Energy Isolation

1 PURPOSE

This procedure provides protection for people, equipment, and the environment from the dangers of uncontrolled, unblocked, unlocked, or unplanned releases of energy (i.e. movement of equipment, from electrical, hydraulic, pneumatic, or other sources of power and exposure to hazardous or toxic material, etc.) when tagging and locking the source of the energy can provide protection from these hazards.

2 SCOPE

This procedure applies to all functional areas, operations, offices, including employees, vendors, visitors and contractors within the scope of the Integrated Management System (IMS).

3 DEFINITIONS AND ACRONYMS

Definitions

Department Locks or Company Locks are used by the departments to enhance communications between departments and to maintain continuity of the lockout between shifts. A department lock shall never be used in place of one's own personal lock.

Do Not Operate Tags are used to indicate that a piece of equipment is locked out and shall not be operated.

Energy is an agent such as electrical, mechanical (including raised loads and compressed springs) and pressurized systems or containment devices (including fluids, hydraulic systems, compressed air, steam, gas and so on) with the potential to cause harm.

General Rules are rules which apply to all employees, vendors, visitors, and contractors regardless of where they work or what they do.

Job Specific is any requirement directly associated with a specific job, task, or occupation.

Lock Box is used in multiple lock situations where the main lock key(s) are locked in the box and personal locks are placed on the lock box to prevent the lock box from being opened until such time as all personal locks are removed from the lock box.

Lock Box System List includes all major equipment locked out in any lock box lockout situation. The lists are used so employees placing personal locks on the Lock Box are aware of what equipment is locked out.

Lock Out Device or Lock is a positive means for rendering an electrical disconnect, equipment, valve, raised load, spring, etc. inoperative or immobile or for containing or relieving pressurized systems such as compressed air, steam, gas, hydraulic or other fluids. Lockout devices may include padlocks, keyed locking devices, blanking plates, restraining bars, blocking or any positive device to prevent the release of energy.

(Cont.)

Lock Out Tag System provides a means of warning others that equipment, machinery, or a device has been de-energized and locked out and it must not be operated. Any lockout shall ensure all persons placing locks can be identified. The tags (HSLP-XXXX) shall be red and black in color displaying the standard ”DANGER” , ”DO NOT OPERATE”, and a place to describe reasons for the lockout.

Low Energy would not likely cause injury to a person, or damage to equipment (including low pressure water lines. etc.), if released.

Multiple Locks are locks that are keyed alike to be used when the multiple lock procedure is used during maintenance shutdowns. No more than two keys shall be allowed for each set of multiple locks.

Multiple Lockout (Lock Box Lockouts) is a system for locking out equipment by groups requiring more than four (4) individual locks during maintenance shutdowns.

Personal Locks are an employee’s personal locks to be used solely for the purpose of lockouts. Employees shall have the only keys for their personal locks and they are to remain with the employee. Locks shall be identified with the owner’s identification information such as: name on a brass tag or a picture ID.

Site refers to any COMPANY facility.

A Supervisor Designee is a competent employee who is specifically designated by his/her supervisor to verify that specific equipment is de-energized for lockout. In addition this person may be designated to install or remove a company lock in the event the foreman or supervisor is not immediately available if either production or work time will be lost as a result. The use of a designee does not relieve the foreman or supervisor of the responsibility for insuring that the lockout procedure is properly followed.

Acronyms

HMR	HSLP Management Representative
HSLP	Health, Safety and Loss Prevention
IMS	Integrated Management System
LOTO	Lock Out Tag Out
PPE	Personal Protective Equipment
RSO	Radiation Safety Officer
SCBA	Self Contained Breathing Apparatus
SOP	Standard Operating Procedure
TAU	Trained Authorized User

4 ROLES AND RESPONSIBILITIES

Document Owner

HMR

Responsible Roles and Position-Holders

Contractors/Vendors

Contractors/Vendors are businesses performing a service for the COMPANY. They are responsible for ensuring their employees working on COMPANY sites have the required locks and tags as specified in this procedure and that their employees understand and comply with the requirements as outlined in this procedure.

Employees and Contracted Employees

All employees in any position whether COMPANY or contracted employees working on any COMPANY site. They are responsible for complying with the requirements as outlined in this procedure and shall ensure that all lockout locks identify the owner of the lock, that before placing a lockout on any equipment a lockout tag is in place, and are responsible for maintaining their personal locks and identification tags.

Foreman / Supervisors or Designee

A Supervisor/Foreman or Designee can be a COMPANY employee or a contractor/vendor working or traveling on any COMPANY site. They are responsible for training, issuance of required locks, tools, and PPE, and for the enforcement of all requirements, rules, and established guidelines as outlined in this procedure.

General Foreman

A General Foreman can be a COMPANY employee or a contractor/vendor working or traveling on any COMPANY site. They shall maintain the Lock Box lockout situations for their area of responsibility and ensure that the list is readily available to the foreman/supervisors and their designees.

HSLP

HSLP is any COMPANY employee working under and including the Regional Director of HSLP. They are responsible for periodically auditing for compliance to this procedure.

5 DIRECTION

All employees, vendors, contractors, and visitors traveling/working on site shall comply with and ensure personnel accountable to them comply with the following requirements of this procedure.

General Rules and requirements for energy isolation

Positive lockout and tag out shall be applied before work may be performed on, in, or near machinery, circuits or systems which could cause injury if the machinery were started, circuits were energized or energy released.

Each employee exposed to the hazard of startup or energy release shall install a personal lock, while they are exposed to the hazards.

Locks as well as wedges, chains, blocks, blanking plates, etc., shall be provided by the COMPANY, shall be singularly identified and shall not be used for any other purposes. They shall be substantial enough that their removal would require excessive force.

Tag out devices shall be provided by the company, standardized, capable of withstanding adverse weather conditions and environments and substantial enough to prevent accidental removal.

Every lockout shall have a tag warning against dangers if the lockout is removed and the system is energized, they shall be securely fastened to the device, and state the reason for installing the lockout.

Electrical lockouts shall be at the power source disconnects, which are usually found in the MCC (Motor Control Centers) or Substations. Push button or control panel/control circuit lockouts are not adequate.

Individual lockouts are required for 110 and 120 VAC breakers in light panels, distribution panels, and instrument power panels with appropriate devices designed for individual circuit breaker lockouts.

When a department lock is used it shall be the first lock on and the last lock removed from any lockout and it shall serve as the COMPANY lock and provide continuity of isolation throughout the job.

Lockout/Tagout all appropriate devices or circuits.

Attempt to restart equipment after lock is installed.

Ensure work area is safe and free of potential hazards.

Emergency Shutdowns

In the event that an emergency shutdown occurs during the weekend or off shifts when the maintenance, or electrical & instrumentation supervisors are not available, it will be acceptable practice to allow the operations supervisor to utilize the multiple lockout procedure without the other department's participation.

This exception is for emergency situations only and a shift mechanic and electrician shall accompany the operations supervisor during the lockout procedure.

All other procedures for multiple lockouts shall remain the same.

General Lockout

Notify the appropriate foreman/supervisor with the request to shut down equipment.

After the equipment has completely stopped, ensure it is isolated by a properly trained employee.

When COMPANY locks are used, the appropriate foreman/supervisor shall install the "company lock" and a signed and dated "Danger, Do Not Operate Tag".

Inspect work area to ensure clearance of personnel.

Attempt local and remote start to confirm the lockout. If there is no response, restore controls to “stop” or “off” and proceed. If there is a response, an error has been made. Determine the problem.

Only electricians shall open doors or covers of disconnect or “roll out” switch gear.

All Foremen/supervisors and personnel working on or coming into contact with the equipment shall install their personal locks and identification. They shall retain possession of the keys to their locks.

In remote locations, where the operations foreman is not immediately available, lockout procedures shall be followed by a designated employee, after contacting the operations foreman by phone or radio, and obtaining permission to do so.

Personal locks shall be removed:

- **a** When the job is complete,
- **b** When the person is reassigned to another area, or
- **c** At the end of the person’s shift.

The “Danger, Do Not Operate Tag” and “department lock” shall remain on the equipment to maintain continuity of lockout through shift changes and other periods whenever no work is being performed (and individual locks may have been removed) until the equipment is ready to be returned to service.

Personal locks shall only be removed by the person who originally placed the lock. If however, a person has inadvertently left a lock on or is otherwise unavailable and the lock needs to be removed, proceed as follows:

- **a** Try to contact the person who left the lock on.
- **b** If personal contact is made, and it is confirmed that the lock was inadvertently left on, the lock may be removed by the area operation’s shift supervisor. The supervisor shall document when this contact was made.
- **c** If personal contact cannot be made, the lock may be removed, under the direction of the appropriate General Foreman, only after a thorough search of the affected area has been made and after notifying all affected personnel that the equipment is ready to be put back into service.

When work has been completed during the shift, the following steps will be taken by employees performing the work:

- **a** All machine guards and other safety devices shall be reinstalled.
- **b** Each worker shall remove their Personal Lock and identification.
- **c** The appropriate foreman/supervisor shall be notified that the equipment is ready to be operated.

When work has been completed during the shift, the foreman/supervisor shall:

a Advise all personnel that the equipment is ready to be put back in operation.

b Ensure that all involved employees are accounted for.

c Inspect the equipment to ensure that nobody will be in danger due to the new equipment start-up.

d Remove the "Department Lock" and "Danger, Do Not Operate Tag".

e If equipment is not to be started at that time, standard operating procedures will be followed at start-up.

When work has not been completed during the shift, the following steps shall be taken:

a Each worker shall remove their Personal Lock and identification before leaving the job.

b The "Department Lock" and "Danger, Do Not Operate Tag" of the department shall remain in place until the equipment is ready to operate.

c The supervisor shall ensure the oncoming supervisor or designee is aware of the work and lockout status.

d The next shift workers shall place their Personal Lock and identification only if the "Company Lock" and "Danger, Do Not Operate Tag" are in place.

e Only electricians shall open doors or covers of disconnect or "roll out" switch gear.

f An electrician shall be present when instrument technicians open doors to access starters for level, flow, and temperature switches that can tie directly into control circuits.

Hazardous Materials / Pressurized Lines

For the purpose of this procedure high pressure hose lines are hose lines of ¾ inch inside diameter or larger and air lines of any diameter which is pressurized above 50 psi. Except where automatic shutoff valves are used, connections to machines and between hoses shall be locked using at least one of the following devices (select best control):

- Chicago fittings with safety pins.
- Whip-check cable between connections.
- Connector with check valve.

When blocking, locking out, or isolating pipes, blanks and valve locks shall be used for lock out tag out before work is performed.

All pipeline hoses, tanks, etc. shall be completely depressurized before being opened.

Lines or vessels containing poisonous or corrosive chemicals shall be drained and flushed, using proper safety procedures, before work is performed.

Proper personal protective equipment shall be worn when working in these areas. SCBA shall be worn when initially breaking lines if hazardous levels exist.

Systems containing corrosives or toxins shall be drained and flushed before opening.

Mechanical Equipment

If equipment being worked on is supplied material by another piece of equipment or discharges material to other equipment, that equipment shall also be locked out. Examples:

- Work in a chute or screen shall require locking the belt supplying material to it as well as the belt or screen receiving material from it.
- Work in a sump shall require locking out any pumps feeding it.
- Work on a sampler shall require locking out the belt or feeder sampled.

Pipes and valves coming in and out of any vessel, chute, hopper, etc shall be blocked, blanked, or locked out prior to any maintenance activities.

Pipelines, hoses, and tanks shall be depressurized before opening.

Although closed and locked, some pipelines, hoses and tanks may leak air or fluids back into the system, permitting it to recharge over time. In the case of a pneumatic system, pressure could slowly build and cause movement or could cause violent separation of components being worked on.

If the valve is not a bleeder valve, the pipeline downstream of the valve shall require opening or blanking after assuring that the line is depressurized.

In the case of working on a pipeline involving manually operated or pneumatically driven knife gate valves, where the valves need to be locked in the closed position to stop the fluid's flow, restraining bars or any other typical mechanical lockout devices shall be used to prevent any movement of the valve's blade.

The effect of gravity upon suspended loads shall not be overlooked. Simply locking out an inclined conveyor drive motor may not be adequate. Any load remaining on the belt could cause belt movement. Therefore, blocking of equipment shall be required in addition to the electrical lockout.

Mobile Equipment Lockout

All parked vehicles and equipment must be blocked, chocked, or ribbed, with implements on the ground etc. with the parking brake engaged as required in the COMPANY's Vehicles Mobile Equipment and Transportation Safety procedure.

Caution Do Not Operate Tag Use

a Danger Do not Operate tags shall be used to prevent the operation of mobile and earthmoving equipment which is not safe to operate.

b Danger Do Not Operate tag shall be placed by any person who considers that the operation of that equipment could cause injury to a person or damage to the equipment. The person who places a Danger Do Not Operate tag shall then notify the supervisor of the problem.

c The Danger Do not Operate Tag shall remain on the equipment until such time as the all repairs are completed.

Caution Do Not Operate Tags shall only be removed by the designated maintenance employee after the following has been completed:

- **a** A physical check shall be made to ensure that the equipment is operative.
- **b** All tools and surplus material have been removed from the job.
- **c** All guards and other safety devices have been replaced.
- **d** All personal danger tags have been removed.

Isolation Procedure for Equipment Being Tested

Mechanics shall remove their personal locks and tags from the isolation switch.

The mechanic shall prominently display a sign on the equipment stating “Equipment Being Tested”.

Every test shall first be coordinated with all technicians before tests begin.

If the equipment is considered operational, a designated mechanic shall coordinate the following:

- **a** Removal of the “Equipment Being Tested” personal tag and signs.
- **b** Verify the removal of equipment, tools, and personnel before moving the equipment.
- **c** Removal of the “Do not Operate” Tags.

5.7.5 If the equipment is not considered operational, a designated mechanic shall coordinate the following:

- **a** The “Do Not Operate” tag shall be kept on the equipment isolation switch.
- **b** Removal of the “Equipment Being Tested” personal tags and signs.
- **c** Personal locks and tags shall be put back on the isolation switch to restart the work.

Mobile Equipment Isolation Procedure

Equipment powered by any form of energy shall be positively isolated prior to any person working on the equipment.

Each person who is performing work on the equipment shall check that isolation from all energy sources has been completed and that his Personal Lock and “Danger, Do Not Operate” tag is placed before beginning to work on the equipment.

It is mandatory for earthworks equipment to have an isolation switch fitted with a lockout box allowing placement of locks.

For vehicles that are fitted with an isolation switch:

- **a** Place a “Danger, Do Not Operate” tag on the isolation switch of the equipment.
- **b** Turn off the isolation switch.
- **c** Test the equipment to assure that isolation has been completed.
- **d** Each worker performing work shall place his “Danger, Do Not Operate” tag and personal lock on the box that locks out the isolation switch.

For equipment with no isolation key or switch:

- **a** Place a “Do Not Operate” tag in a visible location in the cab of the equipment.
- **b** Disconnect one battery lead.
- **c** Test the equipment to ensure it has been completely isolated.

Each person performing work shall place his personal tag and “Danger, Do Not Operate” tag on the terminal of the battery lead, fixing it far from the battery terminals to avoid inadvertent contact and powering of the equipment.

Since mobile equipment is fitted with hydraulic systems and in some cases with linkages, additional precautions shall be taken to lock them out.

Hydraulic implements such as hoist arms, mold boards, and rippers shall be blocked to prevent movement such as during maintenance activities and when in the raised position.

The following must be taken into account for hydraulic systems:

- **a** Pins/slings shall be used for giant truck hoppers and metal supports for dump truck hoppers.
- **b** Specially designed metal supports may be used for buckets and rippers.

For articulated equipment such as front-end loaders, articulation stops shall be installed prior to start of work.

Regarding hoppers, these shall be cleaned before the equipment enters maintenance service; the zone of possible material fall shall be marked off with safety tape as an additional precaution measure.

Multiple Lockout (Lock Box Lockouts)

In areas that require multiple lockouts, boxes shall be provided for machinery and equipment that require them.

The supervisor or supervisor designee affected by the outage shall remove the locks from the multiple lock boxes, place the locks on the proper lockout points, and request start checks to verify proper isolation.

The supervisor or supervisor designee shall sign the Lock System List and place it on the clipboard at the Lock Box.

Employees shall verify that the equipment has been locked out by checking the lock system list.

The keys to the master locks being used for multiple lockouts shall, in turn, be placed inside the lock box. The operations supervisor shall then place a red lock on the lock box.

Each employee associated with the equipment repair, adjustment, cleanup, inspection, etc. shall place their personal lock on the multiple lock box.

At the completion of the employee's work assignment, the employee shall remove their lock from the multiple lock boxes. The details of each multiple lockout are posted at the multiple lockout boxes.

5.9.8 If the job is not completed and will carry over into other shifts or workdays, individual locks shall be removed at the end of the shift. Persons working the oncoming shifts shall check the equipment and place their own locks on the equipment or multiple lockout boxes.

The supervisor or supervisor designee shall ensure that the COMPANY's lockout device remains installed during shift change.

Upon completion of the work and inspection of the equipment and the immediate area to see that all personnel are in the clear and all other locks have been removed from the multiple lockout boxes, the operations supervisor shall then remove the red color lock from the lock box. The affected departmental supervisors shall then remove the master lock keys, unlock the applicable equipment, remove tags and return the keys to the multiple lockout boxes.

Nuclear Device Lockout

General Considerations for Working around Nuclear Devices

- **a** Only the site's Radiation Safety Officer (RSO) or 24-hour Trained Authorized User (TAU) designee shall remove, install, or relocate nuclear devices.
- **b** Only the site's RSO or 24-hour TAU designee shall perform radiation tests on nuclear devices.
- **c** Only those persons specifically licensed by the state shall perform maintenance or repair on nuclear devices. This includes activities such as repair of shutters and source holders, or replacement of radioactive material within the source holder. Repair or maintenance of detectors does not require a specific license.
- **d** If a nuclear device is damaged or needs to be relocated, post or barricade the work site and then contact your supervisor and the Radiation Safety Officer.

Procedure for Locking Out a Nuclear Device

All of the above provisions on energy isolation apply to nuclear devices, with the following additions.

- **a** Each nuclear device associated with a piece of equipment or an area shall be locked out before any activity that might expose an individual to the radiation beam takes place.

b The supervisor or supervisor designee shall place a COMPANY lock on each nuclear device before the equipment or area is released for maintenance.

c Only trained employees approved by the site's Radiation Safety Officer shall open and/or close shutters and place locks on nuclear devices.

Each person shall place his lock on the shutter of each involved nuclear device or use multiple lock boxes.

Each individual shall visually inspect each device and ensure it is properly locked out prior to entering the area.

If a person discovers that a nuclear device has not been properly locked out, he/she shall first contact the supervisor and have him/her lock it out before putting his/her lock on it.