Gateway to the Rockies
HINTON

Managing Hazardous Energy

#HS.D1402.07

Why ?

- Part 15, Managing the Control of Hazardous Energy – OHS Code
- CSA Z460-12, Control of Hazardous Energy
- 212(1) If machinery, equipment or powered mobile equipment is to be serviced, repaired, tested, adjusted or inspected, or if any other work is to be performed on the machinery, equipment or powered mobile equipment that requires the control of hazardous energy, an employer must ensure that no worker performs such work on the machinery, equipment or powered mobile equipment until it has come to a complete stop and (a) all hazardous energy that may pose a hazard to a worker is isolated by activation of an energy-isolating device and the energy-isolating device is secured in accordance with section 214.1, 215 or 215.1, or (b) the machinery, equipment or powered mobile equipment is otherwise rendered inoperative in a manner that prevents its unintended activation and provides equal or greater protection than the protection afforded under clause (a).

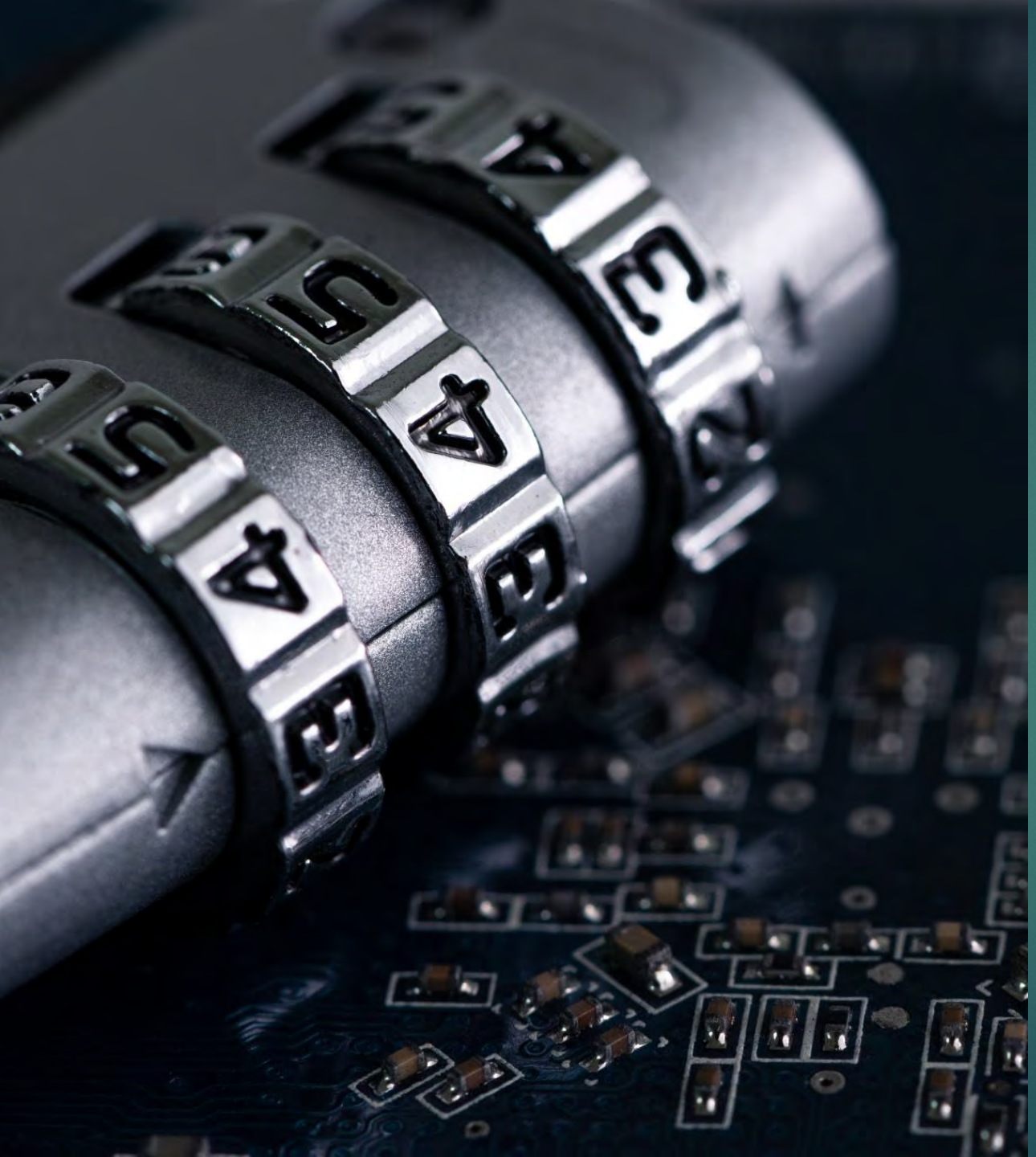
Plan Forward

Control of Hazardous Energy

- Lock outs – personal or group
- Isolation Devices/Lock out Boards
- Procedures – each energy isolating device is secured with personal lock
- Verify effective isolation
- Who?
- Tested
- Return to Operation
- Transfer of Authorization
- Lock Removals
- Old Locks versus New Locks to be Issued – keys secured to lock the devices.

Lock outs

- Hazardous Energy - electrical, mechanical, hydraulic, pneumatic, chemical, nuclear, thermal, gravitational, or any other form of energy that could cause injury due to the unintended motion energizing, start-up, or release of such stored or residual energy in machinery, equipment, piping, pipelines, or process systems.
- Lockout - The practice of using mechanical devices to positively isolate equipment, piping or processes from accidental release of energy sources that could result in injury to those in the work area, damage to property or processes.



LOTO

DISCUSSION

WHERE WOULD AN EMPLOYEE BE RESPONSIBLE TO LOCK OUT, WHEN AND WHY?

Definitions

- Authorized Operator – has the authority to shutdown and control hazardous energy when working with machinery, equipment or powered mobile equipment. An Authorized Operator will communicate immediately with the applicable supervisor who will arrange for lock out to an Authorized Worker.
- Authorized Person – Authorized Worker/Supervisor/Manager/Director who has been designated and deemed competent to review and evaluate the safe removal of lock/device (s).
- Authorized Worker – has the authority to lock out the energy source and/or equipment at all points of access and will be responsible to isolate, verify, document and be the last to remove the lock out device (s).

- Electrical energy - Switch electrical disconnects to the off position.

- Hydraulic and pneumatic potential energy –

Set the valves in the closed position and lock them into place.

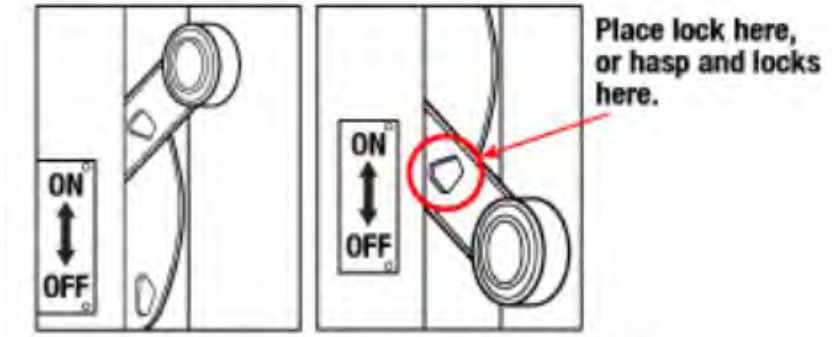


Figure 1: Electrical lockout

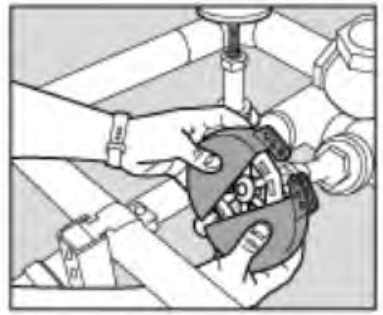
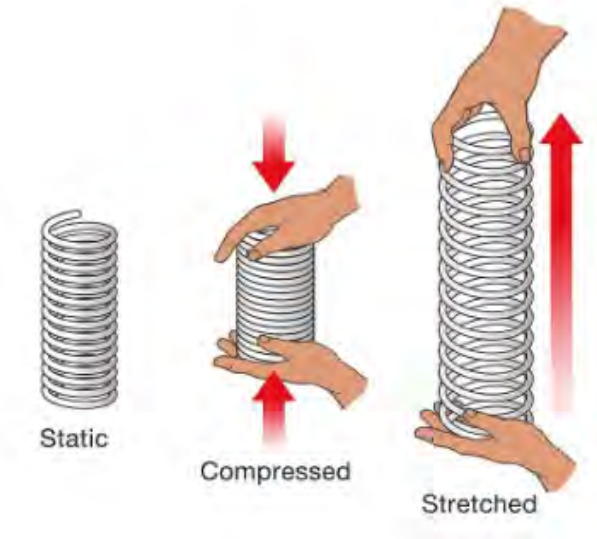
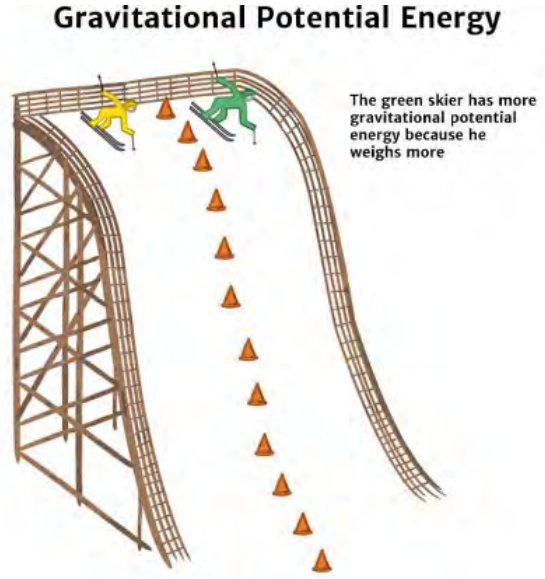


Figure 2: Hydraulic and pneumatic lockout

- Mechanical potential energy - Carefully release energy from springs that may still be compressed.
- Gravitational potential energy - Use a safety block or pin to prevent the part of the system that may fall or move.



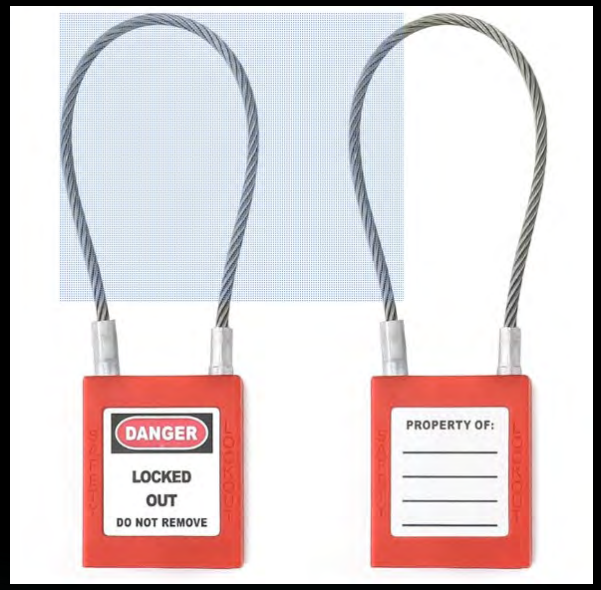


- Chemical energy - Locate chemical supply lines to the system and close and lockout the valves. Where possible, bleed lines and/or cap ends to remove chemicals from the system.


LOCKOUT
STATION
BOZZYS
HAVE YOU REMEMBERED TO
LOG IN AND/OR OUT?

What's new?

What's else is new?


DANGER
LOCKED
OUT
DO NOT REMOVE
PROPERTY OF:


TAGS ON THE ROLL
DANGER
DO NOT
OPERATE
THIS LOCK/TAG MAY
ONLY BE REMOVED BY:
NAME:
DEPT.:
EXPECTED COMPLETION:
STOPOUT

LOTO Terminology

1. Tag out – Authorized Operator
2. Removal – Authorized Person
3. Lock out – Authorized Worker

EMERGENCIES

What should I do when it's an emergency?

1. Emergency Shutdown
2. Hand Off Auto (HOA)
3. Tag out
4. Contact your Supervisor
5. Supervisor request for lock out

Tag Out

- Hand Off Auto (HOA)
- Switch/Lever
- Zip tie
- Tag Filled out
- Communicate immediately with the applicable supervisor who will arrange for lock out with an Authorized Worker

Tag Outs – WHEN?

1. If you are an Authorized Operator
2. If you are an Authorized Worker and lock out equipment for another person or group – LEAVE ON

Lock Outs – WHEN?

1. If you are a Worker or Contractor working on a lock out - Authorized Operator & Authorized Worker

Wrong way – Why?

How do we lock out?

Step 1: Notification

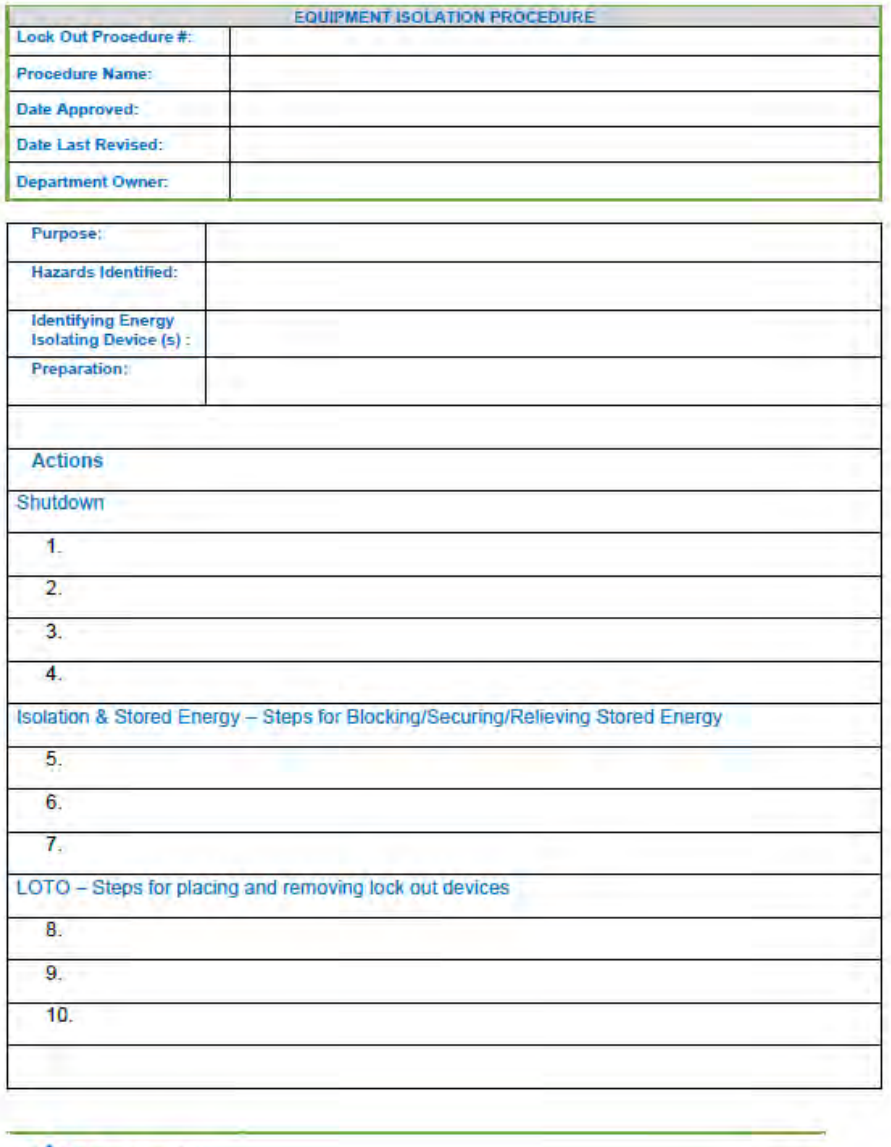
- Notify affected workers that a lockout will be in effect and explain the reason for the lockout (This is to ensure no workers attempt to re-activate machines/equipment)

- If the equipment being locked out affects external stakeholders, the Authorized Worker must notify and collaborate with them before any work begins

Step 2: Written Lockout Instructions

- Authorized Workers will FOLLOW written procedures for the applicable lock out.

- Procedures will be kept readily available at the worksite (WorkHub)



EQUIPMENT ISOLATION PROCEDURE	
Lock Out Procedure #:	
Procedure Name:	
Date Approved:	
Date Last Revised:	
Department Owner:	

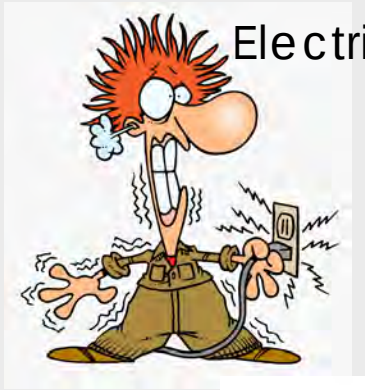
Purpose:	
Hazards Identified:	
Identifying Energy Isolating Device (s) :	
Preparation:	
Actions	
Shutdown	
1.	
2.	
3.	
4.	
Isolation & Stored Energy – Steps for Blocking/Securing/Relieving Stored Energy	
5.	
6.	
7.	
LOTO – Steps for placing and removing lock out devices	
8.	
9.	
10.	

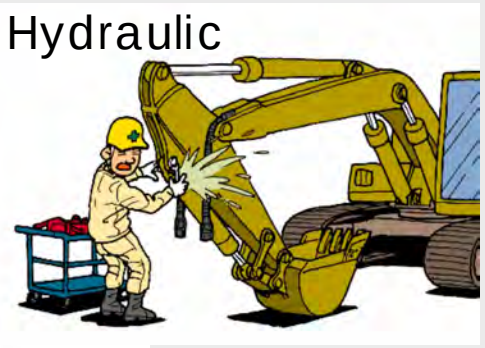
What if there is no written procedures for lock out?

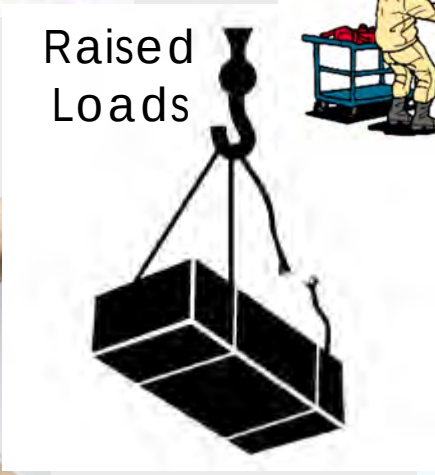
- Use QR Code – EMERGENCIES ONLY

Step 3: Identification

While everything that requires isolation will be confirmed in advance and on the equipment isolation procedure, Authorized Workers will want to ensure there are no new or missed energy sources







Step 4: Equipment Shutdown

- Follow the Equipment Isolation Procedure to achieve a zero-energy state
- Ensure additional hazards are not created during shutdown (i.e./ lighting in public areas)

Step 5: Isolation

- Operate the switch, valve or other energy-isolating device(s) to ensure all energy source(s) are isolated and deactivated

- Isolation may be single or multiple points

Step 6: Lock Out & Tag Out

- Each energy isolating point must be locked and tagged in a safe, secured position to prevent accidental movement of the device.
- Each Authorized Operator performing work directly on the pipe/ machine/equipment being serviced/maintained will personally attach a lock/device to the required isolation points. The isolation point in a group LOTO may be a lockbox.
- Workers CANNOT attach a personal lock/device for another employee.
- Any Worker who will be impacted by the work being performed will have the right to apply a lock/device to the isolation points.
- Workers or groups performing work independently of main isolation but impacting other isolation points will obtain approval from the Authorized Worker before applying additional locks.

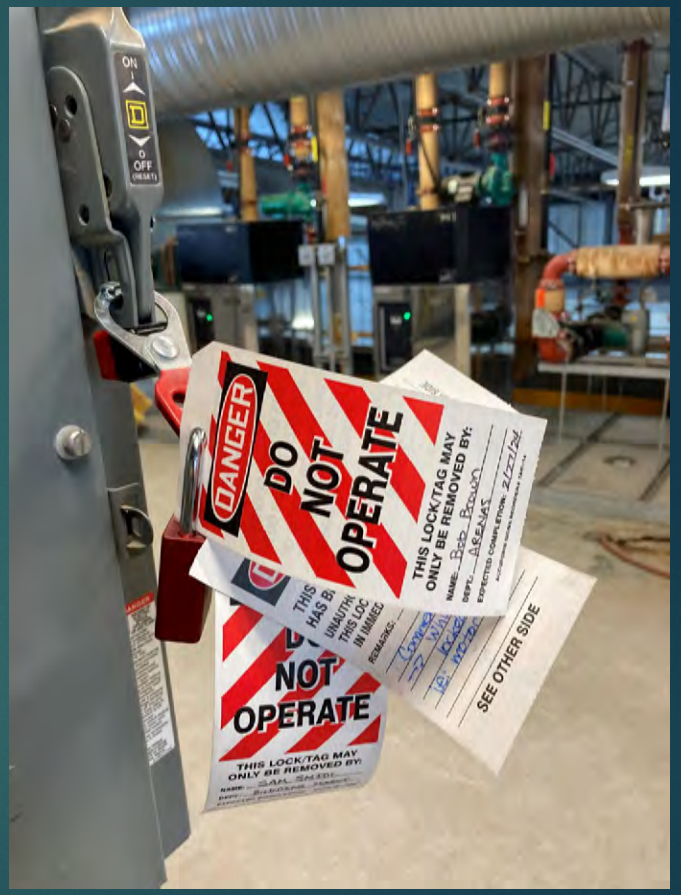
Step 7: Stored Energy

- Relieve, disconnect, restrain and/or render safe, potentially hazardous stored or residual energy.
- If re-accumulation of stored energy is possible, verification of energy isolation shall be continued until servicing or maintenance work is completed or until the hazard no longer exists.

How does this work?

Step 1 – AW removes zip tie and places scissor tag and lock

Step 2 – if contractor working on equipment, place lock and tag to scissor



Step 3 – if Town worker working on equipment, place lock and tag to scissor

If all parties are working together on equipment

Step 8: Testing & Verification

The Authorized Worker will verify BEFORE work starts:

- Test circuitry.
- Perform load verification cycling.
- Visually inspect position.
- Manually activate machine/equipment controls, actuating devices/locked out mechanisms.
- Monitor movement or discharge.
- Observe gauges.
- Confirming that locks are physically placed in correct locations is not an accepted form of verification.

Step 9: Servicing & Maintenance

- Proceed with servicing/maintenance on the machines/equipment that have been locked out appropriately.

Step 10: Return to Service

- Lock out Release
  - Inspect and clear work area of tools, equipment, non-essential items.
  - Notify all Workers in start-up area that equipment will be re-energized before energy is restored to the machine, equipment, or process.
  - Once confirmed, each Worker will remove lock/device and tags.
  - Authorized Worker will remove the last lock/device (s) applied to isolation points.

Step 11: Re-Energization

- The Authorized Worker will return the isolating devices (e.g. switches, valves) to appropriate operating position.
- If safe, restore energy to machine/equipment.

Authorized Removal of a Personal Lock

1. Contact the Authorized Worker who applied the lock out device and request that they remove their device/lock, if the Authorized Worker is not available, contact an Authorized Person.
2. Document on the lock removal authorization form.
3. Remove lock and/device, once steps have been achieved.

• Locks and Tags/Warning Signs

Locks and Tags/Warning Signs

- Do Not Start, Do Not Open, Do Not Close, Do Not Energize, Do Not Operate, etc.
- the date/hour that the control device and the locking device were set in the safe position.
- the name of the Worker performing the work or live test.
- distinctively marked as a testing tag or sign when used with a live test.
- be removed only by the Authorized Worker

Contractors

- Project manager
- Locks provided by contractor
- Follow Town procedures
- Prime contractor

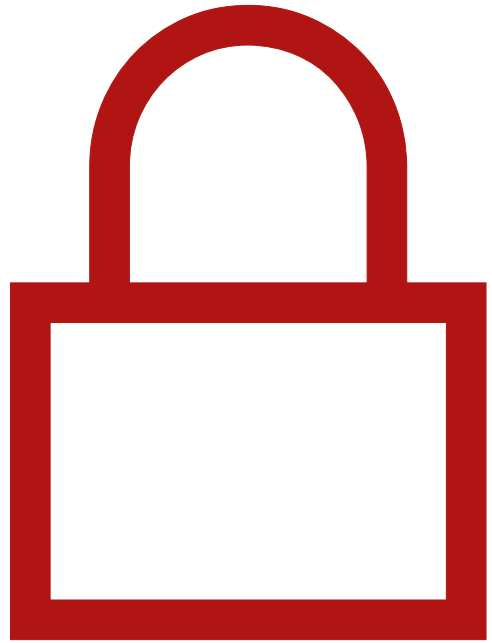
Authorized Lock Removal

What happens if a lock wasn't removed?

"Authorized Person" -

Authorized Worker/Supervisor/Manager/Director who has been designated and deemed competent to review and evaluate the safe removal of lock/device (s).

Form



SCENARIOS


SQUARE D
by Schneider Electric
Play Pool Filter Pump
ON
OFF
DANGER
DANGER
PELIGRO
PLAY POOL CONTROLLER
SQUARE D
Whirl Pool Filter Pump
ON
OFF
DANGER
DANGER
PELIGRO
HOT TUB CONTROLLER
SPA BOOSTER PUMP INTERLOCK
FILTER PUMP MUST BE ON TO
START BOOSTER PUMP
PLAY POOL BOOSTER PUMP INTERLOCK


CAUTION: TWO SOURCES OF VOLTAGE
AUX. CONTACT, MAIN POOL BOOSTER
PANEL PB CCT. 10,12
EATON
DANGER
MAIN POOL FILTER PUMP
PANEL 'H', CCT. 37,39,41
RUN
STOP START
RESET


ABB
PUMP P-1A
PNL P - 13,15,17
O
Hand Auto
R
ABB
PUMP P-1B
PNL P - 38,40,42
O
Hand Auto
R
TEKMAR - PNL P
tekmar
Menu
Item


P-501
HOTCHKISS
COLD BRINE PUMP
OFF
P-503
HOTCHKISS
UNDERFLOOR HEAT PUMP
ON
OFF
P-502
THOMPSON
COLD BRINE PUMP
ON
OFF
COMPRESSOR 1
OFF
COMPRESSOR 2
ON
OFF
COMPRESSOR 3
ON
OFF


ON
TRIP
OFF
ON
OFF
OFF
HAND
AUTO
P-503
HOTCHKISS
UNDERFLOOR HEAT PUMP
RESET
ON
TRIP
OFF
ON
OFF
OFF
HAND
AUTO
P-502
THOMPSON
COLD BRINE PUMP
RESET
ON
TRIP
OFF
ON
OFF
OFF
HAND
AUTO
P-501
HOTCHKISS
COLD BRINE PUMP
RESET
ON
TRIP
OFF
ON
OFF
COMPRESSOR 1

- Hand, Off, Auto
- Add tag with description of why you tagged out


P-21,23
SQUARE D
SPA


HAND OFF AUTO
PF - 2
AUXILLARY PUMP
RESET
..TURN.. PANEL 'H' 2, 4, 6
Auxiliary Pump
...to hand... or OFF
KLOCKNER MOELLER

Q & A?