

1. Lock-Out

“Lock-Out” is the term applied to a system or procedure designed to control all situations where the unexpected energization, start-up, or release of stored energy of the equipment, machinery, or process, would be likely to endanger or injure any personnel.

The WorkSafe BC Occupational Health and Safety Regulations require that **any person** (employee or student) working on a machine for “maintenance” must disconnect or interrupt the power source through the use of a “control device”, from that machine and secure the control device in an inoperative state by the use of a padlock.

Through compliance with this lock-out procedure, any person working on a piece of machinery for any period of time, can be assured of not being injured due to accidental or inadvertent engagement of **any** power supply system. The intention is to ensure that the machine or equipment is placed in a “zero energy state”

2. Definitions

The following definitions are applicable to these safe work procedures and the WorkSafe BC regulations.

Assigned Lock	refers to a lock for which the worker personally controls the key
Authorized Person	refers to a person who has been authorized by a TRU supervisor to perform the maintenance work conducted. May refer to an employee, student, or contractor.
Control Device	Means the device controlling the flow of power to the machinery or equipment and includes, but is not limited to: switches, circuit breakers, valves and clutches. In the case of electrical controls, it means the device controlling the flow of current to the branch circuits which supplies power to the machinery or equipment. Individual control buttons or switches in control circuits are excluded (WCB 1980)
Control Power	A term often used to refer to the energy source which powers only the control circuit for the machinery or equipment, rather than the machine or equipment itself.
Disconnect	A mechanism which disconnects the machinery or equipment from the power source.
Hazardous Energy	see “power source”
Intermediate Disconnect	refers to a control device installed between the main motor control centre (MCC) and the piece of machinery. The intermediate disconnect is usually located near the machinery to be serviced. These devices are often used for the convenience of workers to reduce time delays which might occur by having to go to the MCC to perform lock-out

functions. Where such devices are installed for the purposes of lock-out, they shall simultaneously disconnect both the motor and the motor control circuits (control power) from their sources of supply.

Lock

means a **keyed padlock** which will secure a control device in the “off” position and prevent it from being reactivated.

Combination locks or locks using magnetic keys or bars are not acceptable.

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Lock-Out Loop

refers to the loop provided on the handles of electrical disconnects, or in specialized lock-out devices for the purpose of attaching locks or multiple lock attachments.

Maintenance

means the work of keeping the machine or equipment in a safe operating condition and includes, but is not limited to: repairing, adjusting, cleaning, lubricating and the clearing of obstruction to the normal flow of material (WCB 1980)

Motor Control Centre (MCC)

usually refers to a centralized location of the main control devices which service the machines or equipment of a given area. These centres may be located some distance from the machinery which they serve.

Multiple Lock Attachment

means a device designed to be used to secure a control device in the “off” position and has provisions to accommodate several locks. Includes device commonly called “scissors clips”, etc. May also include the use of cable lock systems, chains, etc.

Plug In Equipment

Includes electrical equipment or machinery which is not wired directly to its power source, but uses an electrical wire cord fitted with a pronged plug on the end of the cord.

Power Source

means any source of power which provides the energy Required to drive a piece of machinery or equipment and Includes, electrical, steam, hydraulic, water, air, mechanical, radiation, and thermal forms of energy. Also includes any elevated object or part which could injure or endanger a worker in the event that it unexpectedly moved.

Tags

refers to “Do Not Operate” tags or other similar label used to Indicate that the device is not to be operated. **The use of “Do Not Operate tags” within the TRU work environment is prohibited.**

3. Scope

These lock-out requirements, rules and procedures shall apply to

- a) All employees and students of the TRU
- b) Outside contractors, sub-contractors or service personnel working on TRU equipment or machinery.

4. Responsibilities

- 1) It is the responsibility of all persons engaged in maintenance activities (as defined by the regulations) to know and comply with lock-out procedures. Failure to follow these lock-out procedures is cause for disciplinary action.
- 2) Supervisors are assigned the responsibility to ensure that all persons are adequately instructed in lock-out procedures and that all energy sources for equipment and machinery are deactivated and secured in the “off” position through the use of appropriate locks.
- 3) In the event of a worker violating a lock-out procedure, the supervisor shall also be held accountable for the workers failure to comply.
- 4) Contractors or service technicians not in the direct employ of TRU shall be responsible for providing their own locks. Under no circumstances will TRU provide locks to non-employees.

5. Authorization

- 1) Maintenance of TRU equipment or machinery shall only be conducted by persons authorized to perform such work.
- 2) Contractors or outside services personnel shall sign-in with the appropriate department (facilities) prior to commencing their work.

6. Locks and Keys

- 1) Each authorized person will be issued with their own personal locks (a minimum of 3), which must be clearly marked, labelled or stamped with that persons name in order to identify the owner of the locks.
- 2) Locks shall be “keyed alike” for each separate individual. No two people shall have matching keys. A sufficient number of keys will be issued to each person for their own locks.
- 3) No “extra” keys are to be retained by the supervisor or any person other than the worker to whom the locks were assigned. No keys for lock-out locks shall be retained in the Facilities Service Department key cabinets.

- 4) In the event that a person's key are lost, the locks will be removed in accordance with the **Lock Removal** section of this procedure.
- 5) Any person who loses their keys and/or locks must report that loss to their supervisor immediately. Where keys are lost, if the individual does not have replacement keys, new locks will be issued or the existing locks re-keyed if possible.
- 6) Persons are forbidden to remove locks belonging to another employee or student. To do so will result in disciplinary action.
- 7) Under no circumstances are an individual's personal locks to be loaned or borrowed.
- 8) **PRIOR** to removing the last lock from a control device, the person doing so is responsible to ensure that all other persons are clear of the machinery or equipment, and that it can be operated safely.
- 9) When going off shift and your personal lock is still in place, your relief must put his own personal lock on **BEFORE** you remove yours.
- 10) Locks shall only be removed by the person who installed them. In the case of an emergency, see "**Lock Removal**" section of this procedure.
- 11) The use of "Do Not Start" or "Lock-Out" tags in place of locks is **prohibited** within all TRU campuses.

7. Multiple Lock Attachments

- 1) Each authorized TRU person shall be issued with a minimum of three (3) multiple lock attachments.
- 2) As an alternative to item 1, a sufficient number of multiple lock attachments shall be readily available in each MCC or other location where they might be required.
- 3) When using these devices, never apply a lock to the last available opening. Always apply another multiple lock attachment.

8. Maintenance Department Locks

- 1) Certain locks may be designated as "maintenance Department Locks" or Facilities Service Locks" for the purpose of securing equipment in an inoperable condition for a long period of time.
- 2) These locks shall be clearly different in size, shape and colour from the type of locks used by individuals.
- 3) These locks shall be numbered consecutively and the total number available be recorded.
- 4) Control of these locks and their keys shall be the responsibility of the Manager, Mechanical and Electrical Services.

- 5) A register (log) shall be maintained to account for the whereabouts of these locks. Where they are signed out by the appropriate supervisor, the record shall indicate who signed the lock out and indicate where the lock is being used. Upon return, each lock shall be logged back in.
- 6) These locks shall not be used under any circumstances in place of personal locks.

9. Control Devices

- 1) Some means of attaching a lock and securing the control device in an inoperable position shall be provided for all types of control devices encountered within TRU.
- 2) Where the control device is of a circuit breaker type, special lock-out devices shall be attached prior to the use of multiple lock attachment and locks.
- 3) On circuit breaker panels, the use of the built-in lock on the panel cover door **shall not be used for the purpose of lock-out.**
- 4) Where equipment is fitted with interlocks, those devices shall be disabled and locked out in accordance with these requirements.

10. Plug-in Equipment

- 1) The only exception to the requirement for applying locks to control devices is when the equipment is connected to a wall or floor mounted socket or receptacle by removable plug.
- 2) Before doing any maintenance work on such equipment remove the plug from the outlet.
- 3) Check that the correct plug has been removed by testing the equipment to ensure that it has been disconnected.
- 4) The person performing the maintenance work must keep control over the plug at all times.
- 5) To ensure that the plug does not be plugged into an outlet accidentally, the worker can apply a smaller personal lock through the holes in the prongs of the plug.
- 6) Where more than one person is required to work on a piece of plug in equipment, a specialized plug lock box shall be attached to the free end of the cord and normal lock-out procedures shall be followed using multiple lock attachments.

11. Disengaging Power sources

- 1) Before turning off the power source, check to ensure that no one is operating the equipment. A sudden loss of power could cause an accident.
- 2) If in doubt about the location of the main disconnect switch or the method of pulling it, contact the electrician on duty.

- 3) An electrical disconnect shall not be disengaged (pulled) while it is under load. Such action can cause arcing or an explosion and result in injury or property damage.
- 4) When disengaging an electrical disconnect be sure that the machinery or equipment is first turned off at the controls. Open the main disconnect with your left hand and face away from the panel.
- 5) In larger **High Voltage** installations only a qualified electrician should operate the main disconnect.
- 6) When locking out valves, taps, or items other than electrical disconnects, the appropriate multiple lock attachment shall be placed through the lock-out loop on the control panel. If a lock-out loop is not available, an alternate means (i.e. chains, specialized lock-out cover, tec.) shall be used to secure the control device in an inoperable position.
- 7) All accumulator tanks or reservoirs which could be holding sufficient reserve energy to operate the equipment shall be drained prior to commencing maintenance work. The drain valve shall be secured in the open position.
- 8) The removal of fuses for the sole purpose of disconnecting power is prohibited.

12. Locking Out – General

- 1) Locking out shall be done by the person to begin work on the machinery or equipment. That person shall be responsible for “testing” the equipment to ensure that it is not functional prior to commencing work.
- 2) Each person working on a piece of machinery or equipment must apply their locks to lock-out all power sources (air, hydraulic, electrical, steam, water, mechanical, radiation, and thermal). If three people are working on equipment, then three locks must be on each power source.
- 3) Locking of control switches or buttons is prohibited since it is not a positive disconnect.
- 4) If in doubt about the lock-out rules or procedures, ask your supervisor or Occupational Health and Safety Department staff.

13. Lock Removal Procedure

Removing another employee’s lock is a serious matter and is prohibited except in the case of an emergency and only when this procedure has been followed.

- 1) The area supervisor shall be informed that a lock needs to be removed and that the person assigned to the lock cannot be located.
- 2) The area supervisor will make every effort to contact the lock owner and document these attempts on the attached checklist.

- 3) The area supervisor shall than contact the chairperson (for instructional staff), or the appropriate Manager (for instructional staff) to request their attendance at the area inspection and lock removal.
- 4) A member of the Occupational Health and Safety Department shall be contacted and asked to be involved in the site inspection to ensure safety and the removal of the lock(s).
- 5) At least one worker representative will be present during the inspection of the area and lock removal.
- 6) If the person cannot be located and the area in question has been inspected and is clear of any hazards to anyone, the lock(s) may be cut off.
- 7) The supervisor shall be responsible for filling out and distributing the lock removal checklist on the following part of this section.
- 8) A copy of the Lock Removal Form and the severed lock shall be forwarded to the Occupational Health and Safety Department for follow-up.

14. Lock Out Procedures

The following procedure shall be followed for **all** machinery or equipment, (except plug-in equipment), where maintenance is required to be performed.

- 1) Shut off the machinery or equipment.
- 2) Shut off the power source(s) at the control devices(s)
- 3) Apply personal lock(s) to lock-out loop or alternate locking device
- 4) Where more then one person will be applying locks, use a multiple lock attachment.
- 5) Test control buttons to be sure that the power sources has been disconnected. This is achieved by pressing the start button to ensure the machine does not start. And then pressing the stop button twice.
- 6) Perform repairs and /or maintenance.
- 7) Upon completion, clear away all tools and personnel.
- 8) Replace all guards and protective devices.
- 9) All employees working on a machine are to remove their lock(s) as soon as they have completed their maintenance.
- 10) Ensure that everyone is clear of the machine.
- 11) Person who originally shut off the power then removes his lock last and turns the power back on and tests the equipment or machine.

Violations of Lock-out Procedures and/or Rules will not be tolerated and disciplinary actions will result.

15. Exceptions / Exemptions

When it is essential to the process that the equipment remain in operation to perform maintenance related work:

- a) Only that part of the machinery which is vital to the operation shall be energized.
- b) Workers engaged in such operations must be fully authorized and trained.
- c) A separate written safe work procedure is developed and posted adjacent to the equipment.

16. Training

- 1) Training in lock-out procedures shall be provided to all persons who are required to use this or similar procedures by their immediate supervisor or other trained person.
- 2) Where in the opinion of the Assistant Director, Human Resources, any person requiring knowledge in lock-out has demonstrated a lack of understanding of the requirements and/or a failure to follow these requirements, they shall be required to take additional training prior to being allowed to engage in any work activity which requires the protection of lock-out.

LOCK REMOVAL FORM

Lock Owner: _____ Date: _____ Time: _____

Persons witnessing lock removal: _____

Area Supervisor's name: _____

Location and equipment/job affected: _____

Reasons for lock removal: _____

Attempts to contact the owner of the lock(s)

Time: _____ Place: _____

Time: _____ Place: _____

Time: _____ Place: _____

Time: _____ Place: _____

Area or equipment checked for:

Obstructions: _____ Tools: _____ Personnel: _____

Signs of Work: _____ Safe to Operate: _____

Lock removed by: _____

Lock out restored: _____ or equipment started
and checked for correct operation: _____

Signatures:

Witness

Area Supervisor

Manager

OH&S Officer

Information reviewed by Manager, Occupational Health and Safety and owner of lock.

Date: _____ Time: _____

Action Taken: _____
