Lockout/Tagout
Control of Hazardous Energy
Sample Program

Prepared for:

UnitedHeartland

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I. INTRODUCTION

As part of the organization's overall safety and health program, a lockout program has been established. The program is designed to assist with compliance of the Occupational Safety and Health Administration (OSHA) Control of Hazardous Energy Standard.

II. OBJECTIVE

The objective of the program is to prevent occupational injuries and illnesses related to the unexpected energization of equipment during maintenance or servicing activities. It is intended to meet the requirements of OSHA 29 CFR 1910.147.

III. SCOPE

This program covers the servicing and maintenance of machines and equipment in which the unexpected energization or startup of the machines or equipment, or release of stored energy could cause injury to employees. This program establishes minimum performance requirements for the control of such hazardous energy.

IV. PROGRAM COORDINATOR

Lockout program coordinator name and title: _____

V. APPLICABILITY

This policy applies to all Organization employees. Visitors, contractors, subcontractors, and vendors will utilize this program unless their own internal program offers an equal or greater amount of protection. When these individuals choose to utilize a program that substantially deviates from this program, they shall communicate their lockout/tagout procedures to the Lockout Program Coordinator prior to the start of work.

VI. PENALTY FOR NON-COMPLIANCE

Each employee is expected to work safely as a condition of employment. Failure to comply with established safety regulations and safe practices may result in disciplinary action. Willful disregard for safe practices, which results in serious injury or property damage, may be grounds for termination.

VII. GENERAL

This procedure covers the servicing and maintenance of machines and equipment in which the "unexpected" energization or startup of the machines or equipment, or release of stored energy could cause injury to employees. This procedure establishes minimum performance requirements for the control of such hazardous energy. Maintenance and/or servicing which takes place during normal production operations is covered by this procedure only if:

- an employee is required to remove or bypass a guard or other safety device
- an employee is required to place any part of his or her body into an area on a machine or piece of equipment at the point of operation or where an associated danger zone exists during a machine operating cycle

The exception to this is minor tool changes and adjustments and other minor servicing activities, which take place during normal production operations. These activities include those that are routine, repetitive, and integral to the

use of the equipment for production, provided that the work performed uses alternative measures, which provide effective protection for the employee.

This procedure does not apply to work on cord and plug connected electric equipment if the employee has exclusive control of the disconnected cord and plug.

Lockout or tagout devices shall not be used on machinery or equipment that is designated to be removed from service. Equipment that has been removed from service shall be locked or tagged using materials specified for that purpose.

VIII. DEFINITIONS

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

B. Authorized Employee: A person who locks or implements a tagout system procedure on machines or equipment to perform the servicing or maintenance on that machine or equipment. An authorized employee and an affected employee may be the same person when the affected employee's duties also include performing maintenance or service on the equipment they operate.

C. Energized: Connected to an energy source or containing residual or stored energy.

D. 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 slide 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 circuit type devices.

E. 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.

F. Lockout device: A device that utilizes a positive means such as a lock, either key or combination type, to hold an energy isolating device in the safe position and prevent the energizing of a machine or equipment.

G. Maintenance and/or Servicing: 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 un-jamming 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.

H. 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 alone can only be used when a machine is not capable of being locked out. This is generally very rare and should be avoided.

I. 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.

IX. ENERGY CONTROL PROGRAM

Authorization – Only authorized employees who have been trained in the type and magnitude of the energy, the hazards of the energy, the methods or means of isolating and/or controlling energy, the means of verification of effective energy control, and the purpose of the procedures to be used may begin to perform maintenance or servicing of machinery or equipment under lockout/tagout procedures.

X. SPECIAL PROCEDURES FOR MULTIPLE ENERGY SOURCES

Where machinery or equipment with multiple energy sources exist, a procedure shall be developed to lockout these specific machines or equipment. A Zero Energy State Procedure (ZESP) is a procedure established for machinery or equipment with two or more energy sources. The ZESP is intended to guide authorized employees through multiple lockout methods required to achieve a zero-energy state. Each ZESP shall include instructions on the existing energy sources and their location, method(s) to isolate the energy, and the steps required to verify that a zero-energy state has been achieved.

A. ZESP Development

Departments possessing machinery or equipment that utilizes two or more energy sources shall develop a ZESP for each of these specific machines and equipment. The ZESP shall be developed prior to the installation of the equipment, or as soon as practical after installation.

The ZESP shall be developed by the department supervisor where the machine or equipment exists. (See Appendix 2, 3 and 4)

The ZESP will be made available to all authorized employees by attaching the ZESP to the machine or equipment.

Each department possessing machinery or equipment that utilizes two or more energy sources shall maintain a ZESP file. The ZESP file shall always be available for review by authorized and effected employees or OSHA Compliance Officers.

B. ZESP Procedure for Authorized Employees

In situations where multiple energy source machinery or equipment requires maintenance or servicing, the authorized employee shall follow the procedures listed below:

1. Identification of the ZESP – before lockout or tagout procedures begin, the authorized employee shall determine that a ZESP is needed for the equipment they will be working on. The authorized employee shall locate the ZESP on the machine or equipment. If no ZESP is found, the department supervisor shall be notified immediately. No work shall be performed on equipment that requires a ZESP, until a ZESP has been developed.
2. Use the ZESP to apply energy controls – before the energy on machinery or equipment is isolated, review the information on the ZESP so that you are familiar with the type and location of the energy sources, the method to control each energy source, and how to verify that each energy source is isolated. Then, follow the procedure for Application of Lockout or Tagout.

3. Verify that no other energy sources exist – inspect the machine or equipment to ensure that there are no additional energy sources to be controlled.
4. Perform required servicing or maintenance work.
5. Release the energy controls – when the servicing or maintenance work is complete, follow the procedure for Release from Lockout or Tagout.

XI. HARDWARE & MATERIALS

The hardware and materials used for the lockout/tagout of equipment shall conform to the following requirements.

A. Lockout devices must be identified as such and not used for any other purpose.
B. Each lock will have a plastic identification label attached. The label will indicate the employee's first and last name.
C. All locks, tags, chains, blocks, clips, or other hardware will be supplied by the authorized employee's department.
D. Both lockout and tagout devices must be capable of withstanding environmental conditions in the workplace (locks should not rust, or tags deteriorate).
E. All identification devices will be standard with "DO NOT OPERATE" warning.
F. Each authorized employee will need an ample supply of locks to secure equipment. Each lock will only have one key.

XII. PERIODIC INSPECTION

Periodic inspections will be conducted, at least annually, to ensure compliance with this program. The authorized employee's supervisor or the Program Coordinator will perform these inspections. The inspection will be conducted to ensure that _____ procedure and the requirements of 29 CFR 1910.147 are being complied with. If any deviations or inadequacies are identified, retraining shall occur for all authorized employees. If deficiencies in the ZESPs are identified, the procedure must be corrected, and authorized employees must be made of aware of the correction.

The inspection will be conducted to assess the authorized employee's knowledge of their responsibilities and the procedures under the energy control procedure being inspected. The inspector shall certify that the periodic inspection was completed using the Lockout Periodic Inspection form. The certification will be filed with Program Coordinator, along with comments regarding where problems may exist and/or where additional training may be necessary. (See Appendix 5)

All ZESPs shall be reviewed each year to ensure they remain appropriate for the equipment.

XIII. TRAINING

Training will be provided to employees as follows:

A. Authorized Employees
Authorized employees will be trained in recognition of the type and magnitude of hazardous energy sources, the hazards of the energy, the methods or means necessary for isolating and/or controlling energy, the means of

verification of effective energy control, and the purpose of the lockout/tagout procedures to be used. (See Appendix 1)

Training will also be provided concerning the tagout system and the limitations associated with tagout, including:

1. Only those tags which have been approved by the Organization will be used as a part of the program.
2. Tags are warning devices and do not provide the physical restraint that is provided by a lock.
3. Tags are to be removed only by the authorized employee responsible for the tags, and they shall never be bypassed, ignored, or otherwise defeated.
4. Tags must be legible and understandable to all employees to be effective.
5. Tags and their means of attachment must be able to withstand environmental conditions encountered in the workplace.
6. Tags may evoke a false sense of security, and their meaning needs to be understood as part of the overall energy control program.
7. Tags must be securely attached to energy isolating devices so that they cannot be detached during use.
8. Tagout device attachment means shall be non-reusable, attachable by hand, and self-locking with a minimum unlocking strength of no less than 50 pounds.
9. A tag shall never be used in place of a lock on an energy-isolating device that is capable of being locked.

B. Affected Employees
Affected employees will be instructed in the purpose and use of this energy control procedure. They will also be instructed not to defeat or remove any lockout or tagout device.

C. Other Employees
Those who work in an area where energy control procedures may be utilized shall be instructed about the purpose of this procedure and prohibition on tampering or attempting to restart or reenergize machines or equipment which have been locked out or tagged out.

Employee retraining will be accomplished:

1. Whenever there is change in 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.
2. Whenever a periodic inspection reveals or whenever there are deviations from or inadequacies in an employee's knowledge or use of the energy control procedures.
3. To reestablish employee proficiency or to introduce new or revised control methods and procedures.

All training will be certified by employee name and date of training. Records will be maintained by the Program

Coordinator.

XIV. ENERGY ISOLATION – APPLICATION OF LOCKOUT OR TAGOUT

The following information relates to the steps to be followed before work on equipment or machinery has been started. Application of lockout or tagout shall be performed in the following sequence:

A. Notification: before lockout or tagout procedures begin, employees who operate the machine or equipment or those who work in the area around the machine or equipment must be notified that a procedure under lockout or tagout will be performed on their machine or equipment. The notification may be made by the employee performing the work or by a designated Organization employee.
B. Preparation for Shutdown: Before a machine or piece of equipment is isolated, the employee(s) who will perform the lockout or tagout must have the knowledge of the type and magnitude of the energy, the hazards of the energy to be controlled, the method or means of isolating and/or controlling the energy, the means of verification of effective energy control, and the purpose of the procedures to be used.

C. Machine or Equipment Shutdown: The machine or equipment must be shut down in an orderly fashion in order to avoid any additional or increased hazard(s) to employees or damage to the machine or equipment as a result of the de-energization.
D. Machine or Equipment Isolation: All energy isolating devices that are needed to control the energy to the machine or equipment must be physically located and operated in such a manner as to isolate the machine or equipment from the energy source(s).
E. Applying Lockout or Tagout Devices: A lockout device must be attached to each energy-isolating device by the person(s) performing the lockout. These must be placed in a manner so that they will hold the energy isolating devices in a safe or off position.
    1. If tagout devices are used, they must clearly indicate that the operation or movement of energy isolating devices from the safe or off position is prohibited.
    2. A tag shall never be used in place of a lock on an energy-isolating device that is capable of being locked.
    3. If a tag cannot be attached directly to an energy isolating device, it must be located as close as safely possible to the device, in a position that will be immediately obvious to anyone attempting to operate the device.
F. Stored Energy: Following the application of lockout or tagout devices to energy isolating devices, all potentially hazardous stored or residual energy must be relieved, disconnected, restrained or otherwise controlled. If there is a danger that the stored energy will re-accumulate to a hazardous level, you must continue to verify isolation until the servicing or maintenance is completed, or until the possibility of such accumulation no longer exists.
G. Verification of Isolation: Before starting work on a machine or equipment, the authorized employee must verify that the isolation and de-energization of the machine or equipment has been effective. This includes but is not limited to:
    1. Mechanical: checking the position for valves and blanking lines, utilizing pressure gauges to determine if supply is under pressure or in a vacuum state, and ensuring blocks or other devices are in place to isolate movement.
    2. Electrical: A qualified person shall use test equipment to test the circuit elements and electrical parts that are exposed to verify that parts are de-energized; determine if any energized condition exists from inadvertently induced voltage or back-fed voltage even though specific circuits are presumed to be de-energized; and if testing over 600 volts nominal, test equipment shall be checked immediately before and after test.

XV. RELEASE FROM LOCKOUT OR TAGOUT

The following information relates to the steps to be followed once the work or activity on equipment or machinery has been completed and the unit is to be placed in service. Release from Lockout or Tagout shall be performed in the following sequence:

Inspect the Work Area: ensure that all non-essential items and employees have been removed or safely positioned, and machine or equipment components are operationally ready.

Removal of Lockout or Tagout Devices: each lockout or tagout device shall be removed by the employee who applied the device.

Employee Notification: after lockout or tagout devices have been removed and before the machine or equipment is started, affected employees shall be notified that the lockout or tagout device(s) have been removed.

Follow the machine or equipment's specific startup procedures.

XVI. LOCKOUT REMOVAL PROCEDURE WHEN THE EMPLOYEE WHO APPLIED THE DEVICE IS NOT AVAILABLE

If the authorized employee who applied the lockout device is not available to remove it, the device may be removed by the supervisor if:

A. The authorized employee who applied the device is not in the building.
B. A reasonable effort is made to contact the employee to advise them of the device removal.
C. The employee has been advised before they resume work.
D. The supervisor removes the employee's lock and applies their own lock in its place.
E. The supervisor notifies the employee that their lock was removed as soon as they return to work.
F. All other Release from Lockout or Tagout Procedures are followed

XVII. TESTING OR POSITIONING MACHINES AND EQUIPMENT

In situations where lockout or tagout devices need to be temporarily removed from the energy isolating for testing or positioning, the procedure below shall be followed:

A. Inspect the Work Area: ensure that all non-essential items and employees have been removed or safely positioned, and machine or equipment components are operationally ready.
B. Removal of Lockout or Tagout Devices: each lockout or tagout device shall be removed by the employee who applied the device.
C. Employee Notification: after lockout or tagout devices have been removed and before the machine or equipment is started, affected employees shall be notified that the lockout or tagout device(s) have been removed.
D. Energize and proceed with testing or positioning.
E. Re-apply lockout or tagout devices: de-energize all systems and re-apply locks and tags following the energy control procedures for the application of lockout/tagout. Disregard this step if the equipment functions properly, and no further maintenance activities will be occurring.

XVIII. GROUP LOCKOUT

When maintenance and/or service work is performed by more than one employee or in conjunction with another department, group, or contractor, a procedure shall be utilized which affords each employee a level of protection

equivalent to that provided by the implementation of a personal lockout or tagout device. The following requirements apply for group lockout or tagout:

A. When machine or equipment maintenance or servicing involves more than one employee and/or more than one crew (including contractors) or department each employee shall place their own lockout/tagout device on all energy isolation points. When an energy isolation device cannot accept multiple locks or tags, a multiple lockout or tagout device may be used.
B. If lockout is used, a single lock may be used at each energy isolation point to lockout the machine or equipment, with the key(s) for the lock(s) being placed in a lockout box or cabinet which allows for each employee to secure the box or cabinet.
C. As each employee completes their tasks, they will remove their lock(s) or tag(s) from the machine or lockout box or cabinet.

XIX. SHIFT OR PERSONNEL CHANGES

Employees who have not completed their designated maintenance duties, but whose shift is ending shall follow the following procedure:

A. The employee shall notify the on-coming employees about the equipment under lockout.
B. The employee shall remove their lockout/tagout device(s), they shall be immediately replaced by the on-coming employee(s) locks.
C. The employee who then assumes continued responsibility for the lockout/tagout of the equipment must verify all energy sources are properly controlled.

XX. OUTSIDE CONTRACTORS

Outside contractors will be informed of the lockout/tagout program requirements and are expected to follow the same basic program. The Program Coordinator will coordinate this activity with the contractor. Any contractor who performs work on machinery or equipment at this facility, which has the potential of containing or storing hazardous energy will be required to document that their (contractor) employees have been trained in standard lockout/tagout procedures. In addition, the contractor is required to provide each of their authorized employees with approved lockout/tagout devices. If an outside contractor utilizes a hazardous energy control program that deviates from this lockout/tagout program, they shall provide a copy of their program to the Program Coordinator prior to the start of work.

APPENDIX 1: TRAINING AUTHORIZED EMPLOYEES

A competent person or organization, as determined by the Program Coordinator, will give the training for authorized employees.

The outline of topics included in the training is as follows:

1. Introduction and purpose
   a. OSHA 29 CFR 1910.147
   b. Organization Lockout Policy
   c. Goals and objectives
2. Organization responsibilities
3. Employee responsibilities
4. Lockout/Tagout definitions
5. Energy identification: electrical, hydraulic pressure, pneumatic pressure, other forms of pressure, potential energy, thermal energy, kinetic energy, chemical energy, and radiation.
6. Tag limitations
7. Energy control procedures
   a. Application of lockout or tagout
   b. Release from lockout or tagout
8. Testing or positioning machines and equipment
9. Group lockout or tagout
10. Shift or personnel changes
11. Special procedures for multiple energy sources
12. Zero energy state procedures (ZESP)
13. Outside contractors
14. Periodic inspection
15. Responsibility
16. Review of materials
17. Written evaluation

APPENDIX 2: ZERO ENERGY STATE PROCEDURE

Performing the Evaluation
Each department possessing machinery or equipment which will require the use of multiple lockout/tagout methods to achieve a zero-energy state shall develop procedures for the lockout and/or tagout of those specific machines and/or equipment. This ***Zero Energy State Procedure*** **(ZESP)** could include any combination of sources such as electrical, hydraulic, pneumatic, potential, thermal, kinetic, chemical, radiation or other forms of energy.

The following sections contain information regarding the different types of energy sources along with questions to be answered when evaluating machinery or equipment. This will assist supervisors and industrial engineers in developing ZESPs for multiple energy source machinery and equipment in their departments.

Electrical (E)
- Definition: Electrical energy is a system for moving electrons through wires to perform work. A magnetic field is produced whenever electrons move through a wire. A magnetic field can generate an electric current when the field moves across a wire.
- Examples: Examples of electrical energy systems, in addition to line voltage and current, include rectifiers, amplifiers, transistors, motors, circuit panels, lights, controls, computers, heaters and batteries.
- Potential Hazards: Hazards associated with electrical energy include the potential for electrocution and injuries, primarily burns, due to the discharge of current through the body or arcing of the electrical energy.
- Questions to Ask When Developing a ZESP:
  - Is there one or more sources of electricity serving the machine?
  - Have the electrical energy source(s) been totally isolated?
    - pulling or locking out the main disconnect
    - breaker panels locked
    - plug-in removed and locked in a can
    - battery back-up disconnected
  - Has all electrical energy been isolated or bled off and capacitors discharged?
  - Can transformers be energized from welding operations on the load side?

Hydraulic Pressure (H)
- Definition: Hydraulic energy is a system of pumps, valves, hoses, etc. delivering fluid under pressure to perform work. Hydraulic energy performs work through two major routes: cylinders and pumps.
- Examples: Examples of hydraulic energy systems include trash compactors, presses, bailers, and forklifts.
- Potential Hazards: Hazards associated with hydraulic energy include the potential for crushing and injuries due to the exposure to high-pressure fluid leaks. Amputation and injection of hydraulic fluid into body tissue are additional hazard potentials.
- Questions to Ask When Developing a ZESP:
  - Are other sources of hydraulic energy used on this machine?
  - Have the hydraulic energy source(s) been totally isolated?
    - closing all valves
    - blocking all lines
    - opening all residual accumulators
    - blocking cylinders or pumps
  - Has all residual energy or pressure been isolated or bled off?
  - Can pressure reaccumulate in the system?

Hydraulics components can create a hazard. Pumps can be started accidentally; accumulators maintain a given pressure within the system; check valves can trap pressure in the system; weight on a cylinder will introduce pressure to the system. Common methods of isolating and locking out pressurized circuits are closing and locking valves, blanking pipes and breaking pipes. After closing and locking a valve, means must be available for bleeding residual pressure from the lines.

Pneumatic Pressure (A)

- Definition: Pneumatic energy is a system of pumps, valves, hoses and cylinders to deliver air pressure to perform work. Pneumatic components create the same type of hazards as hydraulics.
- Examples: Examples of pneumatic energy systems include plant air, air operated presses, lifts, air actuated over-hydraulics, compressors, conveyors and air powered hand tools.
- Potential Hazards: Hazards associated with pneumatic energy include the potential for crushing and injuries due to exposure to high pressure air. Additional hazards include injection of air into the bloodstream which can result in crippling and death due to air embolism, as well as injection of particulates into body tissue.
- Questions to Ask When Developing a ZESP:
  - Is there one or more air systems serving the machine?
  - Have the pneumatic source(s) been totally isolated?
    - closing all valves
    - blocking all lines
    - opening all residual accumulators
    - blocking cylinders or pumps
  - Has all residual pressure been isolated or bled off?
  - Can pressure reaccumulate in the system?

Other Forms of Pressure (OP)

- Definition: Other mediums that can create pressure within lines and machinery like hydraulic and pneumatic systems.
- Examples: Examples of other forms of pressure systems are gases (hydrogen, nitrogen, carbon dioxide, acetylene, oxygen), natural gas (boilers, cafeteria equipment), water (domestic water supply, heat exchangers, chilled water, return water supply), or steam (boilers, heaters, steam traps, heat exchangers, presses or lifts).
- Potential Hazards: Hazards associated with other forms of pressure include the potential for crushing and injuries due to exposure to the medium. Hazards from various media can include thermal burns, fire, asphyxiation and injection of the medium into the body tissue and/or bloodstream.
- Questions to Ask When Developing a ZESP:
  - Is there one or more pressure systems serving the machine?
  - Have all sources of pressure been totally isolated?
    - closing all valves
    - blocking all lines
    - opening all residual accumulators
    - blocking cylinders or pumps
  - Has all residual pressure been isolated or bled off?
  - Can pressure reaccumulate in the system?

Potential Energy (PE)

- Definition: Simply defined, potential energy is the energy of rest or position.
- Examples: Springs (S) held in compression or under tension, pins, linkage, hydraulics, pneumatics, vacuum and magnetic systems can release the positioned components and allow them to move. Gravity (G) by the failure of springs, pins, linkage, etc. can cause machine components or materials to fall (dump trucks, forklifts).
- Potential Hazards: Hazards associated with potential energy include the uncontrolled release of this energy which can cause machinery components or materials to go ballistic and cause punctures or penetration injuries, dismemberment or *caught between* situations.
- Questions to Ask When Developing a ZESP:
  - Is there one or more springs, pins, linkage systems, chains, etc., serving the machine?
  - Have all sources of potential energy been totally isolated, removed or blocked?

Common methods of controlling potential energy are, blocking, pinning, chaining or lowering.

Thermal Energy (TE)

- Definition: Thermal energy is the motion of particles at the molecular or particulate level. It involves both hot and cold systems and the transfer of this energy through mediums.
- Examples: Welding, torch work, chemical reactions, heat exchangers, boilers, and cryogenic systems.
- Potential Hazards: Hazards associated with thermal energy are burns, heat stress, or frozen tissue.
- Questions to Ask When Developing a ZESP:
  - Must the employee work near the heat or cold?
  - Are means available to bring the temperatures above or below the action levels?
  - Is appropriate personal protective equipment (PPE) available for use?

Kinetic Energy (KE)

- Definition: Kinetic energy is the energy of machinery or equipment due to its motion.
- Examples: Rotating flywheels and spinning shafts create both a contact hazard and point of operation hazard (a spinning flywheel on a press could cause a press cycle when working on the clutch controls).
- Potential Hazards: Hazards associated with forms of kinetic energy include caught in, caught on and caught between situations for employees.
- Questions to Ask When Developing a ZESP:
  - Has all energy of motion been stopped?
  - Are means available to block spinning or rotating machine or equipment parts to prevent them returning to motion?

Chemical Energy (CE)

- Definition: Chemical energy is the energy associated with chemical reactions such as decomposition, synthesis or replacement reactions.
- Examples: The plating tanks and associated piping, and chemical storage tanks.
- Potential Hazards: Heat of reaction, uncontrolled reactions, fires and explosions are the primary hazards with chemical energy.
- Questions to Ask When Developing a ZESP:
  - Have pipes and tanks been blocked and/or bled?
  - Have system tanks and piping been purged or inerted?
  - Has the residual chemical been neutralized or inactivated?

Radiation (R)

- Definition: The emission and propagation of waves or particles.
- Examples: X-ray units.
- Potential Hazards: Irradiation or exposure to alpha, beta, or gamma particles which can cause radiation burns, radiation sickness and death.
- Questions to Ask When Developing a ZESP:
  - Is there a radiation source associated with this machine or equipment?
  - What is the type of radiation?
  - Is PPE available for alpha or beta exposure?

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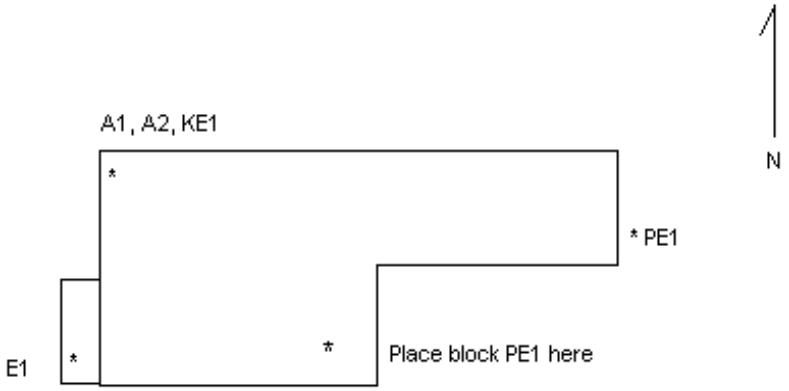
APPENDIX 3

Machine: _____

Locks Required	Machine/Equipment Identification	Column Location
2	Example 101	Maintenance Building



Shut Machine Down by Normal Methods Before Locking Out

Energy Source	Energy Source	Energy Source	Energy Source
Flywheel	KE1	Apply flywheel brake by opening valve KE1.	Visually check to make sure flywheel has stopped.
Gravity	PE1	Insert block under elevator.	Lower elevator onto block by bleeding airline.
Air	A1, A2	Close and lock valve A1. Bleed residual pressure by opening valve A2.	Elevator should lower onto block.
Electric	E1	Pull main disconnect and lock.	Push main machine start button.

Completed by | Date

APPENDIX 4

Machine: _____

Locks Required	Machine/Equipment Identification	Column Location

Shut Machine Down by Normal Methods Before Locking Out

Energy Source	Energy Source	Energy Source	Energy Source

Completed by | Date

APPENDIX 5: LOCKOUT/TAGOUT PERIODIC INSPECTION

Date: _____ Time: _____
Name of Inspector: _____ Title: _____
Machine or Equipment: _____
Location: _____
Maintenance/Services Conducted: _____
_____
Authorized Employee(s): _____
Affected Employee(s): _____

Inspection Procedure **Satisfactory?**

1. General review of responsibilities and procedures (See LO/TO Procedure Card) ☐ Yes ☐ No
   Comments: _____

2. Knowledge of machine/equipment energy types ☐ Yes ☐ No
   List Energy Types: _____
   Comments: _____

3. Knowledge of machine/equipment control methods ☐ Yes ☐ No
   List required controls: _____
   Comments: _____

4. Other comments or deficiencies identified: _____
   _____

5. Recommend refresher training? ☐ Yes ☐ No

Certification

I hereby certify that an inspection was performed on the Lockout/Tagout procedure utilized by the employee(s) indicated above on the aforementioned machine and/or equipment to ensure the procedure and requirements of OSHA 29 CFR 1910.147 (Control of Hazardous Energy Lockout/Tagout) are being satisfied. The findings of this inspection have been reviewed with the employee(s) performing the servicing and/or maintenance work being inspected.

Inspector: _____ Date: _____
Authorized employee(s): _____ Date: _____
_____ Date: _____
_____ Date: _____
Program Coordinator: _____ Date: _____

Upon completion, send to Program Coordinator.