

Control of Hazardous Energy (Lockout/Tagout)

Lockout/Tagout Procedure

PURPOSE

The purpose of this program is to protect employees of Pagoda Electrical, Inc. from injuries while servicing and maintaining equipment. Control of Hazardous Energy is the purpose of the Lockout-Tagout Program. This program establishes the requirements for isolation of both kinetic and potential energy, electrical, chemical, thermal, hydraulic and pneumatic and gravitational energy prior to equipment repair, adjustment or removal.

This procedure establishes the minimum requirements for the lockout of energy isolating devices whenever maintenance or servicing is done on machines or equipment. It shall be used to ensure that the machine or equipment is stopped, isolated from all potentially hazardous energy sources and locked out before employees perform any servicing or maintenance where the unexpected energization or start-up of the machine or equipment or release of stored energy could cause injury.

OBJECTIVE

The objective of this procedure is to establish a means of positive control to prevent the accidental starting or activating of machinery or systems while they are being repaired, cleaned and/or serviced. This program serves to:

- A. Establish a safe and positive means of shutting down machinery, equipment and systems.
- B. Prohibit unauthorized personnel or remote control systems from starting machinery or equipment while it is being serviced.
- C. Provide a secondary control system (tagout) when it is impossible to positively lockout the machinery or equipment.
- D. Establish responsibility for implementing and controlling lockout/tagout procedures.
- E. Ensure that only approved locks, standardized tags and fastening devices provided by Pagoda Electrical, Inc. will be utilized in the lockout/tagout procedures.

DEFINITIONS

Affected Employees: Are those employees who operate machinery or equipment upon which lockout or tagging out is required under this program or whose job requires him/her to work in an area in which such servicing or maintenance is being performed. Training of these individuals will be less stringent in that it will include the purpose and use of the lockout procedures.

Authorized (Qualified) Employee: Are the only ones certified to lock and tagout equipment or machinery in order to perform servicing or maintenance on that machine or equipment. Whether an employee is considered to be qualified will depend upon various circumstances in the workplace. It is likely for an individual to be considered "qualified" with regard to certain equipment in the workplace, but "unqualified" as to other equipment. An employee who is undergoing on-the-job training and who, in the course of such training, has demonstrated an ability to perform duties safely at his or her level of training and who is under the direct supervision of a qualified person, is considered to be "qualified" for the performance of those duties.

Bleeding: The process of safely removing liquid or gas from a closed system.

Blind: A form of blocking is the placement of a blind. A blind is a disk of metal placed in a pipe to ensure that no air, steam, or other substance will pass through that point if the system is accidentally activated. Before installing blinds, employees must bleed down steam, air, or hydraulic lines to get rid of any pressure.

Blockout Device: A type of energy-isolation device that physically prevents the flow or movement of energy. Suitable blocks are another important safety device for making a piece of equipment safe to be repaired or serviced. Blocks must be placed under raised dies, lifts, or any equipment that might inadvertently move by sliding, falling or rolling. Blocks, special brackets, or special stands such as those commonly used under raised vehicles, must be available and always used. Another form of blocking is the placement of a blind. Before installing blinds or blocks, employees must bleed down steam, air, or hydraulic lines to get rid of any pressure. Coiled springs, spring-loaded devices, or suspended loads must also be released so that their stored energy will not result in inadvertent movement.

Capable of Being Locked Out: An energy isolating device is capable of being locked out if it has a hasp or other means of attachment to which, or through which, a lock can be affixed, or it has a locking mechanism built into it. Other energy isolating devices are capable of being locked out, if lockout can be achieved without the need to

dismantle, rebuild, or replace the energy isolating device or permanently alter its energy control capability.

Chemical Energy: Power created by the reaction between two or more substances.

Control of Hazardous Energy: OSHA's proper title for the lockout/tagout safety standard. The standard protects employees by requiring practices and procedures that prevent accidental machine startup for machines that are undergoing maintenance.

Cord and Plug Connected Equipment: Equipment where the only energy source is electrical power provided by a plug in connection.

Electrical Energy: A form of power created by the movement of electrons. Electrical energy, or electricity, can cause electric shock.

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

Energy Isolating Device: A mechanical device that physically prevents the transmission or release of energy. This includes locks; hairpins; tongs; lockable valves; clam shell devices for valves; blank flanges for piping systems; restraining devices to prevent movement of parts; etc. Also, including, but not limited to the following: A manually operated electrical circuit breaker; a disconnect switch; a manually operated switch by which the conductors of a circuit can be disconnected from all ungrounded supply conductors, and in addition, no pole can be operated independently; a line valve; a block or isolate energy. Push buttons, selector switches and other control circuit type devices are not energy isolating devices.

Energy Source: Any source of electrical, mechanical, hydraulic, pneumatic, chemical, thermal, or other energy. Employees may be exposed to hazardous energy in several forms and combinations during installation, maintenance, service or repair work. Examples include:

- Kinetic (mechanical) energy in the moving parts of mechanical systems
- Potential energy stored in pressure vessels, gas tanks, hydraulic or pneumatic systems, and springs (potential energy can be released as hazardous kinetic energy)
- Electrical energy from generated electrical power, static sources, or electrical storage devices (such as batteries or capacitors)
- Thermal energy (high or low temperature) resulting from mechanical work, radiation, chemical reaction, or electrical resistance
- Potential energy from suspended parts
- Steam and condensate systems under pressure

(**Note:** Once the energy sources are neutralized, a machine is in a **zero mechanical state** (ZMS). Zero mechanical state provides the greatest protection against unexpected

mechanical movement. Therefore, the objective of good lockout procedures is to achieve zero mechanical state.

Grounding: Diverting stray electrical current to a neutral, safe source.

Hydraulic Energy: Power created by the compressive force or movement of a liquid in a confined area. Machines that lift objects often use hydraulic energy.

Kinetic Energy: The Energy that exists whenever an object, which has mass, is in motion with some velocity. Everything you see moving about has kinetic energy.

Lockout: The placement of a lockout device on an energy isolating device, in accordance with an established procedure, ensuring that the energy isolating device and the equipment being controlled cannot be operated until the lockout device is removed.

Lockout Device: A device that utilizes a positive means such as a lock, either key or combination type, to an energy isolating device in a safe position and prevent the energizing of a machine or equipment. Included are blank flanges and bolted slip blinds. Lockout devices shall indicate the identity of the employee applying the device(s).

Machine Guard: A shield or cover over hazardous areas on a machine to prevent accidental contact with body parts or to prevent debris, such as chips, from exiting the machine.

Mechanical Energy: A combination of kinetic and potential energy resulting from the force of gravity or the movement or release of a machine component, such as a spring, clamp, or wheel.

Normal production operations- The utilization of a machine or equipment to perform its intended production function.

Other Employees: Are identified as those that do not fall into the authorized, affected or qualified employee category. Essentially, it will include all other employees. These employees will be provided instruction in what the program is and not to touch any machine or equipment when they see that it has been locked or tagged out.

Pneumatic Energy: Power created by the compressive force or movement of air or gas in a confined area. Assembly tools often use pneumatic energy to force parts together.

Potential Energy: Power that is stored or suppressed or that exists because of its position and the effects of gravity. Machines that have large components that raise and lower, such as a press, contain potential energy that becomes kinetic energy when it is released.



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Servicing and/or Maintenance: Workplace activities such as constructing, installing, setting up, adjusting, inspecting, modifying, and maintaining and/or servicing machines or equipment. These activities include lubrication, cleaning or unjamming of machines or equipment and making adjustments or tool changes, where the employee may be exposed to the unexpected energization or startup of the equipment or release of hazardous energy. Additional typical situations include:

- When it is necessary to bypass or remove a guard or other safety device
- When it is necessary to place any part of your body where you could be caught by moving machinery
- When it is necessary to place any part of your body near an exposed or uninsulated electrical circuit
- When it is necessary to work on high-pressure systems or on piping which contains hazardous materials

Setting Up: Any work performed to prepare a machine or equipment to perform its normal production operation.

Tagout: The placement of a tagout device on an energy isolating device, in accordance with an established procedure, to indicate that the energy isolating device and the equipment being controlled may not be operated until the tagout device is removed.

Tagout Device: A prominent warning device, such as a tag and a means of attachment, which can be securely fastened to an energy isolating device in accordance with an established procedure, to indicate that the energy isolating device and the equipment being controlled may not be operated until the tagout device is removed. Tagout devices shall indicate the identity of the employee applying the device.

Thermal Energy: Power created by or in the form of heat. Heat can be retained in machine parts and cause burns.

GENERAL.

Energy control program. Pagoda Electrical, Inc. shall establish a program consisting of energy control procedures, employee training and periodic inspections to ensure that before any employee performs any servicing or maintenance on a machine or equipment where the unexpected energizing, start up or release of stored and/or potential energy could occur and cause injury, the machine or equipment shall be isolated from the energy source, and rendered inoperative. Potential energy may include any source of electrical, mechanical, hydraulic, pneumatic, chemical, thermal, or other energy such as electrical, steam, hydraulic, tension, gravity, etc.

Training.

- Authorized employees shall be trained on hazardous energy control procedures and on the hazards related to performing activities required for cleaning, repairing, servicing, setting-up and adjusting prime movers, machinery and equipment.
- Each affected employee shall be instructed in the purpose and use of the energy control procedure.
- All other employees whose work operations may be in an area where energy control procedures may be utilized, shall be instructed about the prohibition relating to attempts to restart or reenergize machines or equipment which are locked out or tagged out.
- Such training shall be documented

Enforcement and Control.

- Employees that fail to comply with Pagoda Electrical, Inc. policy and procedures will be retrained, reprimanded, and/or their employment terminated, depending on the severity of the violation.
- Pagoda Electrical, Inc. shall ensure these policies and procedures are followed. The Safety and Health Manager is in control of Pagoda Electrical, Inc. Lockout/Tagout Program. It is the responsibility of the Safety and Health Manager and the employee's supervisor to inspect procedures/actions and ensure these policies and procedures are complied with and followed. Employees shall notify management IMMEDIATELY if they are aware that any violations are occurring or have occurred to this policy.

Equipment Requiring Lockout Tagout

- See Attachment 2 and Attachment F

Procedures

The procedures shall clearly and specifically outline the scope, purpose, authorization, rules, and techniques to be utilized for the control of hazardous energy, and the means to enforce compliance including, but not limited to, the following:

- (A) A specific statement of the intended use of the procedure;
- (B) Specific procedural steps for shutting down, isolating, blocking and securing machines or equipment to control hazardous energy;
- (C) Specific procedural steps for the placement, removal and transfer of lockout devices or tagout devices and the responsibility for them; and
- (D) Specific requirements for testing a machine or equipment to determine and verify the effectiveness of lockout devices, tagout devices, and other energy control measures.

APPLICABILITY

This policy applies to the cleaning, repairing, servicing, setting-up and adjusting of machines and equipment in which the unexpected energization or start up of the machines or equipment, or release of stored energy could cause injury to employees. Also, cleaning, repairing, servicing and adjusting activities shall include unjamming prime movers, machinery and equipment.

An operation is also regulated by this lockout/tagout policy when:

1. Any employee (or contractor) is required to remove or bypass a guard or other safety device.
2. When working on energized systems that have, kinetic and potential, electrical, chemical, thermal, hydraulic, pneumatic and gravitational energy
3. Any employee (or contractor) is required to place any part of his body into the mechanism of a piece of equipment or path of hazardous energy unless:
 - a. the activity is routine, repetitive and integral to the use of the equipment
 - b. the operator has been properly trained in the precautionary steps necessary to perform the activity safely or is provided other protection (guarding)

RESPONSIBILITY

- A. Barry Spayd, Operations Manager will be responsible for implementing the lockout/tagout program. Specific responsibilities include:
- Provide Hazardous Energy Control training to employees.
 - Maintain a current listing of employees who have completed lockout training. (Attachment 1)
 - Maintain a current list of all machines that fall under the Hazardous Energy Control program. Listing is to be updated each time a change occurs. (Attachment 2)
 - Implement and enforce this program.
 - Maintain an adequate supply of padlocks and DANGER tags for use each time a lockout process is performed. Additional Padlocks will be available at the Parts Room or through the job site foreman.
 - Conduct the annual review and periodic inspection.
- B. All foreman are responsible for enforcing the program and insuring compliance with the procedures in their departments. Each supervisor is responsible for the effective use of this program in the work group and to see that all required procedures are followed in every instance.
- C. The Safety and Health Manager is responsible for monitoring the compliance of this procedure and will conduct the annual inspection and certification of the authorized employees.
- D. Authorized employees (those listed in **Attachment 1**) are responsible for following established lockout/tagout 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 or maintenance covered under 1910.147, The Control of Hazardous Energy (lockout/tagout). Each employee is responsible for learning and following the procedures and practices developed under this program. Notify the Program Coordinator prior to a lockout process.
- E. Affected employees (all other employees in the facility) (those listed in **Attachment 1**) are responsible for insuring 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 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. Each employee is responsible for learning and following the procedures and practices developed under this program.

TRAINING

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

- Each authorized employee shall receive training in the recognition of applicable hazardous energy sources, the type and magnitude of the energy available in the workplace, and the methods and means necessary for energy isolation and control.
- Each affected employee shall be instructed in the purpose and use of the energy control procedure.
- All other employees whose work operations are or may be in an area where energy control procedures may be utilized, shall be instructed about the procedure, and about the prohibition relating to attempts to restart or reenergize machines or equipment which are locked out or tagged out.

When tagout systems are used, employees shall also be trained in the following limitations of tags:

- Tags are essentially warning devices affixed to energy isolating devices, and do not provide the physical restraint on those devices that is provided by a lock.
- When a tag is attached to an energy isolating means, it is not to be removed without authorization of the authorized person responsible for it, and it is never to be bypassed, ignored, or otherwise defeated.
- Tags must be legible and understandable by all authorized employees, affected employees, and all other employees whose work operations are or may be in the area, in order to be effective.
- Tags and their means of attachment must be made of materials which will withstand the environmental conditions encountered in the workplace.

- Tags may evoke a false sense of security, and their meaning needs to be understood as part of the overall energy control program.
- Tags must be securely attached to energy isolating devices so that they cannot be inadvertently or accidentally detached during use.

Training, Retraining or refresher training will be conducted whenever one of the following conditions exist:

1. At time of initial hire and at least annually
2. The employee has a change in job assignment.
3. There has been a change in the equipment or process.

Training, Retraining or refresher training will be conducted whenever one of the following conditions exist: (continued)

4. There has been a change in the energy control procedure.
5. A new hazard has been introduced or could be encountered
5. Any time an inspection reveals deviations from the standard procedures; inadequacies in employee's knowledge or use of the lockout/tag out procedure; or an accident as a result of unexpected energy release.

Training will be documented, signed and certified using Attachment B (Authorized Personnel) or Attachment C (Affected Personnel). The certifications will be retained in the employee personnel files.

Authorized Employees Training

All Authorized Employees, supervisors and janitorial employees will be trained to use the Lock and Tag Out Procedures. The training will be conducted by either a job foreman or the Safety and Health Manager at time of initial hire. Retraining shall be held at least annually.

Authorized Employees Training will consist of the following:

1. Review of General Procedures
2. Review of Specific Procedures for machinery, equipment and processes
3. The recognition of applicable hazardous energy sources, type and magnitude of energy available in the work place, and the methods and means necessary for energy isolation and control.
4. Location and use of Specific Procedures
5. Procedures when questions arise

Affected and Other Employee Training

Training will be conducted by the job foreman or the Safety and Health Manager at time of initial hire. Training will be certified for authorized or affected personnel. The certification will be retained in the employee's personnel file.

Retraining shall be held at least annually. The training will consist of the following:

1. Only trained and Authorized Employees will repair, replace or adjust machinery, equipment or processes
2. Affected Employees and/or Other Employees may not remove Locks, locking devices or tags from machinery, equipment or circuits.
3. Purpose and use of the lockout procedures and the prohibition relating to attempts to restart or re-energize machines or equipment which are locked out or tagged out.

BASIC LOCKOUT PRINCIPLES

All equipment must be locked out to protect against accidental or inadvertent operation, when operation could cause injury to personnel. Locks are to be applied and removed only by the authorized employee who is performing the servicing or maintenance.

No one should attempt to operate locked-out equipment.

Disciplinary action will be applied if any employee violates these procedures, regardless of whether or not physical harm or equipment damage results.

Lockout devices (padlocks) with an appropriate DANGER warning tag shall be used only for energy control. Prior to the servicing or maintenance of equipment a padlock and DANGER warning tag will be obtained from the Parts Clerk. Each padlock will be keyed differently with no master key or duplicate keys available.

PROCEDURES

Background: This procedure has been developed to establish formal methods, procedures, and equipment to be used to ensure that before any employee (or contractor) performs any servicing or maintenance on a machine or equipment where the unexpected energizing, start up or release of stored energy could occur

and cause injury, the machine or equipment shall be isolated, and rendered inoperative.

It is the stated intent of this program to use locks wherever possible with identification tags to provide positive energy isolation. If, in the judgement of Pagoda Electrical, Inc. management, the equipment cannot be locked out, warning tags may be used. In this special case, there will be written justification on file with the specific isolation procedures for this equipment. Should this equipment require upgrade or modification, it will have lockable switches, fittings, or valves added so that it becomes possible to lockout the equipment.

The ensuing items are to be followed to ensure both compliance with the OSHA Control of Hazardous Energy Standard and the safety of our employees.

A. Preparation for Lockout or Tagout

Employees who are required to utilize the lockout/tagout procedure (see Attachment A) must be knowledgeable of the different energy sources and the proper sequence of shutting off or disconnecting energy means. 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).

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 lockout/tagout accordingly. See Attachment F for specific procedure format.

Electrical

1. Shut off power at machine and disconnect.
2. Disconnecting means must be locked or tagged.
3. Press start button to see that correct systems are locked out.
4. All controls must be returned to their safest position.
5. Points to remember:
 - a. If a machine or piece of equipment contains capacitors, they must be drained of stored energy.

- b. 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.
- c. Some equipment may have a motor isolating shut-off and a control isolating shut-off.
- d. 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.

Hydraulic/Pneumatic

1. Shut off all energy sources (pumps and compressors). 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.).

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.

Mechanical Energy

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

1. Block out or use die ram safety chain.
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.

Lockout Procedures

Equipment will only be locked or tagged out by authorized employees who have been trained in Pagoda Electrical, Inc.'s procedure and who are familiar with the specific procedures for the equipment.

1. All employees affected by lockout/tag out will be notified of the application of the lockout devices and/or tags at the beginning of the lockout procedures.
2. Equipment will be shut down following specific procedures developed for the affected equipment.
3. All energy sources will be identified from the specific procedures for the affected equipment.
(Energy sources include electrical, mechanical, hydraulic, pneumatic, thermal, chemical, and others (see attached Energy Sources, Attachment F).
4. All energy sources are to be **locked out**. Each employee involved with the operation will place his/her lock on each energy-isolating source. The locks must be applied with a warning tag describing why the equipment is locked out, who placed the lock on the equipment, and the date. The key will remain in the possession of the individual locking out the equipment. All locks used in the facility must be keyed individually.
5. Stored or residual energy must be relieved, disconnected, blanked off, restrained, and otherwise rendered safe. Energy sources subject to accumulation, such as capacitors, hydraulic reservoirs, air tanks, steam traps, etc., should be controlled by isolation and locking out. If there is a possibility of accumulation of stored energy to a hazardous level, verification of isolation shall be continued until the servicing or maintenance is completed.
6. When all steps involved with shut down listed in the specific procedures for equipment have been completed, make sure that all personnel are clear, and attempt to start or activate the equipment to make sure that all energy sources have been locked out. Return controls to "off" position.

7. Cord and plug connected equipment does not require lockout/tag out if the following conditions exist:

- ☐ The authorized individual is within sight of the equipment

- ☐ Unplugging the equipment isolates the equipment from all energy sources
- ☐ The equipment has no stored energy

If equipment must be left unattended or if all of the above conditions do not apply, then the equipment will be locked and tagged out by attaching a tag to the on/off switch and attaching a lockout device to the plug to prevent it from being plugged in.

Tag out Procedures

It is Pagoda Electrical, Inc. policy not to use tags alone in an energy isolation procedure. The only exceptions to this must be authorized by the Safety and Health Manager or Project Manager with written justification as to why the equipment or process does not lend itself to being physically locked out. Should this equipment be upgraded or modified so that it becomes possible to lock out the equipment, lockable switches, fittings, or valves will be added.

1. Tags are to be used with locks to identify the individual, the hazard, and the date.
2. Tags must be durable and able to withstand the environment in which they are used.
3. Tags are to be attached with pull ties and must be securely attached so that it is readily apparent what the tag is warning about. Alternate methods of attaching tags may be used as long as they are not easily removed or reusable and must withstand 50 pounds unlocking strength. (rubber bands, wire ties, and string are not permissible means of attachment).
4. Any employee that removes, bypasses, ignores, or otherwise defeats a tag without permission of the authorized person responsible for it or proper management approval, is subject to immediate dismissal. (see procedures for removal of locks and tags)
5. In employee training, the employee must be made aware that tags do not protect against the unexpected energization of the equipment, and they should be extraordinarily alert around tagged out equipment and systems that is not also locked out.

Application of Control

The established procedures for the application of energy control (the lockout or tagout procedures) shall cover the following elements and actions and shall be done in the following sequence:

(1) Preparation for shutdown. Before an authorized or affected employee turns off a machine or equipment, the authorized employee shall have knowledge of the type and magnitude of the energy, the hazards of the energy to be controlled, and the method or means to control the energy.

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

(3) Machine or equipment isolation. All energy isolating devices that are needed to control the energy to the machine or equipment shall be physically located and operated in such a manner as to isolate the machine or equipment from the energy source(s).

(4) Lockout or tagout device application.

(i) Lockout or tagout devices shall be affixed to each energy isolating device by authorized employees.

(ii) Lockout devices, where used, shall be affixed in a manner to that will hold the energy isolating devices in a "safe" or "off" position.

(iii) Tagout devices, where used, shall be affixed in such a manner as will clearly indicate that the operation or movement of energy isolating devices from the "safe" or "off" position is prohibited.

(A) Where tagout devices are used with energy isolating devices designed with the capability of being locked, the tag attachment shall be fastened at the same point at which the lock would have been attached.

(B) Where a tag cannot be affixed directly to the energy isolating device, the tag shall 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.

(5) Stored energy.

(i) Following the application of lockout or tagout devices to energy isolating devices, all potentially hazardous stored or residual energy shall be relieved, disconnected, restrained, and otherwise rendered safe.

(ii) If there is a possibility of re-accumulation of stored energy to a hazardous level, verification of isolation shall be continued until the servicing or maintenance is completed, or until the possibility of such accumulation no longer exists.

(6) Verification of isolation. Prior to starting work on machines or equipment that have been locked out or tagged out, the authorized employee shall verify that isolation and de-energization of the machine or equipment have been accomplished.

Group Procedures

When servicing and/or maintenance is performed by a crew, craft, department or other group, they shall utilize a procedure which affords the employees a level of protection equivalent to that provided by the implementation of a personal lockout or tagout device.

In the event that multiple authorized employees must be involved for a single lockout/tag out procedure, The jobsite foreman will be the single authorized employee with the overall responsibility for controlling hazardous energy for all members of the group while the work is in progress. The Foreman shall ascertain the exposure status of each individual group member. The Foreman must implement the energy control procedures, communicate the purpose of the operation to group, coordinate the operation, and ensure that all procedural steps have been properly completed. Each authorized employee involved in the group lockout/tag out activity must be familiar with the type and magnitude of energy that may be present during the servicing and maintenance work. Each employee in the group must affix his/her personal lockout or tag out device to the group lockout device, group lockbox, or comparable mechanism, before engaging in the servicing and maintenance operation, and removes it when finished. The authorized employee in charge of the group must not remove the group lockout or tag out device until each employee in the group has removed his/her personal device.

Multi-Work Shift Operations

In the event individuals other than those that originally locked or tagged out the equipment must complete that lockout/tagout work during either a shift

change or other personnel change, the forman will be the single authorized employee with the overall responsibility for controlling hazardous energy for this operation.

Specific procedures shall be utilized during shift or personnel changes to ensure the continuity of lockout or tagout protection, including provision for the orderly transfer of lockout or tagout device protection between off-going and oncoming employees, to minimize exposure to hazards from the unexpected energization or start-up of the machine or equipment, or the release of stored energy.

At each transfer of this type the incoming employees will have an opportunity to verify that the equipment has been deenergized prior to placing his or her lock or tag on the equipment.

Documentation of who these designated, authorized employee's are and procedures to be followed, will be site specific, written down and records will be maintained

Steps for Restoration of Equipment and Removal of Locks and Tags

These procedures are extremely important and must be followed whenever any locked or tagged out equipment will be brought back into service or whenever locks or tags are to be removed. Only the Employee that locks and tags out machinery, equipment or processes may remove his/her lock and tag. However, should the Employee leave the facility before removing his/her lock and tag, the job foreman may remove the lock and tag. The foreman must be assured that all tools have been removed, all guards have been replaced and all employees are free from any hazard before the lock and tag are removed and the machinery, equipment or process are returned to service. Notification of the Employee who placed the lock is required prior to lock removal. This procedure is to be done only after every effort has been made to have the individual who locked out the equipment remove his lock and tag.

Unauthorized removal of a lock or tag on a properly locked out piece of equipment will result in immediate dismissal.

(See Attachment 3 - Special Lock & Tag Removal Procedure)

Before lockout or tagout devices are removed and energy is restored to the machine or equipment, procedures shall be followed and actions taken by the authorized employee(s) to ensure the following:

1. Inspection: Make certain the work is completed and inventory the tools and equipment that were used. The work area shall be inspected to ensure that non-essential items have been removed and to ensure that machine or equipment components are operationally intact
2. Clean-up: Remove all towels, rags, work-aids, etc.
3. 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.
4. Check controls: All controls should be in their safest (off) position.
5. 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.
6. Remove locks/tags. Each lockout or tagout device shall be removed from each energy isolating device by the employee who applied the device. **No lock or tag shall be removed by anyone other than the employee who signed the tag except by means of the Special Lock and Tag Removal Procedure. See Attachment 3**

B. Release from Lockout/Tagout (continued)

Exception to paragraph (B)(6): When the authorized employee who applied the lockout or tagout device is not available to remove it, that device may be removed under the direction of Pagoda Electrical, Inc., provided that specific procedures and training for such removal have been developed, documented and incorporated into Pagoda Electrical, Inc.'s energy control program. Pagoda Electrical, Inc. shall demonstrate that the specific procedure provides equivalent safety to the removal of the device by the authorized employee who applied it. The specific procedure shall include at least the following elements:

- (i) Verification by Pagoda Electrical, Inc. that the authorized employee who applied the device is not at the facility;
- (ii) Making all reasonable efforts to contact the authorized employee to inform him/her that his/her lockout or tagout device has been removed; and
- (iii) Ensuring that the authorized employee has this knowledge before

he/she resumes work at that facility. **(See Attachment 3)**

7. All employees who would be affected by the start-up of the equipment must be notified of the removal of the lockout devices **before** they are removed.

8. Prior to start-up the area must be inspected to ensure that all employees, contractor personnel, and others have been safely positioned.

(This step is essential to eliminate the chance of anyone being exposed to unexpected release of hazardous energy).

C. Additional requirements.

Testing or positioning of machines, equipment or components thereof.

This situation, the temporary removal of devices, shall be documented as to who performs and who verifies the action. Also, in situations in 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:

(i) Clear the machine or equipment of tools and materials in accordance with paragraph B. of this section;

(ii) Remove employees from the machine or equipment area in accordance with paragraph B. of this section;

(iii) Remove the lockout or tagout devices as specified in paragraph B. of this section;

(iv) Energize and proceed with testing or positioning;

(v) Deenergize all systems and reapply energy control measures to continue the servicing and/or maintenance.

D. Service or Maintenance Involving More than One Person

When servicing and/or maintenance is performed by more than one person, each authorized employee shall place his own lock or tag on the energy isolating source. This shall be done by utilizing a multiple lock scissors clamp if the equipment is capable of being locked out. If the equipment cannot be locked out, then each authorized employee must place his tag on the equipment.

E. Procedures for Outside Personnel/Contractors

Outside personnel/contractors shall be advised that Pagoda Electrical, Inc. has and enforces the use of lockout/tagout 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.

Pagoda Electrical, Inc. will obtain information from the outside personnel/contractor about their lockout/tagout procedures and advise affected employees of this information.

The outside personnel/contractor will be required to sign a certification form (see Attachment E). If outside personnel/contractor has previously signed a certification that is on file, additional signed certification is not necessary.

F. Periodic Inspection

A periodic inspection (at least annually) will be conducted of each authorized employee under the lockout/tagout procedure. This inspection shall be performed by the Safety and Health Manager. If the Safety and Health Manager is also using the energy control procedure being inspected, then the inspection shall be performed by another party.

The inspection will include a review between the inspector and each authorized employee of that employee's responsibilities under the energy control (lockout/tagout) procedure. The inspection will also consist of a physical inspection of the authorized and affected employee while performing work under the procedures.

- Where lockout is used for energy control, the periodic inspection shall include a review, between the inspector and each authorized employee, of that employee's responsibilities under the energy control procedure being inspected.
- Where tagout is used for energy control, the periodic inspection shall include a review, between the inspector and each authorized and affected employee, of that employee's responsibilities under the energy control procedure being inspected, and the elements set forth in the TRAINING section.

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

The Safety and Health Manager shall certify in writing that the inspection has been performed. The certification shall identify the machine or equipment on which the energy control procedure was being utilized, the date of the inspection, the employees included in the inspection, and the person performing the inspection. The written certification (Attachment D) shall be retained in the individual's personnel file.

ANNUAL REVIEW

The Safety and Health Manager_ will conduct an annual audit of **each lockout procedure**, the written program, and training to ensure that the procedures are adequate and that they are being followed (this individual should not be directly involved with the day to day supervision of the lockout/tag out program). The audit must ensure that each procedure is adequate to provide effective protection to the authorized employee during servicing and maintenance operations covered by this standard. If authorized employees are deviating from these procedures, the employees involved must be retrained and the training documented. The person conducting the audits will observe a representative sample of authorized employees performing the servicing and maintenance operations using the lockout/tag out procedures.

They will also perform a review with each authorized employee of that employee's responsibilities under the energy control procedure being audited. For tag out procedures, the review of responsibilities also includes the affected employees. The audit should include verification that training has been completed for all authorized and affected employees involved in the lockout/tag out procedure. Authorized and affected employees should know the location of specific written procedures for equipment. Employees must be able to explain the purpose of this procedure and the details of how it works.

LOCKOUT – TAGOUT DEVICES

If an energy isolating device is not capable of being locked out, Pagoda Electrical, Inc.'s energy control program shall utilize a tagout system.

If an energy isolating device is capable of being locked out, Pagoda Electrical, Inc.'s energy control program shall utilize lockout, unless Pagoda Electrical, Inc. can demonstrate that the utilization of a tagout system will provide full employee protection.

Tagout devices shall warn against hazardous conditions if the machine or equipment is energized and shall include a legend such as the following:

Do Not Start, Do Not Open, Do Not Close, Do Not Energize, Do Not Operate.

Protective materials and hardware.

The following Pagoda Electrical, Inc.-initiated rule relates to **29 CFR 1910.147(c)(5): 437-002-0154 Unique Locks**. *In addition to and not in lieu of the definition contained in 1910.147(b) for "lockout device," each person's lock shall have either a key or combination which is **unique** to that device.*

Locks, tags, chains, wedges, key blocks, adapter pins, self-locking fasteners, or other hardware shall be bought and supplied by Pagoda Electrical, Inc. for isolating, securing or blocking of machines or equipment from energy sources. These devices and materials are to be provided to authorized (trained) employees.

Both lockout and tagout devices shall be singularly identified, shall be the only device(s) used for controlling energy, shall not be used for other purposes, and shall meet the following requirements:

(A) Durable.

(1) Lockout and tagout devices shall be capable of withstanding the environment to which they are exposed for the maximum period of time that exposure is expected.

(2) Tagout devices shall be constructed and printed so that exposure to weather conditions or wet and damp locations will not cause the tag to deteriorate or the message on the tag to become illegible.

(3) Tags shall not deteriorate when used in corrosive environments such as areas where acid and alkali chemicals are handled and stored.

(B) Substantial.

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

(2) Tagout devices. Tagout devices, including and their means of Attachment, shall be substantial enough to prevent inadvertent or accidental removal. Tagout device attachment means shall be of a non-reusable type,

attachable by hand, self-locking, and non-releasable with a minimum unlocking strength of no less than 50 pounds and having the general design and basic characteristics of being at least equivalent to a one-piece, all-environment-tolerant nylon cable tie.

(c) 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.

(D) Identifiable.

Lockout devices and tagout devices shall indicate the identity of the employee applying the device(s).



Tagout devices (example, above) shall meet the following requirements:

- constructed and printed so that exposure to weather conditions or wet and damp locations will not cause the tag to deteriorate or the message on the tag to become illegible;
- not deteriorate when used in corrosive environments such as areas where acid and alkali chemicals are handled and stored;
- and their means of attachment be substantial enough to prevent inadvertent or accidental removal;
- attachment means shall be of a non-reusable type, attachable by hand, self-locking and non-releasable with a minimum unlocking strength of no less than 50 pounds and having the general design and basic

characteristics of being at least equivalent to a one-piece all-environment tolerant nylon cable tie;

- warn against hazardous conditions if the machine or equipment is energized and shall include a legend such as the following: Do Not Start, Do Not Open, Do Not Close, Do Not Energize, Do Not Operate.

Lockout devices shall meet the following requirements:

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

General Sequence of Events for Lockout Tagout:

Step 1: Preparation for Lockout/Tagout

- Authorized employees shall locate appropriate lockout/tagout procedures for the type of equipment or machine that will be involved in the lockout.
- Authorized employees shall locate all isolating devices that apply to the equipment, machine, etc., that will be involved in the lockout/tagout procedures.
- Authorized employees shall notify all affected employees that a lockout/tagout system is going to be used and the reason e.g., necessary repairs, preventative maintenance, servicing or adjustments.

Step 2: Isolate Energy Sources

- If the machine or equipment is operating, shut it down by normal stopping procedure (e.g., depress stop button, open switch, secure valve).
- De-energize all sources of hazardous energy:
 - Disconnect or shut down engines or motors.
 - De-energize electrical circuits.
 - Block fluid (gas or liquid) flow in hydraulic or pneumatic systems.
 - Block machine parts against motion.
- Block or dissipate stored energy:
 - Discharge capacitors.
 - Release or block springs that are under compression or tension.
 - Vent fluids from pressure vessels, tanks, accumulators.
 - Block raised dies, gears, or equipment that could descend or move when the energy is removed. Lower suspended loads to the floor or secure them independently.
- Secure the equipment, apply all appropriate energy-isolating/lockout devices with danger tags in a safe state. The tag, at a minimum, should have the name of the authorized employee, department, time, and date. Fill out tags completely and place them in such a way as to be immediately apparent to anyone who might attempt to operate the device. Tags must be attached by a durable means, e.g., nylon cable tie. String and tape are prohibited.
- If more than one person is required to lockout/tagout a piece of equipment, etc., each authorized employee shall place his/her own personal lockout/tagout device on the energy-isolating device(s). When an energy-isolating device cannot accept multiple locks or tags, a multiple lockout/tagout device (hasp) can be used.

General Sequence of Events for Lockout Tagout: (continued)

Step 3: Methods of Verifying Isolation of Equipment

- After ensuring that no personnel are exposed, verify by test and/or observation that all energy sources are de-energized.
- Review methods of verifying isolation of equipment for the specific type of equipment.
- Operate the push button or other normal operating controls to make certain the equipment will not operate. CAUTION: Return operating control(s) to “Neutral” or “OFF” position after the test.
- When practical, have a second authorized employee familiar with the equipment verify the integrity of your lockout.

Step 4: Perform the Necessary Work

- Remember to re-check the integrity of the lockout/tagout frequently, especially in tasks that last from several hours to several days.

Step 5: Prepare for Re-Energizing/Restoring Equipment to Service

- When the servicing or maintenance is completed and the machine or equipment is ready to return to normal operating condition, the following steps shall be taken:
 - Check the machine or equipment and the immediate area around the machine to ensure that nonessential items have been removed (tools, work aids and spare parts) and that the machine or equipment components are operationally intact (close cabinets and panels).
 - Check the work area to ensure that all employees have been safely positioned or removed from the area.
 - Verify that the controls are in neutral.
 - Remove the lockout devices and re-energize the machine or equipment. Note: The removal of some forms of blocking may require re-energization of the machine before safe removal.
 - Notify affected employees that the servicing or maintenance is completed and the machine or equipment is ready for use.

Step 6: Remove Locks and Tags

- When all affected employees are ready (clear of danger points), each

authorized employee may now remove his/her own locks and tags.

No lock or tag shall be removed by anyone other than the employee who signed the tag except by means of the Special Lock and Tag Removal Procedure. (See Attachment 3)

ATTACHMENT A

List of Affected and Authorized Employees

List each person affected by this procedure and those authorized to use this procedure.

AFFECTED EMPLOYEES	
Name	Job Title

AUTHORIZED EMPLOYEES	
Name	Job Title

Approved by

Date

ATTACHMENT B

**Certification of Training
(Authorized Personnel)**

I certify that I received training as an authorized employer under Pagoda Electrical, Inc.. Lockout/Tagout program. I further certify that I understand the procedures and will abide by those procedures.

AUTHORIZED EMPLOYEE SIGNATURE

DATE

ATTACHMENT C

Certification of Training (Affected Personnel)

I certify that I received training as an Affected Employee under Pagoda Electrical, Inc. Lockout/Tagout Program. I further certify and understand that I am prohibited from attempting to restart or re-energize machines or equipment that are locked out or tagged out.

AUTHORIZED EMPLOYEE SIGNATURE

DATE

ATTACHMENT D

Lockout/Tagout Inspection Certification

I certify that **Equipment** was inspected on this date utilizing
lockout/tagout procedures. The inspection was performed while working on
 Equipment .

AUTHORIZED EMPLOYEE SIGNATURE

DATE

INSPECTOR SIGNATURE

DATE

Outside Personnel/Contractor Certification

I certify that _____ and
(outside personnel/contractor) have informed each other of our respective
lockout/tagout procedures.

AUTHORIZED EMPLOYEE SIGNATURE

DATE

INSPECTOR SIGNATURE

DATE

ATTACHMENT F

Equipment Specific Procedure for Pagoda Electrical, Inc..

Machine or Equipment Type: _____

Location: _____ ID # _____

Date Procedure Created _____ Verified By _____

Date Verified _____

1. Notify all affected employees in the area:
2. Proper Shutdown Procedure:
3. Blocking of Potential Mechanical Energy

Hazard	Equipment Needed	Placement Safety Devices

4. Isolation of Power/Energy Sources:

Energy Type	Isolating Device	Location	Procedure

5. Bleeding of Potential Energy

Energy	Bleed Down Points	Procedure

6. Verification Test

Lockout to Verify	Controls to try:	Process to verify Lockout

All controls must be returned to the “Off” position after the “Verification Test”
ATTACHMENT F (continued)

NOTIFY ALL AFFECTED EMPLOYEES WHEN THIS PROCEDURE IS IN APPLICATION.

Start Up Procedures

List the steps in order necessary to reactivate (energize) the equipment. Be specific.

Procedure:

Energy Source Activated:

Procedures For Operations and Service/Maintenance

List those operations where the procedures above do not apply [See 29 CFR 1910.147 (a)(2)]. Alternate measures which provide effective protection must be developed for these operations. Job Safety Analysis is one method of determining appropriate measures.

Operation Name:

Attachment 1 TRAINING RECORD

The following Pagoda Electrical, Inc. employees have received Hazardous Energy Control (Lockout) training.

Name	Department	Type of Training*	Date

*Authorized, Affected, or Other

Attachment 2

Lockout Equipment Listing

The following machines and equipment fall under the requirements of 29 CFR 1910.147. For this reason appropriate lockout procedures must be performed each time servicing or maintenance is done.

Equipment/Machine	Identification	Location	Date Listed

Attachment 3 – SPECIAL LOCK AND TAG REMOVAL PROCEDURES

Lockout/Tagout

This form is to be utilized when an authorized employee has applied a personal energy isolating (lockout/tagout) device(s) and is not available to remove it. An authorized supervisor and a witness must, at a minimum, ensure the following procedures have been completed prior to any lock/tag removal:

1. Verification that the authorized employee who applied the device is not at the facility and worksite has been achieved; and
2. Reasonable efforts have been made to contact/locate the authorized employee to inform him/her that his/her lockout or tagout device has been removed; and
3. The authorized employee has been notified prior to resuming work, that his/her lockout/tagout device(s) has been removed.

For Lock Assigned to: _____
(Name of Authorized Employee)

Reason For Lock Removal: _____

Please Circle the Appropriate Check Marks:

10. ✓ 1. Employee has been personally contacted. How & When: _____

Was the employee informed that his/her lockout/tagout device(s) has been removed?

Please check: ___ Yes ___ No

11. ✓ 2. Unable to contact the employee.

If Number "2" Is Circled, Complete The Following:

12. ✓ a. Checked time sheet.

13. ✓ b. Called employee's home. Spoke to: _____
Call witnessed by: _____
(Name & Signature of Witness)

14. ✓ c. Asked co-workers: (Name:) _____
(Name:) _____

15. ✓ d. Other attempts: _____

Attachment 3 (continued)

16. ✓ e. A standby person will be stationed by the work location or point of exposure until the equipment is running.

BY VIRTUE OF OUR SIGNATURE BELOW, WE ATTEST TO THE FACT THAT, TO THE BEST OF OUR KNOWLEDGE, THE OWNER OF THIS LOCK AND TAG IS NOT AT THE FACILITY AND WORKSITE.

(Supervisor's Signature) (Date)

(Witness Signature) (Date)

(Note: Prior to removal of any locks or tags, this form shall be signed by both the authorized supervisor and witness. Once completed, a copy shall be retained and kept on file with the Lockout/Tagout Periodic Inspection Record for 3 years.