

**SUBJECT: EQUIPMENT LOCK-OUT****1. Purpose**

"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.

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. Scope**

The WCB's Occupational Health and Safety Regulations require that employees and workers that work 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 padlocks.

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

- a) all employees, workers and students of UNBC; and
- b) outside contractors, sub-contractors or service personnel working on UNBC equipment or machinery.

**3. Authority**

The Risk & Safety Manager is responsible to the Vice-President (Finance & Administration) for the administration of this policy and the development of procedures.

**4. Definitions**

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

**4.1 Assigned Lock**

Refers to a lock for which the worker personally controls the key.

**4.2 Authorized Person**

Refers to a person who has been authorized by a UNBC supervisor to perform the maintenance work being conducted. May refer to an employee, student or contractor.

**4.3 Control Device**

Refers to 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 circuit which supplies power to the machinery or equipment. Individual control buttons or switches in control circuits are excluded.

---

#### 4.4 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.

#### 4.5 Disconnect

A mechanism which disconnects the machinery or equipment from the power source (see control device).

#### 4.6 Hazardous Energy

See Power Source.

#### 4.7 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.

#### 4.8 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.

#### 4.9 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 personnel. Also may be used to refer to the actual task of applying proper locks.

#### 4.10 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.

#### 4.11 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 obstructions to the normal flow of material.

#### 4.12 Motor Control Centre (MCC)

Refers to the location of the main electrical control devices which service the electrical motors in a given area. These centres may be located some distance from the machinery which they serve.

#### 4.13 Multiple Lock Attachment

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

---

#### 4.14 Plug-in Equipment

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

#### 4.15 Power Source

Means any source of power which provides the energy required to drive a piece of machinery or equipment and includes, but is not limited to: 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.

#### 4.16 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" in place of locks is prohibited at the UNBC Prince George Campus .

### 5. Procedures

#### 5.1 Responsibilities

5.1.1 It is the responsibility of all employees and workers to know and comply with the lock-out procedures. An employee's failure to follow these lock-out procedures shall be cause for disciplinary action.

5.1.2 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.

5.1.3 In the event of a worker violating a lock-out procedure, the supervisor shall also be held accountable for the worker's failure to comply.

5.1.4 Contractors or service technicians not in the employ of UNBC shall be responsible for providing their own locks. UNBC will not provide locks.

#### 5.2 Authorization

5.2.1 Maintenance of UNBC equipment or machinery shall only be conducted by persons authorized to perform such work.

5.2.2 Contractors or outside service personnel shall sign in with the appropriate department prior to commencing their work.

#### 5.3 Locks and Keys

5.3.1 Each authorized person will be issued with their own personal locks (a minimum of 5), which must be clearly marked, labelled or stamped with the persons name or a code identifying the owner of the locks.

5.3.2 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 and the person receiving those locks shall have sufficient keys.

5.3.3 No extra keys are to be retained by the supervisor or any person other than the worker to whom the locks were assigned.

5.3.4 In the event that a person's keys are lost, the locks will be removed in accordance with the Lock Removal section of this procedure.

5.3.5 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 rekeyed if possible.

- 
- 5.3.6 Persons are forbidden to remove locks belonging to another employee or worker. To do so will result in disciplinary action.
  - 5.3.7 Under no circumstances are individual's personal locks to be loaned or borrowed.
  - 5.3.8 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.
  - 5.3.9 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.
  - 5.3.10 Locks shall only be removed by the person who installed them. In the case of an emergency, see Lock Removal section of this procedure.
  - 5.3.11 The use of Do Not Start or Lock-out tags in place of locks is prohibited at the UNBC Prince George Campus.
  - 5.3.12 An annual review of locks and keys shall be conducted by employees at UNBC.
- 5.4 Multiple Lock Attachments
- 5.4.1 Each authorized UNBC personnel shall be issued with a minimum of five (5) multiple lock attachments.
  - 5.4.2 When using these devices, never apply a lock to the last available opening. Always apply another multiple lock attachment.
- 5.5 Facilities Department Locks
- 5.5.1 Certain locks may be designated as Facilities Department Locks for the purpose of securing equipment in an inoperable condition for long periods of time.
  - 5.5.2 These locks shall be clearly different in colour from the type of locks used by individuals. Facilities locks will be red in colour.
  - 5.5.3 These locks shall be numbered consecutively and the total number available will be recorded.
  - 5.5.4 Control of these locks and their keys shall be the responsibility of the Assistant Director of Facilities.
  - 5.5.5 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.
  - 5.5.6 These locks shall not be used under any circumstance in place of personal locks.
- 5.6 Control Devices
- 5.6.1 Some positive means of attaching a lock and securing the control device in an inoperable position shall be provided for all types of control devices encountered at the UNBC Prince George Campus. Contractors shall be responsible for supplying these items or equipment for work which is contracted.
  - 5.6.2 Where the control device is of a circuit breaker type, special lock-out devices shall be attached prior to the use of a multiple lock attachment and lock(s).
  - 5.6.3 The locking of covers or doors on circuit breaker panels for the purposes of lock-out, is prohibited at the UNBC Prince George Campus.
  - 5.6.4 Where equipment is fitted with interlocks, those devices shall be disabled and locked out in accordance with these requirements.
- 5.7 Plug In Equipment
- 5.7.1 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 a removable plug.
  - 5.7.2 Before doing any maintenance work on such equipment remove the plug from the outlet.

- 
- 5.7.3 Check that the correct plug has been removed by testing the equipment to ensure that it has been disconnected.
  - 5.7.4 The person performing the maintenance work must keep control over this plug at all times.
  - 5.7.5 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.

## 5.8 Disengaging Power Sources

- 5.8.1 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.
- 5.8.2 If in doubt about the location of the main disconnect switch or the method of pulling it, contact the supervisor on shift or the Assistant Director of Facilities.
- 5.8.3 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.
- 5.8.4 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.
- 5.8.5 In larger high voltage installations only a qualified electrician should operate the main disconnect.
- 5.8.6 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. If a lock-out loop is not available, an alternate means (e.g. chain, specialized lock-out cover) shall be used to secure the control device in an inoperable position.
- 5.8.7 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.
- 5.8.8 The removal of fuses for the sole purpose of disconnecting power is prohibited.

## 5.9 Locking Out - General

- 5.9.1 Locking out shall be done by the first 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 any work.
- 5.9.2 Each person working on a piece of machinery or equipment, must apply their locks to lock-out all power sources. If three people are working on equipment, then three locks must be on each power source.
- 5.9.3 If in doubt about lock-out rules or procedures ask your supervisor. Advice is also available through the Risk & Safety Office.

## 5.10 Lock Out Procedure

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

- 5.10.1 Shut off the machinery or equipment.
- 5.10.2 Shut off the power source(s) at the control device(s).
- 5.10.3 Place multiple lock attachment(s) in lock-out loop or alternate locking device.
- 5.10.4 Apply personal lock(s) to multiple lock attachment(s).
- 5.10.5 Test control buttons to be sure that the power source has been disconnected.
  - a) Push start button.
  - b) Push stop button.
- 5.10.6 Perform repairs and/or maintenance.
- 5.10.7 Replace all guards and protective devices.
- 5.10.8 Upon completion, clear away all tools and personnel.

- 
- 
- 5.10.9 All employees or workers working on a machine are to remove their lock(s) as soon as they have completed their maintenance.
  - 5.10.10 Ensure that everyone is clear of the machine and start the equipment to return it to normal. Violations of Lock-out Procedures and/or Rules will not be tolerated and disciplinary action will result.

#### 5.11 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 shall be developed and posted at the location of the equipment.

#### 5.12 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 the following procedure has been adhered to:

- 5.12.1 The supervisor shall be informed that a lock needs to be removed and that the person assigned the lock cannot be located.
- 5.12.2 The supervisor will make every effort to contact the lock owner and document these attempts on the attached checklist.
- 5.12.3 The supervisor shall then contact the Assistant Director of Facilities to request their attendance at the area inspection and lock removal. If the Assistant Director of Facilities is not available, the Director of Facilities shall be requested to attend.
- 5.12.4 An alternate to the above persons is to request the Risk & Safety Manager to attend. The Risk & Safety Manager shall only be requested if the Assistant Director of Facilities or Director of Facilities are unavailable when requested.
- 5.12.5 At least one worker representative will be present during the inspection of the area and lock removal.
- 5.12.6 If the person cannot be located and the area in question has been inspected and is clear of any hazards to anyone, the lock may be cut off.
- 5.12.7 The supervisor shall be responsible for filling out and distributing the Lock Removal Form.
- 5.12.8 A copy of the Lock Removal form and the lock shall be forwarded to the Risk & Safety Office for follow up. Further, a copy shall be supplied to the Director of Facilities and the Joint Health & Safety Committee. A copy shall also be submitted to the Joint Health & Safety Committee or Safety & Health Representative of the contractor when a contractor's lock requires emergency removal.

#### 5.13 Training

- 5.13.1 Training in lock-out procedures shall be provided to all persons who are required to use this or similar procedures. Contractors are responsible to train their workers in lock-out procedures.
- 5.13.2 Where in the opinion of the Risk & Safety Manager 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 participate in additional training prior to being allowed to engage in any work activity which requires the protection of lock-out.
- 5.13.3 A review of lock-out procedures shall be conducted at least once annually.