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WCDSB

Updated: 12/08

CONTROL OF HAZARDOUS ENERGY (Lock Out)

Purpose

The purpose of this lockout/tagout procedure is to establish an effective system to prevent the unintentional release of energy from any machine, equipment or process which may cause injury or damage to an individual or process.

From time to time machinery, equipment, devices etc. are bound to require maintenance or servicing.

When machinery, equipment, etc requires maintenance, precautions must be taken to ensure that whoever is working on the machine, equipment, device etc. can do so in a safe manner, without the risk of injury. To that end, the machinery, equipment, device, etc. being serviced must have zero power at the time of work. Zero power can be achieved through a process called "Lock-out"

A lockout is a process or procedure used to prevent hazardous energy from equipment, from injuring workers. A lock or lockout device is used with a tag. The lock is placed on the energy isolating mechanism that is in the "off" or "closed" position. The lockout must result in a zero energy state before work begins on the equipment.

Scope

Any activity which may result in the release of energy to an individual while working at attending or visiting WCDSB facilities.

Applicable Legislation

Occupational Health and Safety Act (OHSA), R.S.O. 1990.

O. Reg.851, R.R.O. 1990, Industrial Establishments, Section 42, 43, 75,76

Applicable Standards

Canada Standards Association (CSA) Z460-05 [Control of hazardous energy - Lockout and other methods], Ontario Ministry of Labour (MOL) Engineering Data Sheet: 9-02 [Lock-out Procedures for Machinery].

Definitions

The following definitions are from Engineering Data Sheet No. 9.02 prepared by the Ontario

Ministry of Labour. The definitions apply to the above mentioned legislation and following procedures.

1. "Control switch" referred to in Section 76, as it applies to electrical controls shall be understood to mean the main power source or disconnect switch.
2. Electrical "disconnect switch" means a pull-type switch or circuit breaker which physically opens to disconnect the circuit.
3. "Start" or "stop" switch means a toggle or push button switch usually mounted on or near the machine being started or stopped.
4. "Machine" shall be understood to include "transmission machinery, device or thing". This includes boilers, vessels, chests, hydraulic or air driven machinery pipelines, sawdust collectors etc., which must be isolated to safely carry out the work.
5. "Power" is recognized as being any type of energy which causes materials to flow, or a machine or piece of equipment to operate.
6. "Work" shall mean other than normal operation of the machine, eg. the inspection, repair, adjustment, cleaning, maintenance etc. for which the machine must be stopped.
7. "Person in charge" means a qualified person who originates the work order, which gives him/her the authority over staff or contract persons working on a machine.
8. "Qualified person" means a person designated by his/her employer as qualified because of knowledge, training and experience to safely perform an assigned task.
9. "Worker" is the staff or contract person performing the work on a machine.
10. "Operator" is the person responsible for the normal shutdown and starting of the machine.
11. In actual application, "the person in charge", "the qualified person" or "the worker" may be the same individual.

SCOPE

These procedures apply to all employees and contractors of the WCDSB.

Affected Person

A person whose job requires operation or use of equipment on which maintenance is being performed under lockout/tagout, or whose job requires work in an area where such work is being performed.

Authorized Person

A person qualified through system knowledge and lockout/tag out training on machines and equipment and authorized by his/her supervisor to install or remove lockout/tag out on machines and equipment in accordance with established procedures.

Energy - Isolating Device

A mechanical device that prevents the transmission or release of energy.

Examples include: circuit breakers disconnect switches; blind flanges; plugs or blocks; and any similar devices used to block or isolate energy.

Energy Source

Any source that could cause harm to an individual by generating or transferring electrical energy or potential (voltage); hydraulic, pneumatic, gas or steam pressure; high temperature; cryogenic temperature or stored mechanical energy; energy stored in springs; and potential energy from suspended parts (gravity).

The WCDSB believes that the majority of electrical work can be carried out with the electrical system de-energized. In keeping with this mandate a policy of Live Work under only those limited conditions permitted under the Occupational Health & Safety Act will be permitted when it is not practicable to disconnect electrical equipment or conductors from the power supply before working on, or near, live exposed parts of the equipment or conductors. “Not practicable” does not mean “not convenient”. It means where life, limb or property damage may occur if the power is turned off.

Individual Responsible for Removing a Lock or Tag when an Authorized Person is absent:

This will be a designated supervisor appointed by the WCDSB Health and Safety Officer. This individual will be the only person empowered to remove

Locks and Tags in the absence of an Authorized Person. See Procedure.

Lockout/Tagout

A general term for all methods of ensuring the protection of personnel from controlled energy sources by installing locks and tags on energy isolation devices.

Supervisors

Individuals who have managerial duties as part of their job function. This includes but is not limited to head custodians and trades working alone.

Zero Energy State

The mechanical potential energy in all elements of a machine is eliminated so that operation of any control will not produce a movement that could cause injury or damage to the machine.

REQUIREMENTS UNDER O. REG. 851, INDUSTRIAL ESTABLISHMENTS, SECTION 42,43,75, 76:

- 42.(1) *The power supply to electrical installations, equipment or conductors shall be disconnected, locked out of service and tagged before any work is done, and while it is being done, on or near live exposed parts of the installations, equipment or conductors.*
- 42.(2) *Before beginning the work, each worker shall determine if the requirements of subsection (1) have been complied with.*
- 42.(3) *Locking out is not required,*
 - (a) if the conductors are adequately grounded with a visible grounding mechanism; or*
 - (b) if the voltage is less than 300 volts and there is no locking device for the circuit breakers of fuses and procedures are in place adequate to ensure that the circuit is not inadvertently energized.*
- 42.(4) *If locking is not required for reasons set out in clause (3)*
 - (a) the employer shall ensure that the procedures required by that clause are carried out.(Requires Direction from Facilities Supervisor and Health & Safety Officer)*
- 42.(5) *If more than one worker is involved in the work referred to in subsection (1), the worker who disconnected and locked out the power supply shall communicate the purpose and status of the disconnecting and lockout.*

- 42.(6) *If a tag is used as a means of communication, the tag*
- (a) shall be made of non-conducting material;*
 - (b) shall be secured to prevent its inadvertent removal;*
 - (c) shall be placed in a conspicuous location;*
 - (d) shall state the reason the switch is disconnected and locked out;*
 - (e) shall show the name of the worker who disconnected and locked out the switch; and*
 - (f) shall show the date on which the switch was disconnected and locked out.*
- 42.(7) *The employer shall establish and implement written procedures for compliance with this section.*
43. *Tools and other equipment that are capable of conducting electricity and endangering the safety of any worker shall not be used in such proximity to any live electrical installation or equipment that they might make electrical contact with the live conductor.*
75. *A part of a machine, transmission machinery, device or thing, shall be cleaned oiled, adjusted, repaired or have maintenance work performed on it only when,*
- (a) motion that may endanger a worker has stopped; and*
 - (b) any part that has been stopped and that may subsequently move and endanger worker has been blocked to prevent its movement.*
76. *Where the starting of a machine, transmission machinery, device or things may endanger the safety of a worker,*
- (a) control switches or other controlling mechanisms shall be locked out; and*
 - (b) other effective precautions taken necessary to prevent any starting shall be taken.*

Responsibilities

Health and Safety Officer (WCDSB)

Shall produce, implement and maintain the General Lockout/Tagout procedure. This will include the distribution of this policy and any subsequent revisions.

Supervisors

Shall use and enforce this procedure when it applies. Will complete the facility specific lockout survey and ensure it is posted and read by all authorized and affected employees. Outline needed equipment to fulfill the requirements of this procedure to the Health and Safety Officer.

Authorized Person

Will use this procedure when it applies and will follow the facility specific guidelines outlined on the facility specific

lockout survey posted at their facility.

All individuals will participate in the related training programs and the requirements outlined in the applicable legislation.

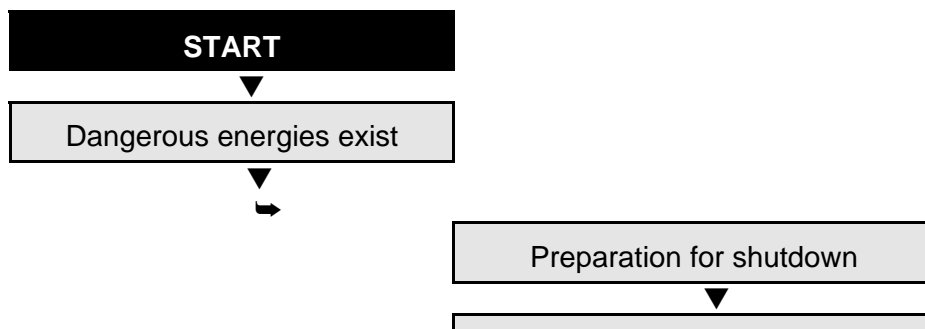
GENERAL REQUIREMENTS

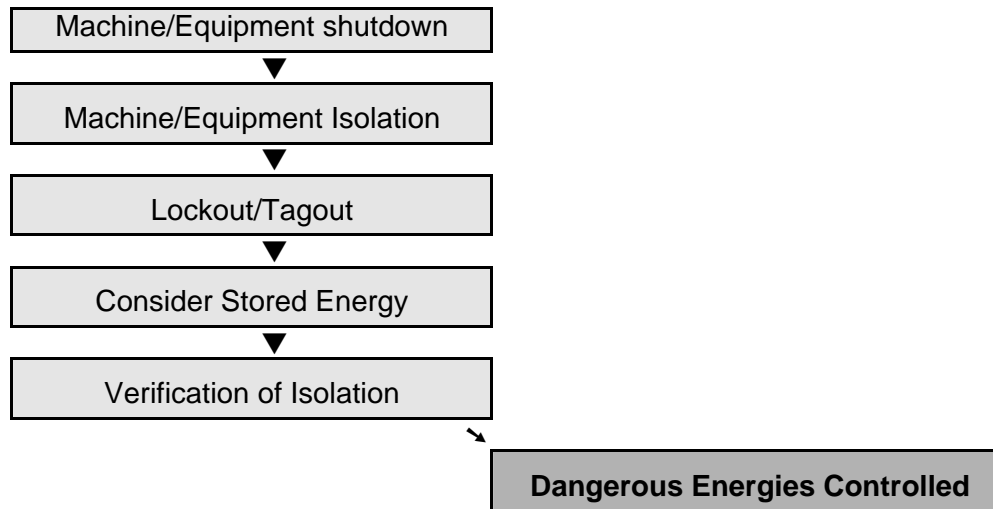
1. The release of energy from any machine, equipment or process which may cause injury or damage to an individual or process must be properly locked-out according to the general lockout/tagout procedure.
2. The identification and documentation specific to each facility outlining all required machinery and process lockouts will be completed and posted for all Authorized and Affective Employees. This will include the identification of the machine or process, types of energies to be controlled, required isolating devices and any specific instructions. See [Appendix A] for established [facility specific lockout survey] form.
3. Contractors shall be required to document their lockout/tagout procedures and submit them to the WCDSB upon request. Contractors should be made aware of the facility-specific lockout survey prior to work commencing at any facility.
4. All Authorized Employees will attend training specific to the WCDSB's lockout/tagout program. Records shall be maintained concerning the names of the employees, date of training and a copy of the presented material by the Health and Safety Officer.

GENERAL LOCKOUT/TAGOUT PROCEDURES:

Implementation:

Flowchart:





Procedure

Preparation for Shutdown

Before Authorized or Affected Persons turn off a machine or piece of equipment, the Authorized Person will have knowledge of the type and magnitude of the energy to be controlled, the hazards of the energy, and the means to control the energy.

Notify all Affected Persons that the machinery, equipment or process will be out of service.

Machine or Equipment Shutdown

The machine or equipment will be turned off or shutdown using safe work practices or established procedures.

If the machinery, equipment or process is in operation, follow normal stopping procedures (depress stop button, open toggle switch, etc.).

Move switch or panel arms to [Off] or [Open] positions and close all valves or other energy isolating devices so that the energy source(s) is disconnected or isolated from the machinery or equipment.

Lock-out primary switches. Do not rely on secondary protection such as limit or microswitches. This means block all power at the source. Before work commences, a 'zero energy state' should be in effect. Ensure that all devices or connectors are disengaged. (Authorized personnel only shall remove fuses with approved and

suitable fuse pullers.)

Before working on a machine that has been locked out, the worker shall test the machine to ensure that all power sources are properly shut off and locked out. Interlocking or dependant systems, which would electrically or mechanically feed into the system being isolated, shall also be tested.

Qualified instructional personnel, in technical labs, performing regular machine or equipment maintenance, such as replacement of belts on instructional equipment, shall ensure that all devices are disengaged or disconnected before servicing.

Machine or Equipment Isolation

All energy control devices that are needed to control the energy to the machine or equipment will be physically located and operated in such a manner as to isolate the machine or equipment from the energy source.

Lockout or Tagout Device Application

Lockout or tagout devices will be affixed to energy isolating devices by Authorized Persons. Lockout devices will be affixed in a manner that will hold the energy isolating devices in the "safe" or "off" position.

Where tagout devices are used, they will be affixed in such a manner to clearly state that the operation or the movement of energy isolating devices from the "safe" or "off" positions is prohibited.

The tagout devices will be attached to the same point a lock would be attached. If the tag cannot be affixed at that point, the tag will be located as close as possible to the device in a position that will be immediately obvious to anyone attempting to operate the device.

Lock and tag out all energy devices by use of hasps, chains and valve covers which have been assigned to the given Authorized Person. **No lock shall be cut-off without authorization from the worker's supervisor.**

Maintenance Staff

Each appropriate Maintenance staff member will be issued a lock and tag by the maintenance foreperson. Locks **shall not** be loaned or transferred between workers.

Stored Energy

Following the application of the lockout or tagging devices to the energy isolating devices, all potential or residual energy will be relieved, disconnected, restrained, and otherwise rendered safe.

Where the re-accumulation of stored energy to a hazardous energy level is possible, verification of isolation will be continued until the maintenance or servicing is complete.

Stored energy (capacitors, springs, elevated members, rotating fly wheels, and hydraulic/air/gas/steam systems) must be relieved or restrained by grounding, repositioning, blocking and/or bleeding the system.

Verification of Isolation

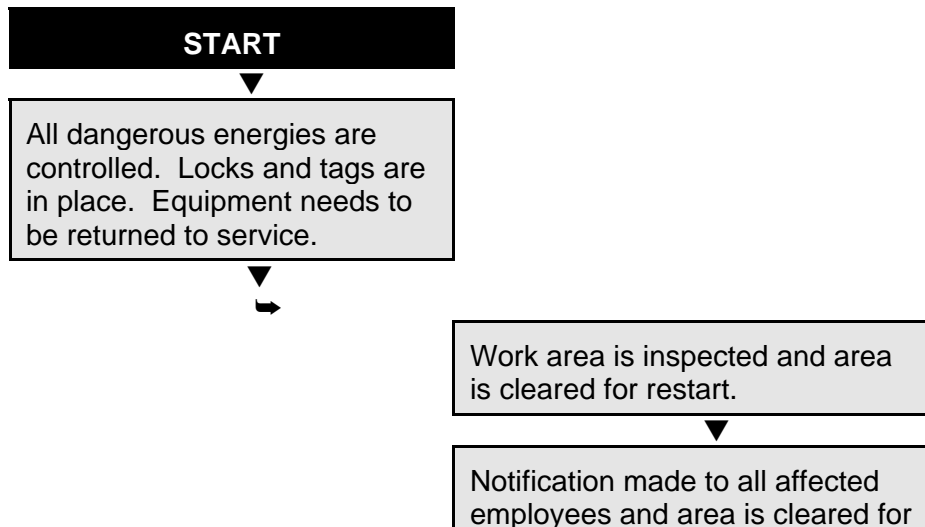
Prior to starting work on machines or equipment that have been locked or tagged out, the Authorized Persons will verify that isolation of the machine or equipment has been accomplished.

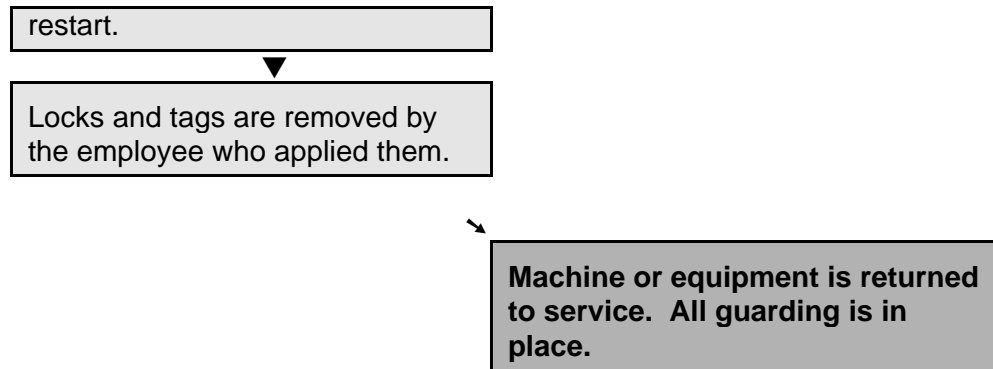
After assuring that no employee will be placed in danger, test all lock and tag outs by following the normal start-up procedures (depress start button, etc.).

Caution: After test, place controls in neutral position.

Removal of Lockout/Return to Service by Authorized Person:

Flowchart:





Procedure

Before lockout or tagout devices are removed and the energy restored to the machine or equipment, the following actions will be taken:

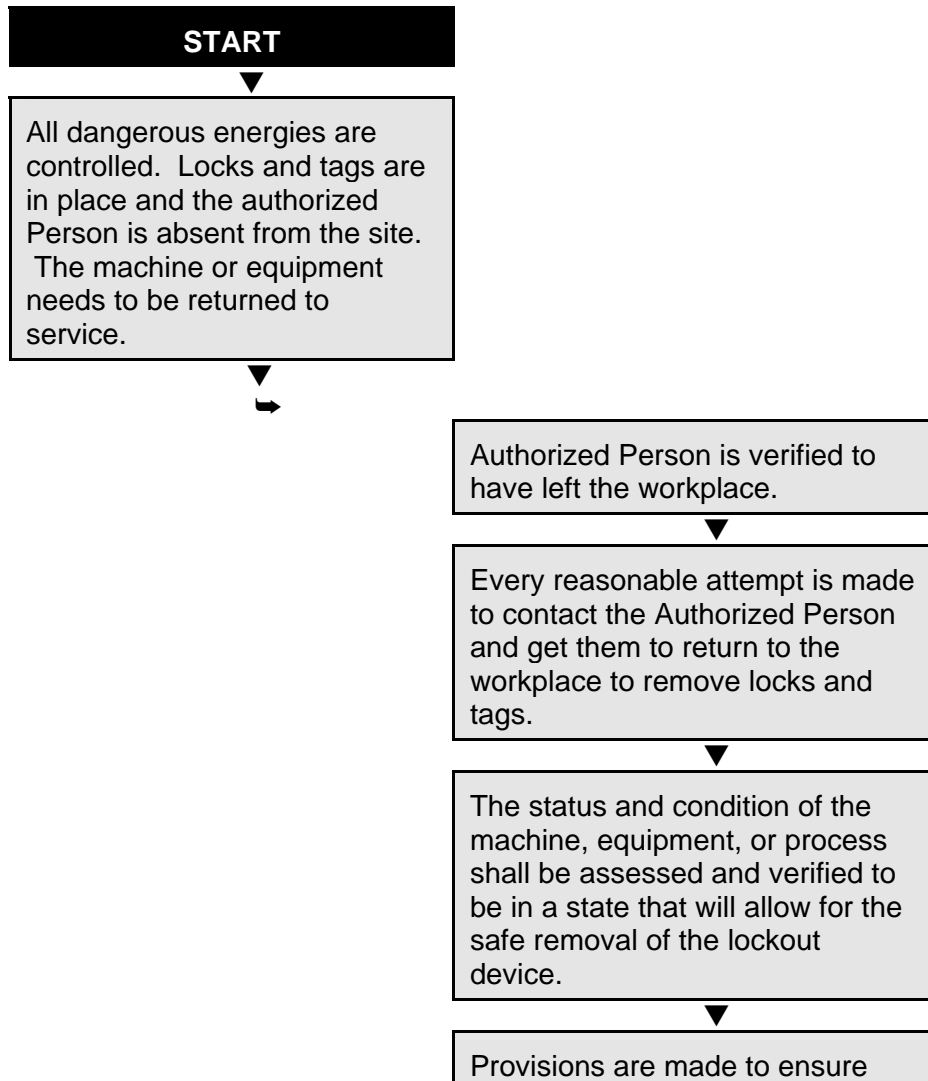
1. The work area will be thoroughly inspected to ensure that non-essential items have been removed and that machine or equipment components are operational.
2. The area will be checked to ensure that all employees have been safely positioned or removed. Before the lockout or tagout devices are removed, the Affected Persons will be notified that the lockout or tagout devices are being removed.
3. Each lockout or tagout device will be removed from each energy isolating device by the employee who applied the device.
4. Once all work is completed, the same set of procedures - only in reverse - shall be followed to energize and activate the system.

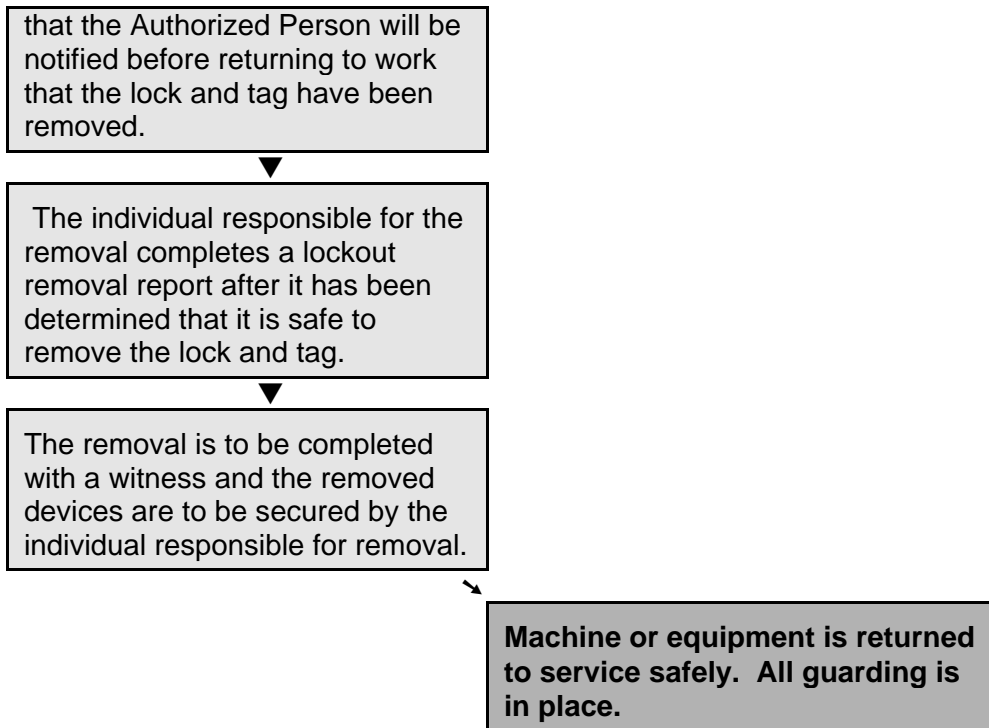
The following check list shall be used as a guide:

- Are guards in place?
- Have braces, pins, chains, blocks been removed?
- Are all tools that have been used accounted for?
- Are all valves closed in the correct position?
- Have tags and locks been removed by authorized persons?
- Are all persons accounted for?
- Has department(s) been notified?
- Has the Lockout Log been signed?

Removal of Lockout/Return to Service when Authorized Person is absent:

Flowchart:





Procedure

Before lockout or tagout devices are removed and the energy restored to the machine or equipment, the following actions will be taken:

1. Attempt to contact Individual with authority (Authorized Person) at the facility. When it is confirmed that the Authorized Person is absent and the machine, equipment or process must be returned to service in the Authorized Persons absence the following must occur:
2. The Authorized Person is verified to have left the workplace.
3. Every reasonable attempt is made to contact the Authorized Person and get them to return to the workplace to remove their locks and tags.
4. The status and condition of the machine, equipment, or process shall be assessed and verified to be in a state that will allow for the safe removal of the lockout device.

5. Provisions are made to ensure that the Authorized Person will be notified before returning to work that the lock and tag have been removed.
6. The individual responsible for the removal completes a lockout removal report after it has been determined that it is safe to remove the lock and tag. (Lockout removal report found in Appendix C).
7. The removal is to be completed with a witness and the removed devices are to be secured by the individual responsible for removal.

METHOD OF LOCKING OUT VARIOUS TYPES OF CONTROLS

1. Disconnect switches with a pull-down handle have lock-out facilities as part of the switch equipment. If difficulty is experienced in ensuring correct lock-out of parts of multiple components operated in unison or sequence, contact the appropriate trade (i.e. electrical-electricians, gas pipelines-pipe fitters etc.) to make sure all components are locked out.
2. For other equipment it may be necessary to construct attachments to which locks or a lock-out bar can be attached. Unless the box is locked, making it impossible to replace a fuse, the mere removal of a fuse does not constitute an adequate lock-out procedure.
3. The attachment may consist of chains for valves; the common hasp for locking cabinets or boxes; sliding bar which when extended would prevent operation of the control handle. Reversing starters shall be locked out in both directions.
4. Each worker is responsible for their own safety and shall individually comply with lockout procedures. No employee shall rely on someone else for lock-out protection.

LOCK CONTROL

Lock-outs shall only be conducted by qualified workers.

PERSONAL SAFETY PADLOCK INSTRUCTIONS

1. The lock is furnished for PERSONAL SAFETY and shall only be used for locking out machinery. Before starting to work on a machine, ensure that the disconnect switch is in the “OFF” position. The worker shall then place the lock and red tag on the switch to prevent it from being accidentally closed.

3. Each person and/or contractor doing repairs and/or maintenance shall have his/her own individually keyed lock (No duplicate or master keys). Key is to be kept "on his/her person"
4. Where one (1) or more worker(s) is working on a machine, the worker(s) shall use his/her own personal padlock to open the disconnect switch. The disconnect switch will remain locked until the last worker has completed his/her work.
5. Photo tags must be attached to each safety padlock. Unauthorized removal of another person's safety padlock shall result in disciplinary action.
6. Locks or tags may not be removed by anyone other than the person and/or contractor who placed them on the switch or other energy source.

TAGS

1. Tags are available from the Maintenance Department and shall be carried as part of every employee's tool kit.
2. Tag shall state:
 - reason why the switch/device is disconnected,
 - name of worker who disconnected and locked/tagged switch/device,
 - date when switch/device was disconnected, and locked and/or tagged.

METHODS OF LOCKING-OUT VARIOUS TYPES OF CONTROLS

1. Most present day disconnect switches with a pull-down handle have lock-out facilities as part of the switch equipment. If difficulty is experienced in ensuring correct lock-out of parts of multiple components operated in unison or sequence, contact the appropriate trade to make sure all components are locked out
2. For other equipment it may be necessary to construct attachments to which locks or a lock-out bar can be attached. Unless the box is locked, making it impossible to replace a fuse, the mere removal of a fuse does not constitute an adequate lock-out procedure.
3. The attachments may consist of chains for valves; the common hasp for locking cabinets or boxes, sliding bar which when extended would prevent operation of the control handle. The sliding bar would be provided with several holes which line up with similar holes on a fixed piece for the attachment of locks. Reversing starters shall be lock-out in both directions.
4. Electrical control equipment shall be clearly identified as to the machine controlled.

5. If work is to be performed on electrical circuits or equipment, a qualified person shall first test for electrical potential with a Certified Category III meter. No one without proper and adequate training shall perform electrical work on equipment.

MULTIPLE LOCKS AND LOCK-OUT BARS

1. After the machine has been shut down, locked out and tagged off, workers working in or on the machine shall be protected by personally placing their own safety lock on the disconnect switch. The key for their lock shall be retained on their person while the lock is in place.
2. Where several workers or trades are working on a machine, provision for additional locks can be achieved through the use of the Board issued lock. Alternately, the lock-out bar can be used to accommodate any number of locks by placing another lock-out bar in the last hole of the previous bar.
3. Each issued safety lock will be identified showing name and department.
4. Contractors issued safety locks will be identified with employee's name and contractor's company name
5. Workers shall be instructed that even though the disconnect switch may already be locked, protection is not provided until their own personal lock is attached.
6. When work has been completed, each worker shall report this fact to the trade supervisor or person in charge. Workers shall then remove their personal lock and tag prior to leaving.

SHIFT WORK

1. If work is not completed at the end of the day or shift, each worker shall report the status of the work to the person in charge of the incoming shift before removing his/her personal lock and tag. The incoming shift shall place their locks and tags as in paragraph 3.2.1 before commencing work on the machine. The person in charge shall not remove his/her lock until the person in charge of the incoming shift has placed his/her lock on the machine.
2. Prior to commencing any work on the second shift, the equipment shall be tested and verified for zero energy as outlined in Section 3.2.1 (d).
3. If the person and/or contractor goes home without removing his/her lock or tag, the supervisor will call them at home and have them return to remove their lock and/or tag. The supervisor shall ensure that the individual has no impairment issues which would make it unsafe to return to work.

4. Removal of a lock or tag by someone other than the person and/or contractor who applied the lock or tag shall be done only if all possible effort has been made to contact the person and/or contractor.

5. In the event that a lock or tag must be removed by someone other than the person and/or contractor who applied the lock or tag, written confirmation of removal and the specific reason it was removed shall be signed by the supervisor and the person and/or contractor who applied the lock as soon as possible after the removal, and shall be kept in the safety records of the company.

TRAINING AND REVIEW

1. All employees who are required to lock-out a machine or a piece of equipment shall be trained on the lock-out and test procedures.

2. At least once per year this procedure shall be reviewed with each employee.

3. The training and review of the procedure will be documented on a form entitled – “Lock-Out and Test Procedure Review”.

The form shall provide:

- identification of the employee
- equipment check list to ensure that the employee has all the necessary equipment
- a record of an actual lock-out demonstration

The form must be signed and dated by both the Supervisor and the employee. This form is to be retained as a permanent record in the Health and Safety Office and by the Supervisor.

EQUIVALENCY

In applying this Safe Lock-Out and Test Procedure, it must be recognized that all procedures are minimum performance standards.

Appendix A - Facility Specific Lockout Survey

Location _____ **Authorized Person** _____ **Date** _____
Completed _____

The following facility specific information outlines all machinery, equipment and processes which require lockout/tagout prior to working on them. This survey must be posted for all Authorized and Affected Employees to read. Any contractor working in the facility must review the applicable sections of the survey prior to any work commencing.

Machine/process identifier	Physical location	Potential hazardous energy	Type of isolating device and installation location	Special instructions	Lockout verification procedure

Machine/process identifier	Physical location	Potential hazardous energy	Type of isolating device and installation location	Special instructions	Lockout verification procedure

Appendix B - General Lockout Guidelines According to Energy Form and Sources*

Energy Form	Energy Source	General Lockout Guideline
Electricity	power transmission lines; machine power cords; motors; solenoids; capacitors (stored electrical energy)	<p>Turn off power at machine first (i.e. at point of operation switch) and then at the main disconnect switch for the machine; lock and tag main disconnect switch (or remove fuses from box, and then tag and lock box).</p> <p>Fully discharge all capacitative systems (eg. Cycle machine to drain power from capacitors) according to manufacturer's instructions.</p>
Fluid Pressure	hydraulic systems (eg. Hydraulic presses, rams, cylinders, hammers)	Shut off, lock (with chains, built-in lock devices, or lockout attachments) and tag valves; bleed off and blank lines as necessary.
Air Pressure	pneumatic systems (eg. Lines, pressure, reservoirs, accumulators, air surge tanks, rams, cylinders)	Shut off, lock (with chains, built-in lock devices, or lockout attachments) and tag valves; bleed off excess air; if pressure cannot be relieved, block any possible movement of machinery.
Kinetic Energy (energy of a moving object or materials moving object may be powered or coasting)	blades; flywheels; materials in supply lines of bins or silos	<p>Stop and block machine parts (eg. Stop flywheels and ensure that they do not recycle); review entire cycle of mechanical motion; ensure that all motions are stopped.</p> <p>Block material from moving into area of work; blank as required.</p>
Potential Energy (stored energy that an object has the potential to release due to its position)	springs (eg. In air brake cylinders); actuators; counter weights; raised loads; top or movable part of a press or lifting device	If possible, lower all suspended parts and loads to the lowest (rest) position; block parts that might be moved by gravity; release or block spring energy.
Pressurized Liquids and Gases (including steam, chemicals)	supply lines; storage tanks and vessels	Shut off, lock (with chains, built-in lock devices or lockout attachments) and tag valves; bleed off excess liquids or gases; blank lines as necessary.

*IAPA [A Health and Safety Guide for your Work Place - Lockout] - 2005

Appendix C - Lockout removal report*

Lockout device and information tag removal report	
Department: _____	
Shift: _____	
Authorized employee's name: _____	
Machine, equipment, or process: _____	
Time and date lockout device and Information tag was discovered to have been left on: _____	
Reason for removal of lock and tag: _____ _____	
Confirmed that the authorized employee has left the site and/or facility?	Yes <input type="checkbox"/> No <input type="checkbox"/>
Supervisor's Initials: _____ Time and date: _____	
Attempts made to contact the authorized employee?:	Yes <input type="checkbox"/> No <input type="checkbox"/>
<input type="checkbox"/> Authorized employee has been contacted and is returning to the workplace to remove the lockout device and tag. Procedure ends, exit procedure, file form for future reference.	
Supervisor's Initials: _____ Time and date: _____	
<input type="checkbox"/> Authorized employee cannot be contacted and/or is unwilling to return to the site and/or facility to remove the lock and tag.	
Supervisory personnel may authorize removal of the lock and tag once	
• The status and condition of the machine, equipment, or process are assessed and verified to be in a state that will allow for the safe removal of the lockout device.	
Supervisor's Initials: _____ Time and date: _____	
• Provisions are in place to prevent the authorized employee from resuming work at this facility without notification of the fact that his or her lock and tag has been removed.	
Supervisor's Initials: _____ Time and date: _____	
Supervisory personnel can now remove the lockout device and tag.	
Supervisor's Initials: _____ Time and date: _____	
Witness: _____	

*CSA Z460/05 □ Annex N

Appendix D – 347 Volts Work Safety Procedure

A Guideline for Establishing a Safe Work Procedure for Working on 347-Volt Lighting Systems

SUBJECT: **347-VOLT SYSTEM MAINTENANCE**
Safe Work Procedure Guidelines

INTRODUCTION: The following provides a guideline to assist in defining safety steps and procedures suitable for facilities to keep employees and contract staff safe from potential hazards associated with working on 347-volt system ballasts.

The Electrical Safety Authority is responsible for public electrical safety in Ontario and defines and enforces safety standards through the Ontario Electrical Safety Code, Ontario Regulation 164/99.

PURPOSE: **To assist in the development of site-specific safety guidelines for facilities to protect workers and contract staff from potential hazards associated with working live on 347-volt system ballasts.**

POLICY: **Electrical work can be carried out with the electrical system de-energized. “Not practicable” does not mean “not convenient”. It means where life, limb or property damage may occur the power is turned off.**

LEGAL

REQUIREMENTS: **Work with the electrical systems de-energized.**

The Ontario Electrical Safety Code (Ontario Regulation 164/99) requires systems to be de-energized prior to conducting any electrical maintenance work (Section 2-305 (1)) to protect electrical trades and maintenance workers. The Occupational Health and Safety Act (OHSA) and Regulations has the same requirements.

Non-compliance with these requirements could lead to charges being laid under the Occupational Health and Safety legislation or the Criminal Code.

GENERAL: The Electrical Safety Authority’s “2004 Ontario Electrical Safety Report” identified that 30% of all occupational electrocutions were sustained by electrical maintenance or electrical trades people who were knowingly working on live electrical systems. Incidents linked to working on live electrical systems have increased by 30% in the past 6 years, and one-third of electrical shocks have been associated with 347-volt systems.

Working on live 347-volt systems presents unusual risks:

- 347-volt systems have complex circuitry
- 3-phase wire systems can become unbalanced when disconnected
- a neutral conductor can become live if not disconnected properly
- the t-bar ceiling structure often associated with these systems can conduct electricity

Following the health and safety procedures outlined can reduce potential electrical hazards. OSHA and Regulations for Construction projects requires that all electrical work be performed by workers certified under the Trades Qualification and Apprentices Act (Regulations Section 182.1a) In addition, the Electrical Safety Authority recommends that only certified and licensed electricians work on 347-volt systems and 347-volt system ballasts.

FACILITY SAFETY REQUIREMENTS:

This facility is committed to the preventing injuries by providing a safe and healthy environment for its employees. As a result, this facility requires electrical systems to be de-energized prior to conducting any electrical upgrades or maintenance work. These steps will be followed in this facility to ensure that potential electrical hazards associated with 347-volt system ballasts are managed. (mark those that apply to your facility with an “✓”)

- Consult relevant electrical drawings and verify that actual wiring installations match the drawing.
- Inspect the work area for any potential electrical hazards such as faulty wiring prior to starting work.
- Check for power at the fixture – a proximity tester can be used. The following procedure should be followed for testing:
 - a. Test the tester on a known circuit.
 - b. Test the live on the circuit you are working on, see if it is energized.
 - c. Go back and test the known circuit for verification.
- Identify the circuit at the panel to be disconnected.
- De-energize the system.
- Lock out & tag out at the panel or switch.
- Verify that you have de-energized the correct circuit – Test the two circuit conductors feeding into the fixture and test each to ground to verify both wires are dead. This procedure requires that you use an approved Category III meter when testing, and that you use the same 3-point testing method outlined above (a.b.c.)
- The following Personal Protective Equipment (PPE) must be used until systems are tested and confirmed.
 - Safety hard hat
 - Safety glasses or goggles
 - Rubber gloves rated for 347/600 volts, worn with leather gloves on the outside
 - Boot with di-electric property, dry and free of moisture
 - V-rated tools
 - Non-conductive ladders/platforms
 - All NFPA Section 70E specified safety equipment
- Others Personal Protective Equipment required: _____
- Personal Protective Equipment (PPE) must be assessed and inspected every ____ weeks.
- In keeping with this commitment to not work live this facility only permits live work under those limited conditions permitted under the Occupational Health & Safety Act – when it is not practicable to disconnect electrical equipment or conductors from the power supply before working on, or near live exposed parts of the equipment or conductors. “Not practicable **does not mean** not convenient.”

SAFETY RESPONSIBILITIES: work and/or

Supervisors are responsible to instruct workers and contract staff to de-energize 347-volt system ballasts prior to initiating electrical maintenance in accordance with the requirements specified in the Occupational Health

and Safety legislation (OHSA) and the Ontario Electrical Safety Code.

Any decision to do live work will be made by the Supervisor in conjunction with the Safety Officer. In the field, a risk analysis or job safety plan must be carried out by the supervisor to assess the level of risk of the work being done.

Supervisors are responsible for ensuring employees are provided with personal protective equipment, and that timelines for inspection and maintenance of personal protective equipment have been established and communicated.

Employees are responsible to notify supervisors of the need for Personal Protective Equipment, and to ensure that 347-volt systems are **de-energized, tested, and locked-out/tagged-out**.