific location of the energy isolating device.
   d. Determine whether a lockout or tagout is appropriate.
5. Types of Stored Energy.
   a. Is residual energy present? Assign order of importance to those energy sources which retain "residual energy".
   b. After the lockout/tagout sequence has been performed in the energy isolating means section, identify the residual energy magnitude. NOTE: This may be in the form of electrical capacitance, line pressure (pneumatic, hydraulic, steam, chemical), or mechanical, etc.
   c. Specifically identify the method used to safely dissipate the residual energy for the energy source.
6. Types of Equipment to Check to Ensure Disconnection.
   a. Describe the equipment pertaining to the energy source. Examples include: control panel, operator controls, and pneumatic gauge.
   b. List the *Authorized Employee*(s) who would be viewing and/or manipulating equipment to ensure disconnection.
   c. Identify the specific location of the energy source.
   d. List the methods or equipment used to ensure the disconnection.
   e. Describe the process or procedure the *Authorized Employee* would utilize. Examples include: activate toggle switch, no movement should occur, or pneumatic gauge should read 0 psi.

Appendix D

Employees Authorized For Group Lockout/Tagout

Employee Name	Job Title	Shift

(*Note: single-lock group lockout is prohibited in all industries; all locks must be unique for each qualified individual. See OR-OSHA Admin. Order 2-1990, f. 1/19/90, ef. 3/1/90 and OR-OSHA Admin. Order 12-2001, f. 10/26/01, ef. 10/26/01)

Appendix E

INSPECTION FORM FOR SITE LOCKOUT/TAGOUT PROCEDURES

1. What machine is the crew working on?

2. Is the specific machine or equipment Lockout/Tagout Procedures form present in the immediate work area?

Yes		No		If not, explain:	

3. Has the main power source(s) been identified?

Yes		No		If not, explain:	

4. Other energy sources identified? Describe.

5. Has the machine and/or equipment been tested for inadvertent start-up prior to work being performed?

Yes		No		If not, explain:	

6. Number and names of the Reed College employees working on machine?

Employee Name	Lock/Tag Attached?				Key On Person?			
	Yes		No		Yes		No	
	Yes		No		Yes		No	

7. Were the locks and tags property identified?

Yes		No		If not, whose were not:	

8. Will the work be completed this shift?

Yes		No		

If no, have arrangements been made to inform the next crew?

Yes		No		

9. Have the extra keys been identified and locked up in the maintenance office?

Yes		No		

If no, have arrangements been made to inform the next crew?

Yes		No		

10. Who made the inspection?

Signature of Maintenance Foreman		Date	Time	
				am/pm

Appendix F

Extra Keys For Lockout

If it becomes necessary to use the extra keys to remove lockout devices from an energy isolating device(s), see Section 13, "Additional Points" paragraphs 1-3 of the General Lockout / Tagout System Procedures.

→ *These procedures must be followed step-by-step to ensure the safety of you and your fellow Reed College employees.*

1.				
	Key Number	Date	Time	Reason for Using Extra Key
	Signature of Foreman		Signature of Qualified Employee	
	Key Returned	Date	Time	Signature, Title
2.				
	Key Number	Date	Time	Reason for Using Extra Key
	Signature of Foreman		Signature of Qualified Employee	
	Key Returned	Date	Time	Signature, Title

Appendix G

Employees Authorized To Instruct Other Employees

Employee Name	Job Title	Shift	Equipment

Appendix H

Lockout/Tagout Decision Matrix

Equipment:	

1. Does the equipment have the potential for stored or residual energy or re-accumulation of stored energy after shut-down which could endanger Reed College employees?

No		Yes	

2. Will the service or maintenance create hazards for other the Reed College employees?

No		Yes	

3. The equipment has a single energy source which is readily identified and isolated.

Yes		No	

4. Will the isolation and lockout of that energy source completely de-energize and de-activate the equipment?

Yes		No	

A machine-specific lockout / tagout program IS NECESSARY to protect Reed College **employees engaged in hazardous servicing and maintenance of equipment.**

5. Is the equipment isolated from that energy source and locked-out during servicing or maintenance?

Yes		No	

6. Will a single lockout device completely isolate this equipment?

Yes		No	

7. Is the lockout device under the exclusive control of the *Authorized Employee* performing the servicing or maintenance?

Yes		No	

8. Have there been any accidents involving the unexpected activation or re-energization of this equipment while performing service or maintenance?

No		Yes	

A machine-specific, written, lockout/tagout procedure is not required, although the sequence of Lockout or Tagout System Procedure must be followed (i.e., equipment test and return controls to neutral).

Appendix I

Definitions

Block or Brace – a physical barrier that is inserted into the energy path to physically prevent movement and help prevent the accidental release of equipment due to gravity or spring tension. A blank flange will block the flow of steam or other hazard to workers servicing a line that has no bleed valve.

Hazardous energy – energy of such magnitude that, if not controlled, can injure a worker. Found in the workplace, different forms include electrical, mechanical, hydraulic, pneumatic, chemical, and thermal.

Hot tap – a procedure used in the repair, maintenance, and service activities. It involves welding on a piece of equipment (pipelines, vessels or tanks) under pressure, in order to install connections. Use it to replace or add sections of pipeline without the interruption of service.

Lockout – the placement of a mechanical lockout device on an energy isolation device and following established procedures to ensure that the energy isolating device and the controlled equipment cannot be operated until that device is removed.

Lockout Device – a device that can only be opened or removed by means of a key that be installed on a disconnect switch, circuit breaker, valve or other energy isolating mechanism to lock it in the safe or off position. Where more than one worker will be involved in servicing the equipment it must be capable of accepting additional locks through the use of a multiple holed hasp.

One worker, one lock, and one key – the overriding lockout/tag-out requirement. Each worker needing to lock out equipment has assigned locks that are number-coded and unique. That worker has the only key that opens the number-coded locks and retains possession of that key when he/she locks and tags out and works on the piece of equipment. The equipment is re-energized only when work on the equipment is complete and all workers have removed their locks and tags. Exception: The Maintenance Manager will have a master key to the locks for the lockout/tag-out program. The manager will use this key to remove a lock only after the worker who applied the lock is accounted for. The Maintenance Manager needs to understand the responsibility and potential consequences should the “one worker, one lock, one key” policy be defeated by improper use of the master key.

Tagout device – placement of a written warning tag stating that an energy isolating disconnects switch, circuit breaker, valve, etc. is in the safe or off position. The device must be durable; the material securing the tag must be substantial so it will not come off easily. (With stand 50 pounds of force to remove it), and the tag must have a place to identify the person who applied the tag-out. Whenever possible, it is safest to combine both lockout and tag-out devices.

Standardized. Lockout and tagout devices shall be standardized within the facility in at least one of the following criteria: Color; shape; or size; and additionally, in the case of tagout devices, print and format shall be standardized.

Periodic inspection. An inspection, conducted every so often on a regular of ad hoc basis, of work place conditions and practices designed to identify injury and illness hazards to persons and damage risks to property.

Appendix J

Lockout / Tagout ***Quiz***

Name _____ **Date** _____

1. Place numbers from 1 to 7 in the blanks indicating the correct order of steps to be taken in lockout/tagout:

   ___ Isolate equipment

   ___ Verify isolation

   ___ Control stored energy

   ___ Shut down equipment

   ___ Prepare for shutdown

   ___ Apply lockout/tagout devices

   ___ Removal of locks

2. Lockout/Tagout is a system used to ensure that equipment you've isolated and de-energized to work on remains shut down.

   True___ or False___

3. In a tagout, a tag is placed on all primary and secondary energy sources.

   True___ or False___

4. You know the equipment is safe when the power has been shut down.

   True___ or False___

5. It's a good idea to have a pre-job briefing with your co-workers before a lockout operation.

   True___ or False___

6. Locks should be removed only by the person who installed them.

   True___ or False___

7. Kinetic energy is energy an object has when it is in motion.

   True___ or False___

8. In preparing for a shutdown, gravity is not a concern.

   True___ or False___

9. Which of the following must an employee know before starting to work on a piece of equipment: *(circle all correct answers)*

   a. Types of energy to be controlled

   b. Magnitude of energy to be controlled

   c. Hazards of energy to be controlled

   d. Method and means to control the energy

10. Which of the following must be notified prior to equipment shutdown for repair? *(circle all correct answers)*

a. Site manager
b. Supervisor
c. Safety person
d. Affected Reed College employees

11. Which of the following would be part of equipment *isolation*? *(circle all correct answers)*

a. Closing valves
b. Locking out feeders
c. Turning off power
d. Releasing hydraulic pressure
e. Releasing steam pressure
f. Blocking movement of parts
g. Releasing spring tension

12. Locks are located at each: *(circle all correct answers)*

a. Electric panel
b. Switch
c. Water valve
d. Energy isolating device

13. Which of the following would be part of control of stored energy? *(circle all correct answers)*

a. Closing valves
b. Locking out feeders
c. Turning off power
d. Releasing hydraulic pressure
e. Releasing steam pressure
f. Blocking movement of parts
g. Releasing spring tension

14. *Verifying isolation* involves: *(circle all correct answers)*

a. Putting locks on the equipment
b. Putting a tag on the equipment
c. Attempting to turn the machine on