Hazardous Energy Isolation- Lockout Tagout

CRITICAL PRACTICE

Your worksite runs on large amounts electrical energy - energy that can injure and kill if it's not controlled.

You and your crew must keep that energy firmly under control at all the times, even when it's not being used to run equipment.

During maintenance or cleaning, we have firm procedures to keep you safe from equipment starting when it shouldn't.

We call this the **Control of Hazardous Energy**.

These procedures are mandatory and apply to you, your crew, contractors and visitors performing work on the worksite.

Regulations or laws that are more stringent than these procedures will take precedence.

Control of Hazardous Energy is required when:

- → Guarding or safety devices need to be removed or bypassed; or
- → Individuals may be exposed to hazardous energy when performing tasks (e.g. pressurized systems).

Alternative control methods that provide effective protection can be used when:

- → tasks are routine, repetitive and integral to the production process, or
- → traditional energy isolation to complete the tasks is not possible.

This **Control of Hazardous Energy Code of Practice** applies to tasks on all equipment except:

- → pre-shift inspections, fueling, and other similar tasks as determined by risk assessment/FLRA.
- → tasks on electrical cord connected equipment (e.g. Hand held portable power tools) when exposure to the hazards of unexpected energization, start-up or release of hazardous energy is controlled by:
  - disconnecting the equipment from the energy source, and
  - the power connection is under the exclusive control of the individual performing the task.

Pause for Safety

Hazards

- → sudden and unexpected equipment start up by automated or other machine-oriented cause
- → electrocution
- → fire, flash or explosion
- → unexpected equipment start up caused by unaware crew-member
- → unexpected release of kinetic and/or mechanical energy (ie. Belt or spring tension)

PPE

Additional PPE

Controls

- → personal padlock and key
- → FLHA / JHA
- → Radio communications
- → Equipment safety manual(s)

Strategies and Procedures

The Key to Success: Your Personal Padlock

- → Upon being hired, you were issued a personal padlock to be used exclusively for protective lockout procedures. You are to carry this lock (and key) with you during all working hours.
- → Every other crew member has one, too.
- → Each padlock is clearly identified with the owner's name and/or a control number.
- → Spare keys are available from your supervisor but there won't be a second-party master override key.
- → Your Supervisor will do periodic checks to ensure you have the proper lock and that it is in good condition.
- → Only approved locks may be used.
- → Don't use the lock for anything except lockout procedures.

Special situations

→ If additional locks are required for a specific job they may be obtained from the worker's Supervisor.
→ In some cases, lockout adaptors (“scissors”) may be issued so that several people can lock out one switch.

Normal Lockout Procedure

Never work on, enter or approach the unguarded parts of any machinery until you have locked out the power supply with your own padlock in such a manner as to make it impossible for the machine to be started, accidentally or deliberately.

Prepare

1. If applicable:

→ review the work order
→ complete an FLRA or JHA
→ complete the isolation permit

Notify

2. Inform your Supervisor and the person immediately responsible for the operation of the equipment of your intention to lock it out.

Turnoff / Shutdown

3. Have the equipment shut down in the normal manner and visually ensure that it has stopped.

→ Do not use disconnect switches to stop machinery.

4. Perform other de-energizing activities as required.

Isolation

5. Set the power supply disconnect switch for the equipment to the 'OFF' position.

→ Use disconnect switches, line valves, blocks, blinds, etc. Do NOT use the equipment operating controls (i.e. on/off button, emergency stop button) for this purpose.
→ Physical barriers (e.g. flanges) must be equipped with a locking device.
→ When the isolating devices are designed with visual disconnects/isolations, it must be verified that disconnect / isolation has occurred.

Apply Locks

6. Place your personal padlock on the switch.

→ One Lock, One Person, One Energy Source
→ Locks must be applied to the energy isolating device or lock box.
→ Everyone working on the equipment is responsible for attaching their personal lock(s).
→ Lockout of each energy isolating device must be done with the approved lockout device.

7. Attempt to put the switch back to the 'ON' position to ensure that it is correctly locked out.

Zero Energy State

8. Relieve all energy including stored or residual energy.

→ This can involve blocking, bleeding, restraining or otherwise rendering the safe zero energy state.
→ Where stored energy has been determined to be a hazard, establish a means for non-hazardous dissipation.

Bump test / Verification

9. Ensure that all individuals are clear of the equipment.
10. Attempt to operate the normal operating controls to ensure the correct equipment has been de-energized and will not operate.

→ If the equipment operates, shut it down and notify your supervisor.

11. After a successful Bump Test (equipment does not operate), return operating controls to the neutral or off position.
12. Contact the central control operator to ask him to attempt to start the equipment even if it indicates "RED" in Central.

→ If it will not start by these means, then the equipment is safely locked out.
→ A radio should be used to contact the central control in isolated areas where there is no ready access to a phone.

Perform Task

13. Carry out the work on the equipment.

→ While you are working on the locked out equipment, you must keep the key for your padlock on your person.

Inspect and Restore

When the work is completed:

14. Visually inspect the area in and around the equipment to ensure that all tools and debris have been removed and guards and other safety devices are in place;
15. Notify all affected individuals that power is to be restored;
16. Verify that all individuals are clear of the equipment;
17. All those with padlocks on the switches can now remove them.

→ Never remove another individual's personal locks or tags; only your own.

18. The last worker to remove his lock will inform the Supervisor and the person immediately responsible for the operation of the equipment that the locks have been removed.
19. With all locks removed, restore power to the equipment while observing normal start up precautions.
20. Verify the equipment is operating properly and return control of the equipment to operation.
21. Complete the documentation of the permit, FLRA or JHA.

Ensure that all padlocks and the supervisory lockouts (including scissors) are removed at the end of each day to allow use of the equipment if necessary.

Locks should be left on at the end of the day if there is no need to run the equipment, or if it is impossible to run the equipment properly.

Simultaneous Lockouts

If you need to lock out more than one piece of equipment and there is no designated 'lockout box':

→ Obtain extra safety locks from your Supervisor in order to be able to lock out each piece of equipment
→ Keep the key for those locks in your possession.
→ "Scissors" are available from your Supervisor when there are more locks to be attached than there is room for on a switch.
→ Attempt to start each piece of equipment locked out.

- If it fails to start, then the machinery is safely locked out.

Lockout Procedures: Contractors

Contractors must be familiar with all the safety rules. It will be the responsibility of management to ensure this.

When commencing a job, the Company contact will assist the Contractor in locking out the necessary equipment and will place a supervisory padlock on the equipment.

Work proceeds using the same protocols as a Normal Lockout.

It will be the joint responsibility of both the Company and the Contractor's representative to ensure that all padlocks and the supervisory lockouts (including scissors) are removed at the end of each day to allow use of the equipment if necessary.

All locks should be left on when there is no need to run it, or if it is impossible to run the equipment during a major Contractor repair job.

Electrical Plant/Generator Lockout Procedures

When carrying out repairs or maintenance to any electrical equipment, the control panel and/or the main breaker MUST be locked out.

1. Turn off the main power to the control panel by turning the switch off and removing the key (if applicable).
2. Install a tag or sign on the control panel indicating work is being done on the plant.
3. Shut off the breaker to the piece of equipment being worked on.
4. Install your padlock, placing the key in your pocket.

→ If the breaker is not equipped for a lock, place the breaker in the "OFF" position, then close and lock the breaker cabinet doors.

→ Locks are not to be removed by anyone except the worker doing repairs or if in an emergency by a competent worker after he has satisfied himself that nobody is in a hazardous situation prior to starting the plant.

Note: During the plant operation, the operator must remain at the control panel at all times. No worker is to carry out repairs to the plant while it is in operation.

Emergency Procedures

1. Ensure energized source is isolated or turned off before approaching worker.
2. The injured person should be pulled free of contact with stationary equipment.
3. Ensure victim has been removed from the electrical source.
4. Confirm that the injured person is breathing.

→ If the person is not breathing, begin artificial resuscitation procedures.

5. Call out for help.
6. Contact 911.
7. Perform emergency first aid and/or CPR if required while awaiting the arrival of Emergency Medical Technicians.

Corporate Responsibilities

We, as a responsible corporation and employer will make sure:

- → to train and protect our workers from injuries associated in working with electrical systems.
    - Part of this training will include electrical awareness training for those workers that are required to work with electricity, i.e. generators, etc.
- → that all operating electrical equipment is kept in safe and proper working condition.
- → electrical equipment maintained for emergency service is periodically inspected and tested as necessary to ensure its fitness for service.
- → Infrequently used electrical equipment maintained for future service is thoroughly inspected before use in order to determine its fitness for service.
- → defective equipment is either be put in good order or permanently disconnected.

- → that in locations where explosive or flammable materials or gases are present, special precautions will be observed as follows:
    - Repairs or alterations shall not be made on any live equipment and fits or seals in enclosures are maintained in their original safe condition.
    - that passageways and working space around electrical equipment shall not be used for storage and are kept clear of obstruction and arranged to give authorized persons ready access to all parts requiring attention.
    - that a minimum working space of one (1) metre with secure footing is provided and maintained adjacent to electrical equipment such as switchboards, panel boards, control panels, and motor control centers that are enclosed in metal, except that working space is not required behind such equipment where there are no renewable parts such as fuses or switches on the back and where all connections are accessible form locations other than the back.
    - that each room containing electrical equipment and each working space around equipment has suitable means of egress, which will be kept clear of all obstructions.

You and Your Crew's Responsibilities

- → Only qualified workers will carry out electrical work.
- → If high voltage work is required it will only be carried out by trained and qualified workers.
- → Proper Lockout / Tag Out procedures will be followed before performing maintenance or any electrical work.
- → Flash protection devices must be used where possible.
- → To not use areas near electrical equipment as storage areas.
- → No flammable materials are to be stored near electrical equipment.
- → Use only proper CSA approved equipment.
- → Proper personal protective equipment (PPE) must be worn for protection from electrical shock and/or arc flash.
- → Install as per the BC Building code or building code for the jurisdiction where the equipment is destined. Where there is a higher standard between jurisdictions the higher standard, where possible should be followed.
- → Use proper illumination to ensure work being performed is visible.
- → All electrical equipment including generators must be properly grounded.
- → All extension and power supply cords must be maintained in a safe condition.
- → Portable electrical equipment used outdoors or in damp locations is equipped with ground fault circuit interrupters (GFCI)

Legal

Hazard Classification

By regulation, hazardous locations must be classified according to the nature of the hazard:

- → Class I
  - flammable gases or vapors are or may be present in the air in quantities sufficient to produce explosive gas atmospheres
- → Class II
  - presence of combustible or electrically conductive combustible dusts
- → Class III
  - presence of easily ignitable fibers or flyings, but in which such materials are not likely to be in air suspension in quantities sufficient to produce ignitable mixtures.

If electrical equipment is required in a hazardous location it must also be approved for the specific gas, vapor, mist or dust that will be present. All bare live parts must be properly guarded against accidental contact.

Code

We will ensure that electrical installations are made so that the probability of fire spreading through fire stopped partitions, floors, hollow spaces, firewalls or fire partitions, vertical shafts, or ventilating or air-conditioning ducting is reduced to a minimum.

Where a fire separation is pierced by a raceway or cable, any openings around the raceway or cable are properly closed or sealed in compliance with the Alberta Building Code.

CSA Approved Materials

We will ensure that electrical equipment is installed and guarded so that adequate provision is made for the safety of persons and property and for the protection of the electrical equipment from mechanical or other injury to which it is liable to be exposed.

All electrical equipment used is of a kind or type and rating approved for the specific purpose for which it is to be used.

All electrical rooms have adequate ventilation and no electrical room or source is placed within one (1) meter of a combustible gas relief valve or vent.

- → All equipment used, including extension cords, will be CSA approved and maintained in proper working order.

Through proper use of CSA approved materials and following the building codes all electrical installations are made so that the probability of spread of fire through fire stopped partitions, floors, hollow spaces, firewalls or fire partitions, vertical shafts, or ventilating or air-conditioning duct is reduced to a minimum.

Terms you may encounter:

"ADS"

Additive Silos

"Blind"

A metal disk placed in a pipe capable of withstanding the maximum pressure of the system to ensure that no air, steam, or other substance will pass through that point if the system is accidentally activated.

"Blocking"

Special brackets or stands such as those used under a raised vehicle or equipment. Blocking must be placed under raised dies, lifts or any equipment that might inadvertently move by sliding, falling or rolling;

"Double block and bleed"

A pipe isolation system that incorporates two in line valves and a "bleed" valve between the in line valves. The system is lockable and/or requires excessive force to operate without specialized equipment;

"Bump test"

Once equipment has been locked and tagged out, an authorized worker must ensure all personnel and tools are clear, then test or "bump" start the locked out equipment as a final check to ensure that the lockout is successful;

"De-energize"

To deal with energy that already exists by draining or relieving residual energy sources such as air or hydraulic lines, tension on springs, dissipating stored electrical or thermal energy or negating the effects of gravity so that the stored energy will not result in inadvertent movement;

"Energy source"

Any electrical, mechanical, hydraulic, pneumatic, chemical, thermal, gravitational or other source of energy. This can exist in the form of parts movement such as equipment rolling or stored energy such as coiled springs or suspended loads;

"Group lockout"

A set of locks used to isolate energy sources (active or potential) in a system. When more than one lock is required to isolate a system, a lock box procedure will be used. A supervisor will accompany an authorized worker to place group locks on appropriate energy isolation points. The energy isolation key(s) for the group locks will be placed in the lock box;

"Isolation tag"

A recordable, tag that is to be attached to the lockout location;

"Live work"

Work that requires the equipment to be running in order to perform work. A written Job Hazard Analysis and Standard Operating Procedure must be available and reviewed for such work;

"Lockout"

To prevent the energization or an undesirable activation of a system. This requires the use of one or more locks to physically secure isolation of all energy sources in order to render the machinery or equipment inoperable. This must be in accordance with a written procedure;

"Lockout adaptor"

A device that enables multiple locks to be placed on the same lockout point. After the work is completed, each worker removes their lock and only upon removal of all locks can the equipment be returned to operation.

"MCC"

Motor Control Centre

“PHT”

Preheat Tower