HAZARDOUS ENERGY CONTROL PROGRAM

PURPOSE:

The purpose of this program is to protect employees from injury due to the unexpected energization, activation, or start-up of equipment during maintenance and to comply with 29 CFR 1910.147, Control of Hazardous Energy (Lockout/Tagout) and 29 CFR 1910.269, Power Transmission and Distribution.

The program provides specific guidelines for employee use. It establishes minimum requirements for the lockout of energy isolating devices during servicing, maintenance, or other non-routine conditions (e.g., safety hazards) for equipment or machines. It shall be used to ensure that the machine or equipment is stopped and isolated from potentially hazardous energy sources and locked out before any employee performs any work where the unexpected energization or start up of the equipment or release of stored energy could cause injury. Projects with responsibilities for power transmission and distribution work shall develop additional procedures as outlined in this process.

RESPONSIBILITIES:

The Project Manager, along with designated on-site safety personnel and supervisors, has the authority to enforce compliance with the lockout/tagout procedures that are described in this program. Workers who do not comply with these requirements are subject to disciplinary action.

Project Manager:

- Ensures that written shutdown/start up procedures are developed for equipment as outlined in this program.
- Verifies contractors use proper lockout/tagout procedures.

Project Safety Coordinator:

- Acts as Lockout/Tagout Program Coordinator and administers written program.
- Trains affected employees and maintains documentation of training session attendance and session contents
- Conducts and documents periodic inspections of the lockout/tagout procedures
- Ensures that these procedures are followed
- Maintains appropriate inspection records

Supervisors:

- Ensures that only authorized employees perform repairs on equipment and that employees follow lockout/tagout procedures
- Supports and participates in periodic inspections
- Participates in the removal of locks and tags in accordance with this program
- Ensures that the procedures for shift change outlined in this program are followed
- Maintains an adequate supply of locks, tags, multiple lock adapters (hasps), and cable ties to secure tags that meet the requirements of this procedure
- Conducts and documents periodic inspections of the lockout/tagout procedures as outlined in this

process

Involved Employee:

- Actively participates in assigned training sessions and follows Lockout/Tagout Program procedures
- Performs duties of affected employees as outlined in this procedure
- Shall not attempt to start, energize, or use locked/tagged out equipment

PROCESS:

Use of Procedures: The procedures in this program shall be used by employees who service, maintain, adjust, clean, or un-jam components from machinery or equipment. Lockout/tagout devices shall be used to ensure that machinery, equipment, or processes are isolated from hazardous energy whenever an employee must remove or bypass a guard, or whenever any part of the body could become injured.

Application of Procedures: The procedures described in this program apply to every form of hazardous energy, including but not limited to the following:

- Electrical - Contact with energized electrical panels, relays, switches, etc.
- Mechanical - Movement of presses, rollers, blades, etc.
- Chemical - Releases of material in tanks, pipes, or valves, etc.
- Thermal - Release of heat, steam, or refrigerants
- Pneumatic - Power presses, conveyors, etc.
- Hydraulic - Powered industrial trucks, punch presses, etc.
- Stored Energy - Batteries, spring-actuated devices, capacitors, or gravity

Program Exceptions: Lockout/Tagout Program requirements do not apply to the following:

- Work on plug-in equipment, where pulling the plug eliminates sources of energy, and the employee doing the repair has total control of the plug (and pulls the plug).
- "Hot Tap" operations involving transmission and distribution systems for gas, steam, water, and petroleum products when performed on pressurized pipelines provided that the following conditions can be demonstrated:
    - The continuity of service is essential
    - Shutdown of the service is impractical
    - Documentation of procedures followed and special equipment used that will provide proven, effective protection for employees
    - The Lockout/Tagout Program does apply to electrical hot tap operations

Procedural Steps:

Protective Materials and Hardware

- Authorized employees shall be provided locks, tags, chains, wedges, key blocks, adapter pins, self-locking fasteners, blank flanges, or other hardware necessary for isolating, securing, or blocking machines or equipment from energy sources.
- Locks provided for lockout/tagout shall be unique and shall not be used for any other purpose. Tags shall be of a standard material, size, and print and shall be colored consistently throughout the site. Tags shall be able to withstand the environment in which they are used.
- Locks and keys shall be individually assigned or supplied from a central distribution point.

Employees shall not be permitted to use another employee's device, and only two keys per lock shall be allowed. One key shall remain with the assigned employee. The supervisor may maintain the second key, as well as a roster of assigned locks, in a locked key box located in his/her office area. No employee, other than the supervisor, shall have direct access to the second key.

- Tagout devices shall be attached using nylon cable ties. Each tagout device shall identify the employee applying the device, type of maintenance being performed, and the date and time that the tagout device was applied. In addition to the requirements outlined above, employees are responsible for using necessary Personal Protective Equipment (safety glasses, gloves, etc.) and tools meeting appropriate safety requirements. A tagout device shall be affixed to each hazardous energy isolation point, even if a lock is also attached.
- Each employee potentially exposed to the stored hazardous energy shall install a separate tag (if lockable, a separate lock in addition to the tag) at each energy isolation point.

Preparation for Shutdown

- Before beginning or ending the lockout/tagout process, the authorized employee(s) shall notify affected employees of the intended application or removal of lockout/tagout devices.
- Before equipment is turned OFF for the purpose of lockout/tagout, the authorized employee must know and/or identify:
    - The type and magnitude of the energy that powers it
    - The hazards of the energy involved
    - The methods of controlling the energy
- This information shall be provided by the appropriate Supervisor, Project Manager, or the customer. If this information is not provided, or is unavailable, the affected employee will not continue the operation until it is secured and understood. Employees un-familiar with a machine, equipment, or process, shall not attempt to perform lockout/tagout on the equipment. See the Project Safety Coordinator or responsible supervisor.

Equipment Shutdown and Release of Stored Energy

- Equipment shall be shut down in proper sequence (de-energized using normal shutdown procedures). If the authorized employee is unfamiliar with the machinery, shutdown shall not be attempted. In this instance, the authorized employee shall contact the Supervisor, Project Safety Coordinator, or the Project Manager for information on the proper shutdown sequence.
- Shutdown and isolation procedures shall be documented for each piece of equipment included in the requirements of this program.

Isolating Equipment

General guidelines for the isolation of various forms of hazardous energy and the control of stored hazardous energy are shown in the tables on the next two pages. This information is to be used as a guide only. In many cases, especially where multiple sources of different types of stored energy are present, these guidelines may not be sufficient. Supervisors should contact their Project Safety Coordinator for assistance if they are unsure of proper procedures to follow.

General Guidelines for Isolation of Hazardous Energy

All Energy Forms

- Use energy-isolating devices to physically isolate the equipment from the energy source
- Be sure to isolate energy sources - secondary, as well as main sources
- Always verify that each source of energy has been isolated using an approved meter, gauge, or piece of test equipment

Electrical Energy

- Know where electrical disconnects for a machine are located and lock these out
- Stand to the side of electrical switch boxes and face away when turning them off. Use the hand that keeps you well away from the switch
- Report any broken disconnects or disconnects that cannot be locked out
- Disconnect any batteries supplying the system
- Discharge any capacitors that may store residual energy
- Install ground wires or operate grounding switches
- Never pull an electrical switch while it is under load unless it is designed for that purpose
- Never remove a fuse from an energized fuse holder rather than disconnecting the source
- Never rely on a control switch to lockout a machine
- Always verify that electrical energy has been isolated by testing the circuit/area with an approved voltage tester

Hydraulic Energy

- Lockout electrical disconnect for the pump motor
- Shut off valves to individual machines if a pump supplies more than one machine and other machines must remain operations
- Close and lockout each valve supplying a machine
- Block parts that could move from loss of pressure or where pressure cannot be relieved
- Move a machine to its rest position prior to lockout and then relieve residual pressure
- Identify and de-energize any accumulators that may be in the system by releasing the stored energy through a valve
- Cycle a machine after it has been de-energized to release any possible stored energy

Thermal Energy

- Allow extreme heat or cold to dissipate
- Use proper protective clothing if thermal energy cannot be allowed to dissipate
- Avoid contact with active steam or cold piping systems

Pneumatic Energy

- Bleed supply lines and leave valves open
- Block parts that could move from loss of pressure
- Move a machine to its rest position prior to lockout and then relieve residual pressure
- Relieve pressure on air tanks by using bleed off valves
- Cycle a machine after it has been de-energized to release any possible stored energy
- Never rely on gauges to determine if an air tank is still under pressure; listen for the discharge of air from the tank

Mechanical Energy

- Let moving parts come to a complete stop prior to beginning work on the machine
- Release the pressure on springs or block the movement of spring-driven parts
- Block or brace parts that could move as a result of gravity
- Never insert tools or stops in moving parts of the machine

Chemical Energy

- Drain process piping systems and close valves to prevent the flow of hazardous materials
- Purge reactor tanks and process lines

- Use a blank flange or physically separate lines if a line must be blocked where there is no value
- Use proper protective clothing when working with and around chemicals

Applying Lockout/Tagout Devices

- Only authorized employees shall apply lockout/tagout devices. The lockout/tagout devices shall be properly applied to each energy-isolating device.
- When it is necessary for more than one group or employee to lockout a single energy-isolating device, a multiple lock hasp or similar device shall be used.
- In the event tags are used instead of locks, attach them at the same point, as a lockout would have been attached and legibly complete documentation (separate tag required for each employee where group lockout/tagout applies). If the tag cannot be attached directly to the energy-isolating device, the tag shall be located at the safest proximity to the device, in a position that is immediately noticeable by anyone attempting to operate the device.

Verification of Lockout/Tagout

- The following steps shall be used to verify that the equipment is isolated from stored energy after the authorized employee ensures that danger areas are clear of personnel:
    - Verify that the main supply disconnect switch or circuit breaker cannot be moved to the ON position.
    - Use a voltage tester or other approved test instrument to check systems and components on electrical equipment.
    - Press start buttons and other activating controls to ensure lockout. On other equipment such as piping, springs, flywheels, etc., attempt to start the isolation device (valve, flange, mechanical block, etc.) to verify that it is locked in place.
    - Verify that air, stored electrical, hydraulic, or other pressure has been relieved by recording the readings on gauges or other indicating devices.
    - Listen for the discharge of air or watch for the discharge of hydraulic fluid at a safe distance.
    - Set machine controls to OFF when testing is complete.

WARNING: Many energy systems must also be dissipated (bled, purged, discharged, etc.) after they are isolated. Failure to do so can cause death or severe injury.

LOCKOUT/TAGOUT SHUTDOWN AND STARTUP PROCEDURES

Procedure No: _____ Effective Date: _____

Equipment/Unit: _____

The ten steps outlined below shall be followed in sequence, to properly lockout/tagout and re-establish energy to the equipment/unit listed above. Employees will follow this procedure for the piece of equipment/unit anytime isolation of stored hazardous energy is required by *Lockout/Tagout Program*.

APPLYING THE LOCKOUT/TAGOUT DEVICE

1 **Notify Employees**: Notify all affected employees that servicing or maintenance is required on the equipment/unit and that it must be shutdown and locked/tagged out to perform the maintenance.

2 **Identify All Hazardous Energy**: Understand and identify the nature of the hazard (check all hazards that apply below)

☐ **Electrical**: Shock and/or burn could result from contact with exposed conductors, line voltage, or high-voltage equipment. Flying parts, evaporated metal, or fire could result if this circuit is shorted. Isolate hazard by lockout/tagout at the circuit breaker, main switch, main plug or main fuse block.

☐ **Pneumatic**: High velocity air/gas impingement can inflict injury to the eyes, ears, and to openings or cuts to the skin. Air/gas flow can cause small objects to become airborne and strike people or objects. Isolate hazard by lockout/tagout at the shut-off valve, gas cylinder, or gas/airline valve.

☐ **Chemical**: Gaseous _____ can cause illness or injury through its toxicity, flammability, corrosivity, or reactivity. Isolate hazard by lockout/tagout at the cylinder valve/gas-line valve.

☐ **Chemical**: Liquid _____ can cause illness or injury through its toxicity, flammability, corrosivity, or reactivity. Isolate hazard by lockout/tagout at the valve flange.

☐ **Mechanical**: The _____ can inflict injury to tissue or bone through crushing, laceration, or impaling. Isolate hazard by lockout/tagout at the main Switch, plug control, circuit breaker, anti-motion pin or _____.

☐ **Thermal**: The _____ part or system can cause burns/fires. Isolate hazard by lockout/tagout at the main electrical switch, electrical plug control, electrical circuit breaker, electrical fuse block, steam valve, fluid line valve, shielding, or _____.

☐ **UV**: Exposure to ultraviolet rays from the _____ can result In burn injuries to the skin and eyes. Isolate hazard by lockout/tagout at the main electrical switch, electrical plug control, electrical circuit breaker, electrical fuse blocks steam valve, fluid line valve, shielding, or _____.

☐ **Electromagnetic**: Strong magnetic fields can attract some tools and work materials with adequate force to inflict injury. Isolate hazard by lockout/tagout at the main electrical switch, electrical plug control, or electrical circuit breaker.

3 **Equipment Shutdown**: Shutdown the _____ following normal procedures.
Equipment/Unit

LOCKOUT/TAGOUT SHUTDOWN AND STARTUP PROCEDURES

4 **Isolate All Sources of Energy**: Find and isolate every source of hazardous energy (Check all that apply below)

☐ **Electrical**: Locate the main switch, circuit breaker, electrical plug, or other energy isolation device to the _____. This switch, breaker, plug, or device is located at _____.
Open breaker, open switch, remove plug, or open other energy isolation device. Attach a lock and tag directly to the isolation device or attach a lockout enabling fixture if a lock will not fit. In the case of a plug, place the plug in a plug control box and affix a lock and tag to the box.

☐ **Valve**: Locate main supply pipe/line valve to the _____.
This valve is located at _____.
Apply lock and tag to the appropriate ball valve, gate valve, donut, handle, or chain energy isolation device or attach a lockout enabling fixture if a lock will not fit.

☐ **Mechanical/Stored/Potential Energy**: Locate all sources of potential mechanical energy to the _____. These sources are located at _____. Block/pin the _____ with a _____.
Apply a lock and tag in such a way as to prevent removal of the _____.

5 **Secure All Sources of Energy**: Check each source of energy identified above and make sure a hazardous energy lock and hazardous energy tag is affixed to all energy isolating devices or lockout enabling fixture. If more than one person performs the work, each person must apply a separate lock and tag to each isolation point. Multiple locks and tags can either be affixed to a multi-hasp or a lockout box can be used.

6 **Release All Sources of Energy**: Release stored energy from each source of energy identified above. This shall be accomplished by opening valves, purging lines, checking that all moving parts have come to a complete stop, and discharging any large capacitors. In the case of capacitors, leave a ground attached to prevent re-charging.

7 **Verify All Sources of Energy are at Zero State**: Check each source of energy identified above to verify a zero energy state. This shall be accomplished by checking for the lack of voltage with a voltmeter, and verifying no flow or pressure by opening valves or checking for pressure with a gauge. **As a last step in the verification process, attempt to operate the equipment/unit to verify that all energy sources have been isolated**.

RELEASE FROM LOCKOUT/TAGOUT

8 **Inspect Area**: After work is completed, conduct a thorough inspection to include all parts of the _____ and surrounding area for loose tools and parts. Check for correct valve settings, switch settings, system integrity, and exposed conductors. Check that all guards are in place and that all personnel are clear.

9 **Notify Employees**: After conducting a thorough inspection notify all employees in the area that the _____ Is about to be powered up, returned to service, turned on, or energized. Ask them to stay clear of the area until the equipment/unit has been returned to service.

10 **Remove Locks/Tags and Re-Energize Equipment**: Remove locks and tags (if more than one person's lock/tag remain, each person shall remove their own lock/tag). Once all locks and tags are removed, an individual qualified to operate the equipment/unit shall verify proper operation.

LOCKOUT/TAGOUT MAGNITUDE OF ENERGIES CHECKLIST

Equipment/Unit: _____ Location: _____

Energy Type	Hazard	Magnitude	Control Method
Electrical	☐ Shock	☐ 13,200 KV	☐ Main Switch
	☐ Burn	☐ 440 VAC	☐ Plug Control
	☐ Fire	☐ 220 VAC	☐ Fuse Blocks
	☐ Other	☐ 110 VAC	☐ Shielding
		V A	☐ Other
Pneumatic	☐ Mech/Pinch Points	☐ High	☐ Air Line Valve
	☐ Crush	☐ Moderate	☐ Gas Cylinder Valve
	☐ Laceration	☐ Slight	☐ Gas Line Valve
	☐ Flying Debris	Pounds of Force	☐ Other
Chemical (Gas)	☐ Flammable	☐ High	☐ Cylinder Valve
	☐ Corrosive	☐ Moderate	☐ Gas line Valve
	☐ Toxic	☐ Slight	☐ Other
	☐ Reactive		
Chemical (Liquid)	☐ Flammable	☐ High	☐ Valve
	☐ Crush	☐ Moderate	☐ Flange Plate
	☐ Laceration	☐ Slight	☐ Other
	☐ Flying Debris		
Mechanical	☐ Shaft in Motion	☐ High	☐ Main Electrical or Switch
	☐ Moving Parts	☐ Moderate	☐ Plug Control
	☐ Crushing	☐ Slight	☐ Shielding
	☐ Laceration	Foot Lbs	☐ Blocking or Pin
	☐ Impalement	HP	☐ Other
UV	☐ Skin Burns	☐ High	☐ Main Switch
	☐ Eye Burns	☐ Moderate	☐ Circuit Breaker
		☐ Slight	☐ Plug Control
			☐ Shielding
Electromagnetic	☐ Strong Field	☐ High	☐ Main Switch
	☐	☐ Moderate	☐ Circuit Breaker
	☐	☐ Slight	☐ Plug Control
		Gauss	☐ Shielding
Thermal	☐ Burns	☐ Moderate Temperature	☐ Main Switch
	☐	☐ Cryogenic	☐ Plug Control
	☐	☐ Degrees C	☐ Valve
			☐ Other

MechWorks, Inc.

PERIODIC LOCKOUT/TAGOUT INSPECTION RECORD

Date of Inspection: _____

Names of Authorized Persons Performing Inspection:

_____

_____

_____

Names of Authorized Employees Performing Servicing or Repair:

_____

_____

_____

Equipment Under Service or Repair:

_____

_____

Number and Title of Procedure Being Used by Authorized Employee:

No. _____ Title: _____

No. _____ Title: _____

	Yes	No
1. Are all employees on this job trained as authorized employees?	☐	☐
2. Were affected employees notified before the project start?	☐	☐
3. Are all sources of energy secured, locked, and tagged out?	☐	☐
4. Have all exposed employees put locks and tags on each disconnect?	☐	☐
5. Was energy isolation confirmed through testing after locks and tags placed?	☐	☐
6. If there was an on/off switch, was it returned to off position following testing?	☐	☐

I certify that any problems discovered during this inspection were reviewed with the authorized employees on this job during the inspection process and that they were made aware of their mistakes and of the proper way to perform the task which they accomplished in error.

Employee/Inspector:

_____ _____

Name Signature

Employee/Inspector:

_____ _____

Name Signature

Employee/Inspector:

_____ _____

Name Signature

Removal of Lockout/Tagout Devices

- The following minimum steps shall be performed after completion of maintenance and repairs and before lockout/tagout devices are removed:
    - Inspect the work area to make sure that equipment has been fully assembled, including guards, and that it is safe to operate.
    - Remove tools from the work area.
    - Make a head count to ensure that employees are clear and safely positioned around equipment.
    - Notify affected employees that the lockout/tagout is being removed.
    - Ensure that each employee who applied a lockout/tagout device removes his/her device.
- EXCEPTION: When the authorized employee who applied the lockout/tagout device is unavailable to remove it, that device may be removed by the employee's supervisor or by a lead person under the direction of the supervisor. The supervisor must verify that the authorized employee is not onsite. The supervisor must also verify that reasonable efforts have been made to contact and inform the original authorized employee that the lock or tag needs to be removed. The supervisor must also notify the original employee that the lock or tag has been removed before he/she returns to work.
- Removal of lockout/tagout devices by anyone other than the employee applying the device shall be documented.

Limitations of Tagout Only Systems
Both affected and authorized employees shall be trained in procedures and limitations regarding the use of tagout only systems.
The procedures and limitations include:

- The use of a tagout only system must be approved by the Project Manager and/or Project Safety Coordinator.
- Tags are warning devices. They do not provide the physical restraint offered by locks when used to secure energy-isolating devices.
- The tagout device attachment shall be attached by a nylon cable tie and completely filled out providing the authorized employee's name, pager or local phone number, and supervisor's name.
- The tag shall state the date and the time at which the tag was applied, and the type of maintenance being performed.

A tag shall never be bypassed, ignored, defeated, or removed without authorization from the authorized employee who applied it (or the supervisor if the employee who applied the tag is unavailable).

Equipment Specific Lockout/Tagout Procedures: Equipment specific shutdown and start-up procedures (lockout/tagout procedures) shall also be developed for each piece of machinery or equipment with stored hazardous energy except as outlined in this program.

Use of Generic Lockout/Tagout Procedures

- The only exceptions to the requirement for equipment specific procedures are work on electrical circuits or equipment that meets all of the following criteria:
    - The machine or equipment has no potential for stored or residual energy or re-accumulation of stored energy after shutdown, which could endanger employees.
    - The machine or equipment has a single energy source, which can be readily identified

and isolated.
    - The isolation and locking out of the single energy source must completely de-energize and deactivate the machine or equipment.
    - The machine or equipment must be isolated from the energy course and locked out during servicing or maintenance.
    - A single lockout device must achieve a lockout condition.
    - The lockout device must be under the exclusive control of the authorized employee performing the servicing or maintenance.
    - The servicing or maintenance must not create hazards for other employees.
    - There must have been no accident involving unexpected activation or re-energization of the machine or equipment during servicing or maintenance.
- In the case of work on electrical circuits, or where the conditions listed above are met, the Generic Lockout/Tagout and Re-Energization Procedure may be used in lieu of developing a machine specific procedure.

Additional Procedural Requirements

- Lockout/Tagout procedural information, such as copies of the machine specific as appropriate, shall be made available to the authorized employees for their use in maintaining the equipment.
- If procedures do not exist during a new project startup, they shall be developed as soon as possible, starting with the most complicated and hazardous machinery/equipment first.
- Periodic documented inspections of lockout/tagout procedures shall be conducted.

Additional Requirements

Temporary removal

The following steps shall be followed if lockout/tagout devices must be temporarily removed and a machine, equipment, or process must be energized for testing or positioning:

- Clear equipment of tools and materials.
- Evacuate or safely position employees in the equipment area.
- Remove lockout/tagout devices in accordance with the Lockout/Tagout Procedure.
- Energize and proceed with testing or positioning of equipment.
- De-energize systems and reapply energy control measures using the steps outlined in the Lockout/Tagout Procedure.
- Continue with maintenance or servicing.

Outside Contractors

Whenever contractors or servicing personnel are engaged in activities covered by the Johnson Controls Lockout/Tagout Program, the contractor/servicing organization shall inform Johnson Controls of their lockout/tagout procedures and Mechworks shall inform the contractor of its program.

When outside contractors are involved, the energy isolation and shutdown shall not begin until the contractor or servicing personnel have verified their compliance with the provisions of the Lockout/Tagout Program, and Mechworks employees have been informed of the contractor's Lockout/Tagout program requirements.

Group Lockout/Tagout

Some maintenance procedures involve locking and tagging out multiple energy isolating devices. Some may also require more than one employee to work on the equipment at the same time. When a group of

authorized employees is working together on the equipment, one of two procedures shall be followed as outlined below:

- Each authorized employee shall affix a personal lock and tag to a hasp on each energy-isolating device. OR
- A single group lock and tag shall be attached to each energy-isolating device with keys from these locks placed in a lockout box. In this case, each authorized employee of the maintenance group performing the procedure shall affix their personal lock and tag to the lockout box to secure the keys inside. This process ensures that none of the energy isolating devices can be unlocked until members of the group have removed their locks from the lockout box. One member of the group shall be designated as responsible for determining and monitoring the overall exposure status of the individual group members or a supervisor shall place their lock and tag on the lockout box and assume these duties.

When more than one crew, department, or craft is involved in performing maintenance or servicing procedures, which require lockout/tagout, the following procedures shall be followed:

- Lockout/tagout control responsibility shall be assigned to an authorized employee who shall coordinate affected work forces and ensure continuity of protection; otherwise, a supervisor shall perform these duties.
- Each authorized employee shall affix a personal lockout/tagout device to the group lockout device or group lockout box when he/she begins work, and shall remove those devices when he/she stops working on the equipment being serviced or maintained.
- Where necessary, the Project Safety Coordinator shall consult with Corporate Director of ES&H regarding group lockout/tagout situations and use of group lockout boxes.

Shift Changes

The steps in this section shall be followed when the maintenance or servicing of a machine requires that the lockout/tagout continue beyond a “normal” shift. These steps shall also be followed when individuals performing lockout/tagout must leave work, or transfer maintenance and/or lockout/tagout responsibility to other employees.

- The employee shall not remove his/her lockout/tagout device until the oncoming employee is ready to lockout.
- Incoming employee shall not use the lockout/tagout device of an employee who is leaving (required to make sure tag information reflects proper employee and that key to lock is in the possession of the employee potentially exposed to the hazardous energy).
- Where a group lockout/tagout system is being used, the single authorized employee responsible for coordination shall ensure the orderly transfer of the lockout/tagout devices.
- When more than one crew, department, or craft is involved in a lockout/tagout system, the single authorized employee responsible for coordination of the associated lockout/tagout shall ensure the orderly transfer of the lockout/tagout devices between oncoming employees and employees who are leaving.

POSSIBLE EMERGENCIES:

Workers may be exposed to hazardous energy in several forms and combinations during installation, maintenance, service, or repair work. Workers who install or service equipment and systems may be injured or killed by the uncontrolled release of hazardous energy. Following are some of the types of injuries that may be encountered when lockout/tagout procedures are not implemented: entrapment in

moving machinery, crushed limbs, head trauma, eye injury, electrocution, severe burns. Refer to the *Emergency Response Plan* for the procedures to follow in the event of an emergency. The following factors have been contributed to these types of injuries or fatalities: 1) failure to completely de-energize, isolate, block, and/or dissipate the energy source, 2) failure to lockout and tagout energy control devices and isolation points after de-energization, and 3) failure to verify that the energy source was de-energized before beginning work.

TRAINING:

Initial Training

- Affected Employees - Affected employees shall complete a training course on the requirements contained in this procedure, to include the requirements of the program and employee responsibility. Training for affected employees shall consist of the following minimum items:
    - The purpose of the Lockout/Tagout Program
    - The procedures used when performing lockout/tagout operations
    - The limitations of using tagout only systems
- Authorized Employees - Authorized employees who use a lockout/tagout procedure shall complete a training course including the same elements required for affected employees plus the following minimum additional items:
    - The recognition of hazardous energy sources applicable to their area
    - The type and magnitude of the hazardous energy
    - The methods and means of lockout/tagout
    - Requirements of this procedure
- Resident Contractors - Employees of resident contractors who are affected or authorized employees and who are under the direct supervision of Mechworks personnel must receive training by authorized Mechworks employees. These contract employees shall be required to comply with the procedures outlined in this Lockout/Tagout Program.
- Nonresident Subcontractors - Contractor and subcontractor employees who use lockout/tagout procedures during their assigned tasks must be trained by their employer. It is Johnson Controls policy to only select contractors that can provide verification that their employees have completed Lockout/Tagout training. Mechworks shall not provide training to nonresident contractors unless required by contract to do so.

Re-Training - Both affected and authorized employees shall be retrained when there is a change in their occupational assignment, a change in machines, equipment or processes presenting new hazards, or when there is a change in the Johnson Controls lockout/tagout energy control procedure. Retraining shall also be provided when the program review procedures or required annual review by the Project Safety Coordinator, reveal that there are inadequacies or deviations from the Program.

Annual Training - Both affected and authorized employees shall be retrained annually using same criteria as Initial Training. Emphasis shall be placed on ensuring each employee fully understands the lockout/tagout procedures applicable to their work.

Documentation and Record keeping

Training courses shall be documented. Copies of the training log shall be kept in each employee's training file.
A statement of verification shall be provided for each resident contractor employee who has received training in accordance with the provisions of the Johnson Controls Lockout/Tagout Program. A notice that employees will comply with the procedures and provisions of the program shall be included in this statement.
If the resident contractor cannot verify training for their personnel, these individuals must coordinate Lockout/Tagout training with Mechworks personnel. The training shall be documented and a notice shall be sent to the contractor's company.

Program Review

Annual Inspection of Procedures

- The lockout/tagout procedures as prescribed in this program shall be periodically inspected, at least annually, to verify the effectiveness of the program. These reviews shall be conducted by authorized employees (inspectors) other than those utilizing the energy control procedure as outlined in the following paragraphs.
- Management shall conduct inspections of actual lockout/tagout situations in their area of responsibility occasionally throughout the year. They shall document these inspections and take necessary actions such as ensuring procedural changes are accomplished if procedural problems are noted or employees are re-trained if mistakes or non-compliance is noted.
- The Site Safety Coordinator shall conduct inspections of actual lockout/tagout situations occasionally throughout the year and document these inspections. The Site Safety Coordinator shall also take necessary actions such as ensuring procedural changes are accomplished if procedural problems are noted or employees are re-trained if mistakes or non-compliance is noted.
- If there is a safety committee, which has members that are authorized employees, these employees shall be encouraged to conduct inspections of actual lockout/tagout situations occasionally throughout the year and document these inspections. If they note problems during the inspection, they shall notify appropriate management of the need to take necessary actions such as procedural changes if procedural problems are noted or re-trained if employee mistakes or non-compliance is noted.

DEFINITIONS:

Affected Employee - An employee who operates or works in the area of equipment where lockout/tagout is used.
Authorized Employee - A trained employee who performs the actual lockout or tagout procedure on equipment. An authorized employee and an affected employee may be the same person when the affected employee's duties include performing the required maintenance on equipment that is locked/tagged out.

Capable of Being Locked Out - An energy-isolating device that can be locked out and is designed so that a lock can be affixed to prevent its operation or activation.
Energized - Any device connected to an energy source or containing potential or stored energy.
Energy Isolating Device - A mechanical device that physically prevents the transmission or release of energy, including but not limited to the following:

- A manually-operated circuit breaker
- A disconnect switch
- A manually-operated switch by which the conductors of a circuit can be disconnected from ungrounded supply conductors
- A line valve or block or any similar device used to block or isolate energy
- Push buttons, selector switches and other control circuit-type devices are not energy-isolating devices

Energy Source - Any source of energy including: electrical, mechanical, hydraulic, pneumatic, chemical, or thermal.
Hot Tap - Performance of maintenance on any part of a system while that system is energized. This encompasses electrical, steam, hydraulic, pneumatic, or any other form of energy transfer.
Kinetic Energy - Energy in motion.
Lockout - The placement of a locking mechanism on an energy-isolating device to ensure that the equipment cannot be operated until the lockout device is removed according to established procedures.
Lockout Device - A mechanism that holds an energy-isolating device in a safe position so that machinery or equipment cannot be energized (must be standardized throughout project).
Non-Resident Sub-Contractor - Outside vendor retained for a particular short-term scope of work.
Normal Production Operation - The use of equipment to perform its intended production function.
Potential Energy - Energy at rest (stored energy).
Resident Contractor - Temporary long or short term Contract Employee.
Servicing and/or Maintenance - Workplace activities such as constructing, installing, adjusting, modifying, lubricating, cleaning, and un-jamming. Lockout/tagout is only required if workplace activities may expose the employee to unexpected start-up or the release of hazardous energy.
Setting Up - Any work performed to prepare machines, equipment, or processes to perform its normal production operation.
Tagout - The placement of a tagging mechanism on an energy-isolating device to indicate that the equipment under control may not be operated.
Tagout Device - A conspicuous warning mechanism, which can be securely fastened to an energy-isolating device (must be standardized throughout project).