The University of British Columbia Land and Building Services	**Isolation and Lockout**
Work Procedure	**I-B-2**

Prepared by: LBS HSE – Diane Weiler Lockout Steering Committee	Approved by:	Issue Date: September 18, 2003 Replaces: July 13, 1999

1. Application

This procedure establishes minimum and uniform requirements for the isolation, securing, locking and tagging of machinery and equipment so that work can be carried out without inadvertent re-energization, release of energy, or movement. This procedure applies to all situations where a device has been put in a safe position so that work can be carried out safely.

This is a mandatory requirement for all Land and Building Services personnel.

Three specific procedures identified in "I-B-2 Isolation and Lockout Work Procedure":

- **Personal Lockout**
- **Group Lockout**
- **Use of Shop Locks**

Term	Definition	Source
Personal Lockout	• To place a personal lock on energy isolating devices to prevent hazardous energy from being released and to ensure personal lockout protection only.	
Personal Lock	• A lock provided by the employer for use by a worker to ensure personal lockout protection such that each lock when applied is operable only by a key in the worker's possession. • The lock must be marked to identify the worker who placed the lock, and the shop of that worker. • Personal locks are to be used for personal protection only and are not to be used as a Shop lock.	**WCB**
Personal Tag	• A tag placed in conjunction with a personal lock to signify that work is being carried out on machinery or equipment that is associated with the personal lock. • This tag will be white with black letters, with a **distinctive hatched** red border to signify a worker is working on the machinery or equipment.	**Procedure**
Group Lockout	• The procedure used where there are 3 or more isolation points to be locked out, and/or a large number of workers will be working on the equipment and/or where the isolation points are a considerable distance apart.	**Procedure**
Group Locks	• Locks dedicated to group lockouts, sufficient in number to lock out isolation points in a group lockout procedure. • Keys are available only to the qualified workers applying the group lockout and the responsible supervisor.	**Procedure**

Group Lockout Tag	• A tag that must be placed on all devices that have been locked out as part of a group lockout procedure, identifying the machinery or equipment locked out, and the names of the person(s) who applied the lock. • This tag will be white with black lettering.	**Procedure**
Shop Lock	• A lock provided by the responsible supervisor for the removal of service of equipment for seasonal shutdowns, temporary shutdowns, continuity purposes or other similar purpose. • A Shop lock does not constitute effective lockout. No one is to work behind a Shop lock without establishing effective lockout in accordance with this procedure.	**Procedure**
Status Tag	• A tag used in conjunction with a Shop lock when a worker is not working on the machinery or equipment to indicate the status of the machinery or equipment and the reason for the Shop lock being placed on the energy isolating device. • It must be indicated on the tag that the Shop lock does not constitute effective lockout. • This tag will be yellow with black lettering.	**Procedure**

2. Hazards

a) Inadvertent re-energization of machinery or equipment.
b) Unexpected release of energy.
c) Unexpected movement of machinery or equipment.

3. References

WCB - Occupational Health and Safety Regulation

Part 10 - De-Energization and Lockout - Sections 10.1 to 10.12

4. Definitions

Term	Definition	Source
Control System Isolating Device	• A device that physically prevents activation of a system used for controlling the operation of machinery or equipment.	**WCB**
Checklist	• A list of all machinery, equipment and energy isolating devices requiring lockout, that had been identified through a review of drawings, identification data, and in consultation with knowledgeable parties.	**Procedure**
Energized	• Connected to an energy source, which has not been isolated.	**Procedure**
Energy Isolating Device	• A device that physically prevents the transmission or release of an energy source to the machinery or equipment.	**WCB**
Energy Source	• Any electrical, mechanical, hydraulic, pneumatic, chemical, thermal, or other source of energy of potential harm to workers.	**WCB**
Group Lockout Procedure	• A procedure that states site-specific requirements for a project requiring group lockout.	**Procedure**
Isolate	• To separate an energy isolating device from the machinery or equipment by means of a gap, barrier, blind, blank, or similar means.	**Procedure**

Lock box	• A sturdy container used to secure keys for group locks used in group lockout, capable of being secured and sealed.	**Procedure**
Lockout	• The use of a lock(s) to render machinery or equipment inoperable, or to isolate an energy source in accordance with a written procedure.	**WCB**
Lockout Logbook	• A logbook where the relevant information (as stated in 5.5.6) must be recorded when a Shop lock is applied.	**Procedure**
Positive Sealing Device	• A uniquely numbered one time use only device - acceptable to the board - that has a seal that will show if it has been tampered with. • To be used in all group lock out procedures as a means to secure the keys in the lockbox. • Requires 2 qualified workers to apply as per section 5.6.3 Application of Group Lockout. • The identification number of the positive sealing device applied must be recorded on the checklist. • Must be clearly stated in the group lockout procedure that this devise is to be used.	**Procedure**
Qualified Worker	• A worker who is knowledgeable of the work, the hazards involved and the means to control the hazard by reason of education, training, experience or a combination thereof.	**WCB**
Supervisor	• A person who instructs, directs, and controls workers in the performance of their duties. (Note: this includes heads and subheads.)	**WCB**
Qualified Supervisor	• A supervisor who is technically competent and has specialized knowledge of building systems and of the current work being carried out on those systems.	**Procedure**

5. Minimum Requirements

5.1 Personal Lockout Equipment

5.1.1 Each worker required to apply a personal lock must be assigned a set of personal locks keyed alike complete with a key, personal tags, status tags and lockout scissors.

5.1.2 If the assigned work requires more than three lockout points, then the group lockout procedure must be used.

5.2 Energy Isolating Device Identification and Isolation

5.2.1 The worker who has been assigned a project or task is responsible for the identification, isolation and lockout of the energy isolating devices and remains responsible until they remove their personal lock.

5.2.2 Identification of the energy isolating devices that require lockout must be done through a review of drawings, identification data, trial & error or similar means.

5.2.3 When the correct device has been identified and isolated, all stored energy must be drained or bled off, pressure released and any potential for movement removed or positively blocked against movement.

5.2.4 To confirm effective lockout, an attempt must be made to operate the machinery or equipment to confirm that it will not start up or operate.

5.3 Application of Personal Locks

5.3.1 These locks are to be used only in personal lockout procedures.

5.3.2 The worker who has been assigned to carry out the work must place a lockout scissor, personal lock and personal tag on the energy-isolating device after it has been switched off or otherwise placed in the safe position.

5.3.3 Any additional worker who is required to work on that machinery or equipment must place his or her own personal lock on the lockout scissors. Once that worker's job is complete he/she alone is responsible to remove his/her personal lock.

5.3.4 A personal lock must not be placed in the last hole of a lockout scissors. Instead, another lockout scissor must be applied and the personal lock placed on the additional lockout scissors.

5.3.5 This personal lock will remain in place at all times while there is a hazard to the worker.

5.3.6 When the person who placed the lock is no longer working on the equipment, and the work is incomplete, the personal lock and tag must be replaced with a Shop lock and status tag. A Shop lock does not constitute effective lockout. No one is to work behind a Shop lock without establishing effective lockout in accordance with this procedure.

5.4 Removal of Personal Locks

5.4.1 A personal lock may only be removed by the owner of the lock.

5.4.2 In situations where a personal lock has been left on a device, and it is necessary to remove that lock and the worker is not available, a Lock Removal Form must be filled out and the following procedure must be adhered to and documented.

NOTE:

- For Utilities – the Manager must be called to work-site to approve and be present for removal of lock.
- For Plant Operations – Manager must be contacted, and manager will determine whether a site visit is required to approve the removal of the lock.

The immediate qualified Supervisor and/or Manager must:

a) Make every reasonable effort to contact the worker who placed the personal lock.
b) Attempt to determine the reason for the lockout.
c) Ensure it is safe to remove the lock and energize system.
d) Get prior approval from the manager if additional work is required to make the system safe to energize.
e) Contact the manager when system is made safe to energize to receive manager's permission to remove the lock.
f) Ensure the Lock Removal Form is completed before lock is removed.
g) Remove the lock in the presence of another qualified worker.

The manager must:

a) Sign the Lock Removal Form
b) Inform the worker at the start of their next shift that their lock has been removed.
c) Initiate a formal incident investigation. The completed Lock Removal Form must be submitted with the Incident Investigation report.

5.5 Application and Removal of Shop Locks

5.5.1 Shop locks will be made available in each shop, and must be numbered and identifiable by shop.

5.5.2 The locks and keys are under the control of the shop supervisor and will be issued as required for specific use.

5.5.3 The use of these locks is for the securing of equipment or machinery, seasonal shutdown, temporary shutdowns, continuity, or similar purposes. A Shop lock does not constitute effective lockout.

5.5.4 No one is to work behind a Shop lock without establishing effective lockout in accordance with this procedure.

5.5.5 A status tag must be used in conjunction with a Shop lock and must record the following information on the tag:

a) Worker's name and department
b) The date
c) Reason for lockout
d) Signature

5.5.6 Shop Locks can only be removed by a qualified and authorized worker provided they:

a) Review all pertinent information recorded in the logbook.
b) Are aware of the scope of the work involved and
c) Contact their immediate supervisor if any of the information identified in (a) and (b) is not available or is not understood.

5.5.7 A Lockout Logbook will be made available in each shop. Any time a Shop Lock is left on at the end of a shift the following details must be recorded in the logbook by the person who applies the lock:

a) Date the Shop lock was applied
b) Shop lock number
c) Equipment and device
d) Location
e) Reason for lockout
f) Who applied the lock
g) Job work order number

5.6 Application of Group Lockout

5.6.1 The group lockout procedure is applicable in situations where there are a large number of energy isolating devices that must be locked out &/or where the isolation points are a considerable distance apart &/or where any machinery/equipment requires more than 3 isolation points to be locked out

5.6.2 Group locks, with keys available only to the two qualified workers applying the procedure and the supervisor in charge, must be used for this procedure

5.6.3 To initiate the application of Group Lockout, two qualified workers must take responsibility to:

a) Ensure a site specific "Group Lockout Procedure" is developed
b) Ensure there is an established checklist that lists all the necessary energy isolating devices that require lockout
c) Ensure the supervisor has checked and confirmed that the checklist and the group lock procedure is complete and accurate
d) Personally lock out and attach a group lockout tag to all energy isolating devices identified on this checklist

e) Clearly print their names and contact phone numbers on the checklist, and sign the checklist
f) Locate a lockbox in a prominent location as near as possible to the machinery or equipment shut down by the lockout
g) Post the signed checklist by the lock-box
h) Post the site specific "Group Lockout Procedure" by the lockbox
i) Place all the keys for the locks used in the group lockout in the lock-box and secure lock-box with a positive sealing device acceptable to the board.
j) Record the identification number of the positive sealing device on the checklist.
k) Hold a pre-job meeting with all workers who will be applying personal locks and working on the machinery.

5.6.4 When the correct devices have been identified and isolated, all stored energy must be drained or bled off, pressure released and any potential for movement removed or positively blocked against movement.

5.6.5 As a last confirmation of safe condition, an attempt must be made to operate the machinery or equipment to confirm that it will not start up or operate.

5.6.6 Before commencing work each employee working behind the group lockout must apply a personal lock and tag to the lock box and any additional equipment requiring personal lockout. Each worker must make sure the serial number of the positive sealing device matches the serial number recorded on the checklist.

5.6.7 Any additional workers assigned to the project must understand the parameters of the work and review the checklist and group lockout procedure before adding their personal locks.

5.7 Removal of Group Lockout

5.7.1 On completion of their work, workers must remove their personal lock from the lock box.

5.7.2 Once all workers have removed their personal locks as per 5.7.1, two qualified workers must determine whether it is safe to end the group lockout.

a) If it has been determined safe to end the group lockout any 2 qualified workers can be assigned the responsibility to remove the sealing device.
b) If the 2 qualified workers who determine it is safe to end the group lockout are different than the 2 qualified workers who initiated it, they must also clearly print their names and contact phone numbers on the checklist, and sign the checklist.

5.7.3 Once the positive sealing device has been removed from the group lock box, the group lockout is no longer in effect.

5.8 Alternate Procedures

1. For power systems as defined in Part 19 of the British Columbia Occupational Health and Safety Regulations (BC OH&S Regulations) - Electrical safety - the requirements of that Part must be followed
   a) For power systems as defined in Part 19 BC OH&S Regulations, also refer to UBC Procedures:
      i. IB-7 - Clearances –High voltage Equipment;
      ii. IB-8 - Overhead High Voltage Electrical Equipment;
      iii. IB-30 - Testing Low Voltage Equipment;
      iv. IB-31 - Working with Low Voltage Equipment;
      v. IB-32 - High Voltage Switching; and

vi. IB-33 - Test and Work Permits
vii. Steam System Lockout Variance-Acceptance AR 2002-00245

5.8.1 For mobile equipment as defined in Part 16 of the BC OH&S Regulations - Mobile Equipment - the requirements of that Part must be followed.

5.8.2 In an emergency where lockout cannot be immediately applied, the energy isolating devices or control system devices must be effectively controlled to prevent inadvertent start up or hazardous energy release. As soon as the emergency is controlled, lockout must be applied as per this procedure to complete repairs.

5.9 Locks not Required

5.9.1 On a tool, machine or piece of equipment which receives power through a readily disconnected supply, such as an electrical cord, quick release air or hydraulic line, or similar device, is disconnected from its energy supply and the connection point is kept under the immediate control of the worker at all times while work is being done.

5.9.2 On electrical distribution panels where a qualified electrical worker disconnects the wires from the breaker, appropriately insulates the wire ends and places a status tag on the wires.

6. Responsibilities

WCB Definition	UBC Organization	Responsibilities
Employer	**Associate Vice President and Directors**	• Ensure that the lockout procedure is implemented, including training, quality assurance system and requirements, monitoring and review of the procedure • Assign responsibilities for implementation and monitoring to ensure the program runs effectively • Ensure that adequate resources are made available for the implementation and continued operation of this lockout procedure
Supervisors	**Associate Directors**	• Implement the lockout procedure and ensure that the necessary systems are put in place and training is provided • Assign responsibilities to ensure the lockout procedure is implemented • Monitor lockout procedure and ensure that it is operating effectively
	Managers, Heads and Sub-Heads	• Ensure that the lockout procedure is implemented • Ensure that all workers are trained in all aspects of this procedure • Give adequate directions to workers so that work can be carried out safely • Ensure that checklists used for group lockouts are accurate and complete and that group lockouts are carried out in accordance with the checklist and this procedure • Monitor the procedure for its compliance and effectiveness and make recommendations as may be appropriate for its improvement
Worker	**All Workers**	• Carry out their work in a safe manner and in compliance with the established procedures

LOCK REMOVAL FORM

When it is deemed necessary to have a lock removed by other than the owner of the lock, a formal incident investigation must be completed. This form must be filled out - before the lock is removed - by the immediate qualified supervisor, as per section 5.4 of this procedure. A copy of the completed form signed by the manager must be attached to the incident investigation report.

DATE AND TIME:_____

JOB WORK ORDER NUMBER:_____

LOCK NUMBER:_____

LOCK ASSIGNED TO:_____

LOCATION OF LOCK:_____

NOTE: ***<u>For Utilities</u> – the Manager must be called to work-site to approve and be present for removal of lock.***
<u>For Plant Operations</u> – Manager must be contacted, and manager will determine whether a site visit is required to approve the removal of the lock.

<u>EMERGENCY LOCK REMOVAL PROCEDURE:</u> Please Check) √

			YES	NO
1.	☐	Immediate qualified supervisor attempts to contact lock owner. Successful?	☐	☐
2.	☐	Immediate qualified supervisor attempts to determine reason for lockout. Determined?	☐	☐
3.	☐	Immediate qualified supervisor determines if system safe to energize. Safe?	☐	☐
4.	☐	(a) Immediate qualified supervisor contacts manager to get approval for work required to make system safe to energize. Approved?	☐	☐
	☐	(b) Immediate qualified supervisor contacts manager for permission to remove lock. Permission received?	☐	☐
5.	☐	With manager's approval, the qualified supervisor takes necessary steps to ensure it is made safe to remove lock. Safe?	☐	☐
6.	☐	In Manager's presence and/or with manager's approval (see Note above) and in presence of another qualified person, qualified supervisor removes lock. Removed?	☐	☐
7.	☐	The Manager notifies employee whose lock has been removed. Notified?	☐	☐

Reason Lock was removed:_____

Confirmed safe to remove lock by:_____ Lock removed by:_____

Date:_____ Witness:_____

Date/Time lock owner notified _____

Qualified Supervisor's Name: _____ Qualified Supervisor Signature: _____

Manager's Name: _____ Manager's Signature: _____

Appendix A

Forms for Reference/ Use for Group Lockout Checklists

THE UNIVERSITY OF BRITISH COLUMBIA

Department of Plant Operations
2329 West Mall
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To: Land and Building Services
Policy & Procedures Book Holders

From: Diane Weiler
Acting HS&E Supervisor

Date: September 26, 2003

Phone: 2-1885

RE: Amended Isolation and Lockout Procedure I-B-02

This letter is to inform you of the process that is being followed to implement the amendments made to this procedure.

As with new procedures, amended procedures also require a procession of stages to effectively implement the changes. We are taking the following steps to implement I-B-02. It will take some time to ensure everyone is up to speed on the changes.

- January 1, 2004 is the date we expect to have this procedure fully implemented. All training should be completed by then.
- The new devices and tags required for this new procedure are presently on order.
- As an initial stage, the fall training session for new hires will be to this amended procedure.
- Managers and Heads will be providing the training to their crews for this procedure. A training program and train-the-trainer education is being provided to assist them in this process.
- It is important that all crews are aware of the steps being taken to ensure we implement this procedure effectively.

Thank you for your support during this process.