

LOCATION:	WRITTEN BY:	APPROVED BY:	DATE CREATED:	LAST REVISION:
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PERSONAL PROTECTION EQUIPMENT (PPE)	
 Safety glasses or face shield must be worn at all times in work areas.	 Long and loose hair must be tied back
 Appropriate footwear must be worn. Shoe must be fully enclosed. No open toed shoes.	 Close fitting/protective clothing must be worn. Remove strings hanging from pullovers/sweaters.
 Rings and jewelry (long necklaces / bracelets, etc.) must not be worn.	 Arc Flash protective clothing must be worn by electricians until they can prove electrical equipment has been de-energized.

HAZARDS PRESENT	ADDITIONAL REQUIREMENTS
<ul style="list-style-type: none"> <li>• Electrical shock</li> <li>• Arc flash</li> <li>• Burns</li> <li>• Cuts</li> <li>• Pinch points</li> </ul>	<ul style="list-style-type: none"> <li>• Lockout / Tag-out training</li> <li>• Lockout / tag-out equipment</li> <li>• PPE</li> <li>• First Aid / CPR</li> </ul>

SAFE WORK PROCEDURE
<p>Only persons who are “Qualified” may conduct lockout/tag-out (LOTO) processes. A person must be “Qualified” by their Supervisor when their duties include performing cleaning, repairing, servicing, setting-up and adjusting operations on equipment requiring energy isolation for safe work activities. All “qualified person(s)” must be trained in LOTO and be provided appropriate tools to conduct lockout/tag-out, and follow all procedures.</p> <p><b>PROCEDURE:</b></p> <p><b>1.0 Prepare for Shutdown</b></p> <p>The authorized employee will:</p> <ol style="list-style-type: none"> <li>1.1 Identify machines, equipment and processes to be isolated.</li> <li>1.2 Inform all affected employees when machinery or piece of equipment will be locked out.</li> <li>1.3 Identify the types and magnitude of hazardous energy to be controlled and understand the hazards of that energy.</li> <li>1.4 Identify the methods for controlling the hazardous energy.</li> <li>1.5 Identify all isolation points and energy isolation devices to be locked out. Ensure remote computer and/or programmable computer logic controllers are considered.</li> <li>1.6 Identify and obtain appropriate personal protective equipment.</li> </ol>

- 1.7 Identify and obtain locks, tags, lockout devices and other equipment required to perform The work. All trades and head caretakers are issued a suitable lock (or locks for multiple energy sources). Each worker has the only key to the lock / lock set.



Typical locks and hasps for use in locking out equipment.

## **2.0 Equipment Shutdown:**

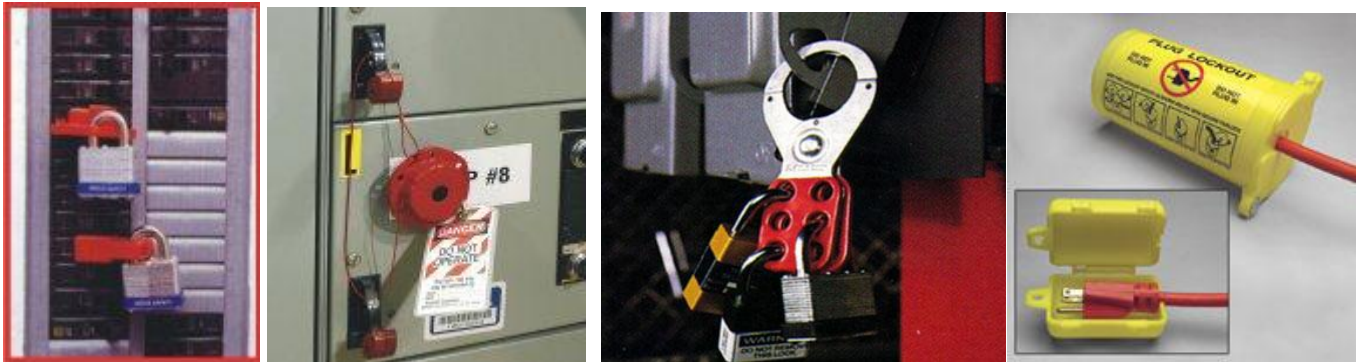
- 2.1 Notify all affected employees of the lockout.
- 2.2 The Qualified Person checks to be sure that no one is operating the equipment BEFORE turning off energy sources.
- 2.3 Shutdown the equipment following the normal stop or rundown procedures. (e.g. push ON/OFF or START/STOP buttons or switches).

## **3.0 Isolation:**

- 3.1 Locate all energy isolation devices required to control the hazardous energy.
- 3.2 Operate the energy isolation devices such that the machine or equipment is isolated from energy sources. This usually involves opening a disconnect switch, circuit breaker or closing valves.  
Note: Never open a disconnect switch without first shutting down the equipment as it could result in arcing or an explosion. Use the left hand rule when opening and closing disconnect switches. (Left hand rule: Stay to the right of the disconnect switch, face away and use your left hand to operate the switch. This positioning protects the face and body in the event of arcing or an explosion).
- 3.3 Steam, air, and hydraulic piping or tanks must be bled, drained, and/or brought to atmospheric pressure and locked "open" to assure no pressure or vacuum in piping or in reservoir tanks.
- 3.4 Gas cylinders must be locked 'closed' and if possible disconnected from distribution piping.
- 3.5 Any mechanical component that could roll, shift or otherwise move, such as springs, counterweights, wheels, fan blades, etc. must be chained, barred or blocked.

## **4.0 Apply Lockout/Tag-out Devices:**

- 4.1 Apply locks and tags to each energy isolation device to ensure it is held in OFF position.
- 4.2 Where a lockout device is required for an energy isolation device, install the lockout device and apply locks and tags to ensure it is held in the "OFF" position.
- 4.3 Each person who will be working on the machinery must put a lock on each of the machine's lockout device(s). Each lock must remain on the machine until the work is completed. Only the worker who placed the lock may remove their lock.
- 4.4 All energy sources which could activate the machine must be locked or blocked out.



Electrical panels shown "locked out"

Electrical plug lockout



Piping shown "locked out"



Disconnect panels with "lockout here" labels and energy isolation information





Locked com. Airline

Locked globe valve

Locked gas cylinder

Locked propane cylinder

## 5.0 De-energization: Stored Energy Release or Restraint

5.1 After application of lockout devices, all stored or residual energy must be relieved, disconnected, blocked, bled, restrained or otherwise made safe. Note: Remember to consider energy stored in capacitors, springs, pressure lines, elevated equipment.

- Compressed air /gasses / hydraulic fluids / steam /pressurized water – need to be locked out and bled to release residual pressure. Physically disconnect the equipment from the supply plumbing if possible. If not, use double valves or blind off supply lines with appropriate flange plates or pipe caps.
- Mechanical energy – block equipment components so they cannot move using support rods for counterweights or elevated components, a wedge-shape wheel chalk for rolling components, crapping and locking chains around movable equipment components and locking it to an immovable object, etc.

## 6.0 Verification

6.1 Ensure all affected employees are cleared of the machine or equipment.

6.2 Before beginning any work, verify the machine or equipment is isolated and cannot be activated or restarted by one or more of the following actions:

- Manually operating control buttons or switches to start or operate the machine or equipment. Return controls to their off or neutral position.
- Using test instruments to test circuits.
- Visually inspecting the position or movement of parts such as gears, rotating parts, shafts, flywheels to ensure movement has ceased; inspecting gauges or other indicators.

6.3 Electrical Work Conducted by Electricians - all electricians conducting electrical work must wear PPE while shutting down. Every electrical conductor or circuit part is considered energized until proved otherwise. Workers must use lock out devices on electrical conductors and circuit parts operating at 30V or more. Workers must use test instruments every time electrical work is done to determine the absence of voltage on conductors / circuit parts operating at 30V or more. Workers must ensure that have an electrically safe work condition prior to starting work. Stored energy in electrical capacitors must be safely discharged.

**CAUTION:** Return disconnects and operating controls to the “off” position after each test.

### **7.0 Testing / Adjusting Equipment during Lockout**

In many maintenance and repair operations, machinery must be tested and therefore energized before additional maintenance work can be performed. For such situations, this procedure must be followed:

- 7.1 Clear the machine or equipment of parts, tools that could be affected by energizing the machine or equipment.
- 7.2 Clear people from the area..
- 7.3 Remove blocks and lockout devices and re-energize systems, following the established safe procedure.
- 7.4 Proceed with tryout or test.
- 7.5 De-energize and re-apply the lockout/tag-out devices shut off all energy sources reinstalling lockouts on energy sources, reinstall blocks, bleed all pressure systems and verify all energy sources de-energized prior to continuing work.
- 7.6 Verify the machine or equipment has been re-isolated by operating controls etc...
- 7.7 Resume work on the machine or equipment.

Equipment design and performance limitations may dictate that effective alternative worker protection be provided when the established lockout procedure is not feasible. If machinery must be capable of movement in order to perform a maintenance task, workers must use extension tools, personal protective equipment and other means to protect themselves from moving parts and potential injury.

### **8.0 Restoring Equipment to Service**

After the work is completed and the equipment is ready to be returned to normal operation, this procedure must be followed:

- 8.1 Remove all non-essential equipment or parts have been removed from the machine and the machine is operationally intact and safe to be operated.
- 8.2 See that all equipment components are operationally intact, including reinstalling guards and safety devices.
- 8.3 Repair or replace defective guards before removing locks.
- 8.4 Ensure the machinery, equipment and surrounding area is clear of anyone who could be harmed by the start-up.
- 8.5 Ensure each person who applied a lockout device and tag removes these from each energy isolation device. Remove each lockout device using the correct removal sequence. Each lock is removed by the qualified person that applied it, or under his/her direct supervision. If the qualified person is absent from the work place then the lock or tag can be removed by a qualified person designated to perform this task provided that the immediate supervisor:
  - Verifies that the qualified person is not present and therefore unable to remove the lock;
  - Makes all reasonable efforts to inform the qualified person that the lockout/tag-out device has been removed; and
  - Ensures that the qualified person knows their lockout/tag-out device has been removed before their work resumes.
- 8.6 Energize the machine, but do not start it up.
- 8.7 Notify all affected employees the machine or equipment is ready to be started. Make a visual check before restoring energy to ensure that everyone is physically clear of the equipment.
- 8.8 Re-start the machine or equipment.

### **9.0 Group Lockout**

When maintenance or servicing work is being performed by more than one authorized employee, a primary authorized employee must be assigned responsibility for the controlling all energy isolating devices for the machine, equipment or process.

9.1 Before beginning work, the primary authorized employee will apply a multi-lock hasp and lock to each energy isolating device and verify the machine, equipment or process has been isolated.

9.2 Other authorized workers review the adequacy of the isolation and apply their own locks to the multi-lock hasp.

9.3 Authorized employees perform work.

9.4 Upon completion of work, each authorized employee removes non-essential items from the work area and remove their own personal lock(s).

9.5 The primary authorized employee is the last one to remove their lock and the energy isolating device. This can only be done after the primary authorized employee has assessed the area and is satisfied it is safe to so.

### **10.0 Contractors**

Whenever outside contractors perform maintenance or servicing work that require lockout/tag-out procedures, the designated Divisional representative and each contractor shall inform each other of their respective lockout/tag-out procedures. The Pembina Trails representative must communicate this information to affected employees and ensure these respective procedures are mutually understood.

\*\*See the attached work specific safety lockout procedures.

## **REGULATORY REQUIREMENTS**

- WS&H Act W210, Section 4, 5, 7, 7.1
- Mb. Workplace Safety & Health Regulations 217/2006,
  - Part 38, Electrical Safety, Sections 38.1, 38.2, 38.14
  - Part 2, Safe Work Procedures
  - Part 6, Personal Protective Equipment
  - Part 8, Musculoskeletal Injuries
- Safe Work Bulletin #164 PPE
- Safe Work Bulletin #246 Safe Lifting
- Safe Work Bulletin #277 Arc Flash Hazards
- CSA Z462 – Workplace electrical Safety

