SAFE MGMT 112

WPP Category B-2

Working under WPP Lockout

January 2020

Training and development

Participant Guide

BC Hydro
Power smart

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Course introduction

Welcome to the **Working under WPP Lockout** course. This course was developed by BC Hydro to train workers in the principles and practices of WPP Personal and Group Lockouts.

Approximate time required to complete: **2 ½ hours**

Audience

The audience of this course is those workers who wish to qualify for authorization to WPP category B or higher. This includes:

- BC Hydro Integrated Generation employees and contractor's workers
- BC Hydro Non-Integrated Area (NIA) employees and contractors

Prerequisites

- Basic Safety in BC Hydro Facilities
- This course is **Part 2** of the System Component training required for authorization to Worker Protection Practices (WPP) Category B.

Course goal

The desired outcome of this course is that you will be able to carry out your roles and responsibilities as a Category B worker.

Course objectives

The desired outcome of this course is that you will understand and be able to carry out your roles and responsibilities as a WPP Category B worker.

At the end of this course, you will be able to:

- Identify the roles that a Category B worker can assume under lockout
- Explain the responsibilities of the category B worker in these roles
- Explain when Group Lockouts are used in place of Personal Lockouts
- Identify the purpose of each type of lock and tag(s) used in WPP Lockouts
- Identify the responsibilities of the Category B worker under Personal and Group Lockouts
- NIA employees and contractors will also be able to describe the use of the "Danger - Do Not Operate" tag used in WPP lockouts

Course Topics

- Work Protection Practices Category B
- Introduction to Lockouts
- Personal Lockouts
- Group Lockouts

Completion requirements

At the end of this course module, you will write an examination to demonstrate your understanding of the information presented in both **Working on the Power System** and **Working under WPP Lockout**.

Lesson 1: WPP Category B

Purpose: The purpose of this lesson is to provide an introduction to the duties and responsibilities of the WPP Category B worker.

Objectives: On completion of this lesson, you will be able to:

- Identify the responsibilities workers are authorized to assume under the WPP Categories of authorization
- Identify tasks that the Category B worker is and is not authorized to perform with respect to WPP lockout
- Explain the roles that a Category B worker can assume under WPP lockout

Topics: This lesson covers the following topics:

- Introduction
- WPP Categories of Authorization
- The Category B Worker

Introduction

In the previous course, *Working on the Power System,* you learned that Work Protection Practices (WPP) is used to establish safe conditions for working on power system equipment in all BC Hydro Generating Stations and NIA Substations.

WPP incorporates:

- A strict set of procedures, using Personal and Group Lockouts, to establish safety protection for different types of work
- A hierarchical system of authorizing workers to perform different roles within those procedures

WPP is governed by the rules and requirements of BC Hydro's *Safety Practice Regulations* and WorkSafeBC's *Occupational Health and Safety Regulation.*

Your safety, as a worker in a BC Hydro Generating Station, depends on your understanding of WPP and your roles and responsibilities within it.

In this course, you will learn what you need to know to work under WPP Lockout as a WPP Category B worker.

WPP Categories of Authorization

WPP Categories of Authorization relate **only** to the workers' level of authority with respect to Safety Protection.

The higher the authorization level, the more responsibility the worker is allowed to take for Safety Protection. Achieving a higher level of authorization requires formal training (such as this course), as well as experience with the Safety Protection mechanisms and technologies.

Category	Authorization
A	▪ Access a generating station or associated facility
B	▪ Place a personal lock and work under WPP ▪ Act as Host ▪ Test Leader
C	▪ Prepare Personal Lockout for equipment not identified on the operating one-line diagram ▪ Visually check Group Lockout ▪ Coordinate testing under a Group Lockout
D	▪ Perform PIC Duties

Any worker can assume responsibilities below his or her level of authorization. For example, a Category D worker may not always work as the PIC, but might perform work at the Category C level.

The WPP Category B Worker

Category B personnel are a diverse group that includes:

- Driver / helpers
- Temporary workers
- Contractor's workers
- BC Hydro construction workers
- CPC Technologists
- NIA Powerline Technicians
- Apprentices and newly hired tradespersons

Authorization and Limitations

Category B workers are authorized to assume the following roles:

- Securing their own protection for work under lockout by placing personal locks. For personal lockouts, the Cat B worker must be directed by a Cat C or D worker when applying personal locks.
- Acting as a Host by supervising an unauthorized visiting worker
- Acting as a Test Leader for testing under a lockout
- Acting as a Work Leader under group lockout

Category B workers are **not** permitted to:

- Plan a lockout
- Isolate power system equipment
- Apply or remove worker protection grounding / bonding or blocking devices

As a Category B worker, you must know what you are authorized to do and never assume the responsibilities for which you are not authorized. Any violation of this rule is a serious safety infraction.

Working under Lockout

When you are working under lockout, you must:

- Attend and participate in tailboards so that you understand the risks, the work protection in place, and the roles of all workers involved
- Review the lockout sheet and ensure the isolation, grounding / bonding, and blocking devices provide the isolation of hazardous energy sources that is appropriate for the work you will do.
- Apply and remove your personal locks according to WPP procedures for personal and group lockout
- Follow the directions of the PIC or other authorized workers when there are changes to the lockout.

Host

Workers who are not authorized to at least Category B are not normally permitted to work under WPP lockout. However, SPR 701.3 allows unauthorized workers access to protected equipment if they are “under the direct and continuous supervision” of a host who is:

- Authorized to at least Category B at the facility
- Currently locked on to the lockout in question

    As a host, it is your responsibility to sign out sufficient locks for the visitor to use for the lockout. The visitor must attach their locks to all protective devices under the supervision of a worker authorized to Category C or higher.

Once the visitor has locked on, it is your responsibility as host to:

- Maintain sight and voice contact with them at all times
- Ensure that they stay within the safe work zone for the job

Test Leader

The **test leader** is the worker responsible for overseeing a specific test procedure to ensure that sources of test energy do not create a hazard to other workers. We will discuss this further in Lesson 4.

Work Leader

A **work leader** is a person, regardless of title or classification, who assumes specific responsibilities within the Lockout process. We will discuss the work leader role further in Lesson 4.

Lesson 2: Introduction to Lockout

Purpose: The purpose of this lesson is to provide an overview of WPP lockout procedures and to explain some of the essential components of lockout.

Objectives: On completion of this lesson, you will be able to:

- Identify the general policies and principles of WPP lockout
- List the major differences between Personal Lockout and Group Lockout
- Recognize the different types of locks and identify their uses in WPP Lockouts
- Recognize the Attention tag and when it is used in WPP
- Recognize the Danger – Don Not Operate tag (used in NIA only)
- Explain the role and responsibilities of the WPP PIC

Topics: This lesson covers the following topics:

- WPP Lockout Policy
- Types of WPP Lockout
- WPP Locks
- Attention Tags
- NIA DANGER - DO NOT OPERATE (DDNO) tags
- The Role of the PIC in Lockout
- Guarantees of Isolation (GOIs)

WPP Lockout Policy

Part 10 of WorkSafeBC's *Occupational Health and Safety Regulation,* "De-energization and Lockout," defines the requirements for lockout in BC. In that document, **lockout** is defined as: "the use of a lock(s) to render machinery or equipment inoperable or to isolate an energy source in accordance with a written procedure."

BC Hydro's process for lockout at all Generating Stations and NIA Substations complies with all the requirements of the Regulation and applies them to the unique conditions and circumstances of the Generating Station environment. The policies, rules, and procedures for WPP lockout are specified in the *Safety Practice Regulations* Section 700.

SPR 701 states the general policy for WPP lockout. The following are **some important rules** governing lockout:

701.1	If the energization or start-up of equipment or the release of a hazardous energy source could cause injury, the energy source must be isolated, grounded / bonded and blocked, and locked out prior to the start of work,…
701.2 **701.3**	Only workers who have been trained and authorized in WPP procedures may access or work on protected equipment, except … visitors … who are under the direct and continuous supervision of an authorized worker.
701.4	Each worker who accesses or works on protected equipment must: Ensure the isolation of hazardous energy sources is appropriate for the work they will do Maintain control over the isolation through the application of one or more personal locks according to WPP procedures Have full knowledge of the hazardous energy that has been isolated, the boundaries of the safe work area, and the safety procedures for the job
701.5	If two or more workers will be using the same isolation, they shall attend a documented tailboard to discuss all aspects of the isolation, the hazards of the job, and the work plan….
701.8	A personal lock is to be used for the sole purpose of work protection and may be placed only by the worker to whom it has been assigned
701.9	A personal lock must be removed only by the worker who placed it. When this is not practical, the matter is to be referred to the facility Manager who will be responsible for its removal, using documented procedures (SPR 725)

Types of WPP Lockout

In compliance with WorkSafeBC requirements, WPP defines separate procedures for Personal Lockout and Group Lockout. The following table outlines the basic differences between personal and group lockouts:

Personal Lockout	Group Lockout
• Each worker places a personal lock on each isolating, grounding / bonding, and blocking device • Cat B workers must be directed by a Cat C or D worker when placing personal locks	▪ Typically used where there is a large number of isolating devices or a large number of workers ▪ Two authorized workers lock out all isolating devices independently ▪ PIC places keys in a key box ▪ Each worker places a personal lock on the key box to secure their protection

Note: Category B workers are permitted to lock out shop equipment and auxiliary equipment that is not directly associated with the power system if there are less than three isolating devices. Workers must follow the lockout procedures posted at the equipment, as specified in SPR 708.5.

WPP Locks

To secure protective devices, WPP uses three types of locks: Personal, Group, and Visitor.

All locks used for lockout are American Lock Model 1105 locks. These are high-security aluminum locks that are supplied with two keys, one of which is retained at the facility or headquarters in a secure key cabinet. This key cabinet is kept locked at all times, with the facility Manager and the Regional Manager each having a key, to ensure that these “back-up” keys cannot be accessed by unauthorized personnel.

Where it is not practical for the facility Manager to access the key cabinet for lock removal purposes, an additional key to the key cabinet may be stored at the facility in a “code access” key box.

All locks are engraved with a code XXX-XXX-XXX representing the facility and the purpose for which the lock is used (GRP = group lock, PER = personal lock, VIS = visitor lock). This code is followed by a unique number identifying the lock or lock set.

For example, GMS-VIS-21 would identify visitor’s lock number 21 at GM Shrum Generating Station.

Personal Locks

Personal locks are red and are issued as individually keyed locks or in sets of identically keyed locks.

- Workers who will be working under Personal Lockout are assigned a set of identically keyed locks.
- Workers who will be working only under Group Lockout are typically assigned a single personal lock.

The name of the worker to whom each individual lock or lock set is assigned is recorded in the facility Personal Lock Log and labelled on each lock.

When a worker is no longer required to work at the facility, they are required to return their personal locks to the person who issued them.

Note: Personal Locks are to be used for the sole purpose of work protection and may be placed and removed only by the worker to whom they have been assigned.

Group Locks

Group Locks are used to secure isolating devices for the purposes of Group Lockout.

These locks come in identically keyed sets of various sizes and seven colours: blue, brown, green, black, purple, orange, and yellow.

A Group Lockout requires two lock sets. Typically, these are different colours to distinguish locks placed during switching from those placed during visual checking.

If two or more Group Lockouts are in place at the same time, different coloured lock sets are used for the different lockouts to distinguish which lockout each of the locked-out devices belongs to.

Each lock in a set is identified with the number of the lockset to which it belongs.

Visitor Locks

Visitor Locks are grey, and are issued as individually keyed locks or in sets of identically keyed locks.

These are to be used by visitors requiring short term access to equipment protected under a lockout.

When a lock is assigned to a visitor, that person's name is recorded in the log. A name label must be attached to the lock to identify who it belongs to.

Scissor Clips

Scissor clips are always used to allow multiple personal locks to be attached to a single device or key box:

- The first person locking on attaches a scissor clip to the device, then places their lock in one hole of the clip
- Other workers attach their locks to other holes in the clip

A lock must never be placed in the last hole of the scissor clip. If there is only one hole left, place another scissor clip in the last hole and attach your personal lock to the second scissor clip.

Removing Personal Locks

A Personal Lock may be removed only by the worker who placed it (SPR 701.9).

However, there is a procedure for removing a lock that has been inadvertently left on, and the worker is not on-site or has misplaced their key. This procedure is necessary only when the lock is preventing equipment from being returned to service or is preventing the lockout from being modified.

Note: Only the Plant/Facility Manager has the authority to remove personal locks and can do so only with the permission of the Area or Senior Manager. This ensures that the proper procedure is followed and no worker is placed at risk because their lock has been removed improperly.

WPP tags

Attention Tag

The **Attention** tag is used to indicate the status of equipment, such as a switch that is opened for personal lockout but has not yet had a personal lock applied. Attention tags are used to advise workers of a condition that might lead to a service interruption, create an unusual situation, or require a special operating procedure.

The tag must be completed in legible handwriting before it is attached to the device. It must show the designation for the device it is attached to, the name of the worker applying the tag, the date the tag is applied and, on the back, the reason for applying the tag.

The application and removal of Attention tags must be recorded in the Station Log or in a logbook for Attention tags.

Warning: The Attention tag does not provide any level of worker protection. Never perform work on equipment that has only Attention tags on its isolating devices.

Danger – Do Not Operate tag (Non-Integrated Area ONLY)

The Danger – Do Not Operate tag is only allowed to be used in our Non-Integrated Area's and is used to secure protection devices that are not lockable. Before being attached to the device, the tag must have all the information filled out in legible handwriting and must be signed by the person who applies it. Danger – Do Not Operate tags must be treated as locks.

For personal lockout, each worker who is working under the lockout must apply their own Danger – Do Not Operate tag to each protective device that is not lockable. Only the person who applied the tag is permitted to remove it.

- For group lockout, Danger – Do Not Operate tags may be placed and removed only at the direction of the PIC.
- The tag shall be secured using a nylon tie directly to any isolating device that is not lockable.

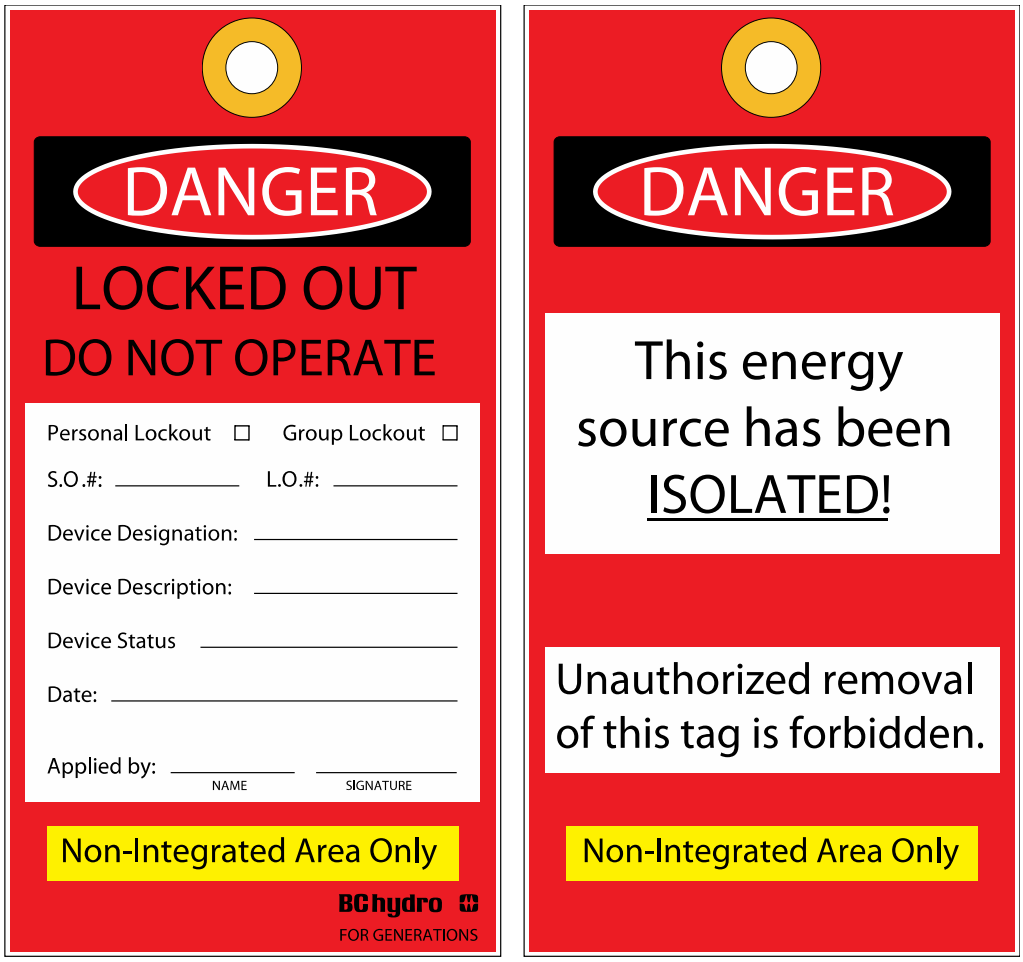


Figure 1. Danger – Do Not Operate tag used in NIA

The tag shall include the following information:

- Switching Order number or Lockout number,
- Device designation,
- Device description, and
- Name and signature of the worker applying the tag.

"Danger – Do Not Operate" tags placed outdoors shall be protected from the weather in a suitable transparent envelop.

Role of the PIC in Lockout

Integrated Areas

Normally, the Generating Station is under the control of the operator at the Control Centre, so that he or she can carry out his or her responsibility to run the power system. However, the operator does not have the authority to establish Safety Protection within the Generating Station.

When necessary, control of Generating Station equipment (Operating Responsibility) is assigned to the station. An authorized worker can then sign on to the station log to perform PIC duties, as required.

Note: A few Generating Stations (GMS, Burrard, and Fort Nelson) have operating responsibility for their equipment and have a PIC on site at all times. In those stations, the assignment of Operating Responsibility is not required.

Transferring Control

When Generation Station equipment needs to be isolated for repair or maintenance, the following procedure is followed:

1. A Category D worker at the station informs the operator at the Control Centre of the required work
2. The operator at the Control Centre initiates (or directs) the switching necessary to disconnect that portion of the Generating Station from the power system (usually taking a generating unit off-line and opening the unit disconnect).
3. The operator at the Control Centre formally assigns operating responsibility for that portion of the system to the Generating Station.
4. A Category D worker at the Generating Station signs on as the PIC of that portion of the station in the Station Log

Non-Integrated Areas

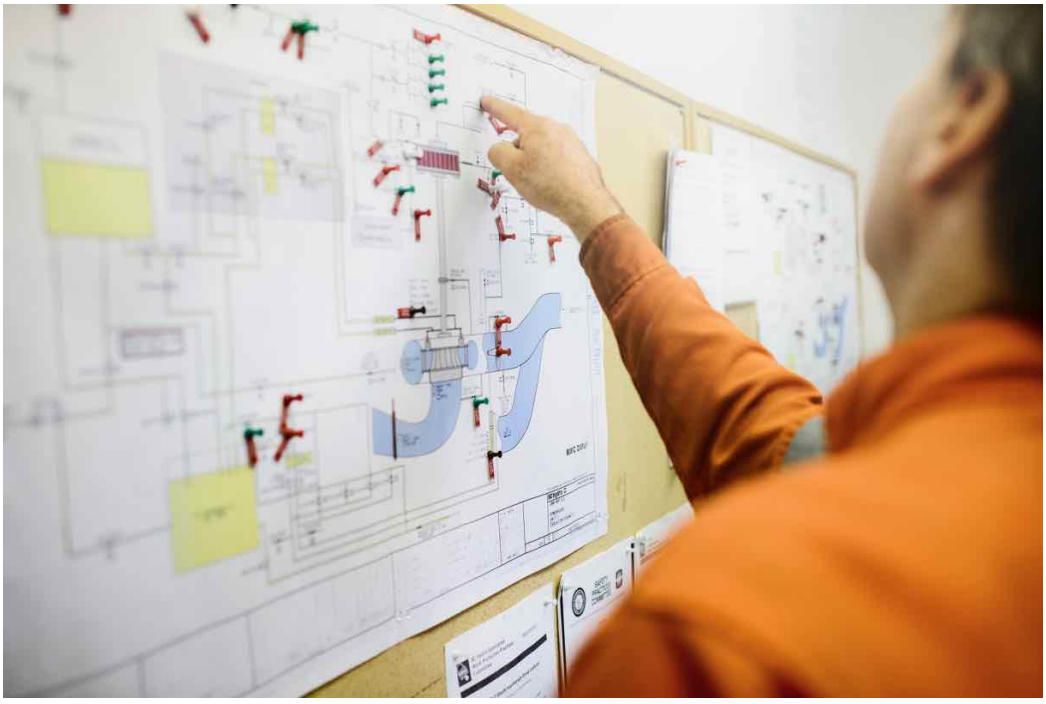
1. Normally, the NIA Generating Station is under the control of the operator at the District Central Control Facility (DCCF), so that he/she can carry out his/her responsibility to run the power system.
2. Control of NIA Generating Station equipment is under the control of the Operator at the District Central Control Facility (DCCF). The DCCF PIC may direct the establishment of worker protection or alternatively control of NIA Generating Station equipment (Operating Responsibility) may be assigned to the station where an authorized worker can then sign on to the station log to perform PIC duties.

The PIC's Responsibilities

The Category D worker who is currently signed in as PIC is responsible for establishing safe working conditions for the equipment under his or her control. The PIC is authorized to:

- Prepare Personal Lockout of equipment on the operating one-line, by planning the lockout and directing the isolation, grounding / bonding, and mechanical blocking of equipment.
- Establishing Group Lockout by planning the lockout; directing the isolation, grounding / bonding, mechanical blocking, and lockout of equipment; and setting up the group lockout board.
- Plan and direct any modifications to a Group Lockout required during the course of the work.
- Plan and direct the restoration of equipment back to service.

Note: The PIC is required to maintain a local Mimic Board displaying the current status of all equipment under his or her control at all times.



Guarantees of Isolation (GOI)

For most work in the station and switchyard, the PIC at the station or DCCF can assume complete responsibility for isolating the equipment through a Lockout procedure. However, in cases where equipment is close to (or on) the WPP/PSSP boundary, an isolating device may be on the PSSP side of the boundary and is under the control of the operator at the Control Centre or DCCF. In fact, the switch or disconnect may be miles away, along the Transmission or Distribution line.

In such cases, the operator isolates the equipment and issues a **Guarantee of Isolation** to the PIC at the station. A Guarantee of Isolation is a form of Safety Protection by which one Operating Authority assures another Operating Authority that a specific line or equipment is isolated and will remain isolated until the GOI is returned (see SPR 506 for information on GOIs.)

Note: NIA PICs may issue GOI's to themselves for establishing worker protection.

The isolating devices in question are secured using "Do Not Operate–Guarantee of Isolation" tags. Both the operator and the PIC complete a Safety Protection Form indicating:

- the isolating devices
- the date and time of issue
- the names of the PICs who issued and received the GOI
- When a GOI forms part of the isolation under a WPP lockout:
- the PIC lists the GOI isolating devices on the Lockout sheet and attaches the GOI Safety Protection Form to the Lockout Sheet
- where it is practicable, WPP locks are applied to the GOI isolating devices to provide the workers with complete control over their safety (SPR 701.11)

Note: If the isolating devices are a distance from the worksite, or it is otherwise impractical for locks to be applied, the isolation is still secured by the "Do Not Operate–Guarantee of Isolation" tags, the tags on the operator's Mimic Display, and the operator's formal assurance.

Lesson 3: Personal Lockout

Purpose: The purpose of this lesson is to provide you with an in-depth understanding of Personal Lockout and the roles and responsibilities of Category B workers under Personal Lockout.

Objectives: On completion of this lesson, you will be able to:

- Identify which types of Personal Lockout require a PIC
- Explain how the Personal Lockout process protects the worker
- Interpret a Personal Lockout Sheet
- Identify the responsibilities of the Category B worker under Personal Lockout
- Explain the responsibilities of the Category B worker during testing under a Personal Lockout

Topics: This lesson covers the following topics:

- Introduction to Personal Lockout
- The Personal Lockout Process
- The Personal Lockout Sheet
- Responsibility of the Category B Worker
- Hazardous Testing under Personal Lockout

Introduction to Personal Lockout

Personal Lockout is a form of work protection in which each worker places a personal lock on each isolating, grounding / bonding, and blocking device to ensure the equipment they are working on remains in a protected state. Personal Lockout is typically used for jobs that require a small number of workers and a small number of protective devices.

Jobs that could be done under personal lockout include:

- Replacing a cooling or ventilation fan motor
- Changing filters on the hydraulic pumps of a governor
- Performing maintenance on a governor
- Checking or maintaining a high-voltage breaker in a switchyard
- Maintenance on a diesel engine

The procedure for Personal Lockout varies slightly, depending on whether the equipment to be locked out is on the operating one-line or not:

- Lockouts for equipment ***not*** on the operating one-line can be prepared by any Category C worker after an assessment of system risk. They need to inform the PIC (or operator at the Control Centre or DCCF) only if the isolation could affect the operation of the power system.

- Lockouts for equipment on the operating one-line require the involvement of the PIC because only the PIC is authorized to operate and apply Safety Protection on this equipment.

The rules and procedures for Personal Lockout are defined in SPR 708 – 715.

Note: As a Category B worker, your role is the same whichever procedure is followed.

The Personal Lockout Process

The general process for Personal Lockout is as follows:

1. Preparation:

A qualified worker:

- Assesses the work to be done, identifies the sources of hazardous energy, the isolation devices, and the grounding / bonding and blocking required
- Prepares a Personal Lockout Sheet and Switching Order, as required

2. Isolation:

A qualified worker:

- Switches isolating devices according to the Lockout Sheet or Switching Order, and **verifies** the isolation
- Applies grounding / bonding and blocking
- Secures the devices with a personal lock or an Attention Tag (if they are not applying a personal lock at the time of switching).
- Posts the Personal Lockout Sheet at a location identified to all workers (typically at the work site).

Verification

A check or test to ensure a hazardous energy source has been isolated.

3. Lock-On:

If more than one worker is working on the equipment, the worker in charge holds a tailboard. Each worker:

- Consults the Personal Lockout Sheet
- **Visually checks** each protective device on the Lockout Sheet to ensure it is switched to the required position and properly secured

Visual check involves 3 steps:

1. Ensure it is the correct device.
2. Ensure it has been switched to the correct position.
3. Ensure it is properly secured.

Note: Category B workers must be directed by a Category C or D worker when attaching personal locks under Personal Lockout.

4. Work:

Each worker does their work under the protection of their personal locks. If locks are left on overnight, their presence must be recorded in the Station Log.

5. Lock Removal:

When the work is complete:

- If the equipment is **ready for service** the last worker to remove their locks returns the lockout sheet to the PIC or the authorized worker who prepared it.
- If the equipment is **not ready for service**, the last worker to remove their locks secures an attention tag to each isolating, grounding/bonding, and blocking device, and returns the lockout sheet to the PIC or the authorized worker who prepared it.

6. Lockout Removal:

The PIC or another authorized worker returns the equipment to service or logs the equipment status in the Station Log.

Note: With Personal Lockout, each worker is personally responsible for ensuring that the lockout is appropriate for the work they are doing. The worker who plans and directs the lockout does not retain any specific responsibility.

The Personal Lockout Sheet

The Personal Lockout Sheet is the official documentation and it serves the following purpose:

- Aids in planning the lockout. It provides a consistent framework for specifying the isolation that needs to be applied.
- Clearly communicates the details of the lockout. It can be used by the person performing the switching to implement the isolation, and it is posted in a location identified to all workers, typically adjacent to the protected equipment.
- Provides a record of the lockout and those responsible for preparing it. It must be retained in the facility for at least two years.

Note: It is very important that you learn how to interpret the Personal Lockout Sheet so that you can effectively check the isolation to ensure it is providing you with adequate worker protection.

BC Hydro

P.L.O. Sheet #: KCL-PLO458
WPJ26926 : 600V Intake Cable Megger
Switching Order #: KCL-SO458

Personal Lockout Sheet

For Work On: Intake Feeders

Purpose: Megger test

No.	Designation	Device description	Device status	Switched by	Verified by	*
1	0.6CB06	Panel 91E Power Intakes	Open, racked out, and locked			
2	0.6CB20	Panel 91NE Power Intakes	Open, racked out, and locked			
3	0.6-91E-MAIN	Panel 91E Main Breaker	Opened and Locked			
4	0.6-91NE-MAIN	Panel 91NE Main Breaker	Opened and Locked			

* - Indicates an isolation point which could not be verified

Switching completed by: _____ Signature: _____ Date: _____ Time: _____

Prepared by: Signature: _____ Date: 2017-Aug-30 Time: 10:57 PDT

Returned by: _____ Signature: _____ Date: _____ Time: _____

Workers and equipment clear? Yes ___ No ___ Equipment ready for service? Yes ___ No ___

Note: Shaded area to be completed when WPP Switching Order has not been issued.

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When working on equipment under a Personal Lockout, the Category B worker is responsible for the following:

Visual check
involves 3 steps:

1. Ensure it is the correct device.

2. Ensure it has been switched to the correct position.

3. Ensure it is properly secured.

- You must advise an authorized worker of any work you are doing on power system equipment:
  - If the equipment is on the operating one-line diagram, you must advise the **PIC** of the work to be done and the isolation requirements.
  - If the equipment is not on the operating one-line diagram, you must advise a worker authorized to Cat C of the work to be done and the isolation requirements.
- You must participate in all tailboard meetings to fully understand the work to be done, the potential hazards, and the Safety Protection in place.
- You must **visually check** that each isolating device listed on the Personal Lockout Sheet has been switched to the required position before placing your personal locks on the devices.

As a Cat B worker:

You can only place your lock on PLO isolating devices under the direction of a Cat C or D worker.

- **Cat B must always place personal locks on protective devices under direction of a Category C or D worker**.
- You must ensure that the number of personal locks you have placed matches the number of isolating devices listed on the Personal Lockout Sheet.
- If the scope of your work changes in such a way that the isolation is no longer adequate, you must stop working and inform the worker who prepared the lockout.
- If your personal locks stay on devices overnight, you must record, in the Station Log, your name and a list of the devices on which your locks are placed.

Note: Each worker who accesses or works on protected equipment shall ensure the isolation of hazardous energy sources is appropriate for the work they will do and shall maintain control over the isolation through the application of personal locks. The worker must have full knowledge of the hazardous energy that has been isolated, the boundaries of the safe work area, and the safety procedures for the job (SPR 701.4)

Hazardous Testing Under Personal Lockout

Hazardous testing is permitted on equipment under Personal Lockout provided that it complies with SPR 713. SPR 701.10 explains how to determine whether testing is hazardous or not. Only one test procedure is to be carried out at any one time.

The worker responsible for testing under a personal lockout is required to do the following:

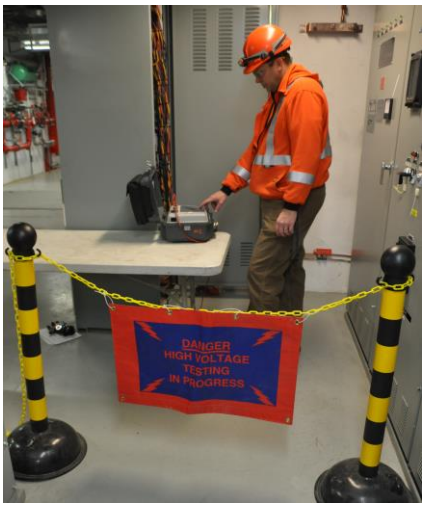
1. Take possession of the Personal Lockout Sheet for the duration of the testing to ensure that no workers can lock on without being fully aware of the testing.
2. Before starting the testing, hold a documented tailboard with all the workers who will be locked on during the test.
3. Ensure that sources of test energy cannot harm other workers.
4. Place the appropriate signs and barriers to protect all workers from the hazards created by the testing.

Grounding / bonding and blocking devices may be removed by an authorized worker for the purpose of testing, under the direction of the person responsible for the testing. Such devices must be replaced immediately after testing and before continuing work on the protected equipment.

Hazardous energy may be temporarily restored to equipment that is not identified on the station one-line diagram for the purpose of testing. An example would be to bump test a motor.

As a Category B worker, you must:

1. Ensure that you understand the testing procedures and the hazards involved, as communicated at the tailboard.
2. Respect any barriers or signs placed to protect you from the hazards of testing.



If you are responsible for the testing, you are responsible for your own safety and the safety of all workers while the testing is in progress. If it is necessary to change the lockout by removing protective devices or restoring an energy source, you must have it done by a qualified worker.

Lesson 4: Group Lockout

Purpose: The purpose of this lesson is to provide you with a good understanding of Group Lockout and the roles and responsibilities of Category B workers under Group Lockout.

Objectives: On completion of this lesson, you will be able to:

- Explain how the Group Lockout process protects the worker
- Explain the role and responsibilities of a work leader under Group Lockout
- Explain the role and responsibilities of a test coordinator and test leader under Group Lockout
- Explain the Category B worker's general responsibilities under Group Lockout
- Interpret a Group Lockout Sheet, a Group Lockout Modification form, a Test Notification form
- Identify the purpose and the key components of the Lockout Board
- Identify the workers' responsibilities when a Group Lockout is being modified
- Identify the workers' responsibilities when testing is being performed under Group Lockout

Topics: This lesson covers the following topics:

- Introduction to Group Lockout
- Establishing Group Lockout
- The Group Lockout Sheet
- The Lockout Board
- Roles and Responsibilities
- Modifying a Group Lockout
- Hazardous Testing under Group Lockout

Introduction to Group Lockout

Group Lockout is an alternate form of lockout that is used for jobs that require either a large number of workers or a large number of protective devices. Typically, a Group Lockout is used for any project that requires more than one crew or the participation of contractors' crews.

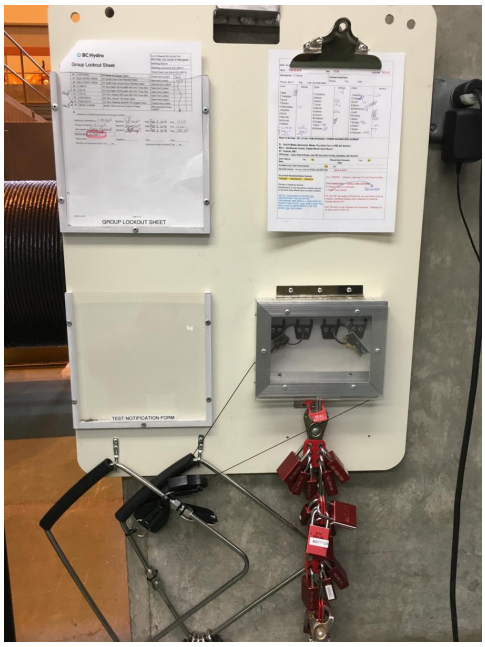
For Group Lockout:

- The PIC plans and directs the lockout
- The lockout is established by two qualified workers who independently attach group locks to each device
- Each worker secures their own safety by placing a personal lock on a sealed key box containing the group lock keys.

Jobs that would be done under Group Lockout could include:

- Scheduled maintenance of a generating unit
- Maintenance or repair of a unit transformer

The rules and procedures for Group Lockout are defined in SPR 716 – 724.



Group Lockout Board

Establishing Group Lockout

The general process for establishing Group Lockout is as follows:

Verification

A check or test to ensure a hazardous energy source has been isolated.

Visual check involves 3 steps:

1. Ensure it is the correct device.

2. Ensure it has been switched to the correct position.

3. Ensure it is properly secured.

1. **Preparation:** Work leaders communicate work and isolation requirements to the PIC.
   - The PIC plans the Safety Protection and prepares a Group Lockout Sheet. The Sheet is checked by a qualified worker.
   - The PIC creates a Switching Order for the isolation, grounding / bonding, and blocking.
2. **Isolation:** A qualified worker independently:
   - Follows the Switching Order instruction to isolate the equipment.
   - **Verifies** the isolation if possible at each isolating device by checking or testing that all hazardous energy has been eliminated.
   - Attaches a group lock from the first set of locks
3. **Visual Check:** A second qualified worker independently:
   - **Visually checks** the switching, grounding / bonding, and blocking against the Group Lockout Sheet to ensure each device has been switched to the required position and secured.
   - Attaches a group lock from the second set of locks
4. **Lockout:** The PIC
   - Places the group lock keys in a key box on the lockout board and seals it.
   - Posts the Group Lockout Sheet on the lockout board.

The Work Leader holds a documented tailboard to communicate the details of the work, the hazards, and the isolation. The Work Leader also discusses any isolating devices that could not be verified along with additional safety precautions that must be taken to ensure hazardous energy is effectively isolated.

4 (cont.) Each worker locking on:

- confirms that the lockout board is the correct one for their work and the seal number matches the number on the GLO Sheet
- attaches their personal lock to the key box to secure the lockout.

5. Work:

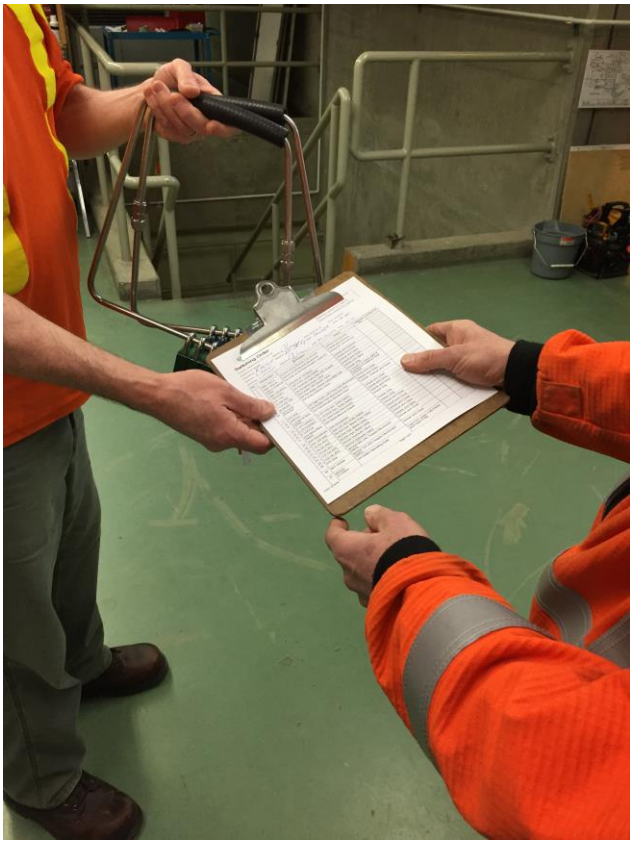
Each worker does their work under the protection of their personal lock. At the end of each shift and the end of their job, each worker must remove their personal lock from the lockout board.

6. Lockout Removal:

When all work is completed, the work leader ensures that all workers and equipment are clear and all personal locks have been removed and completes and returns the Group Lockout Sheet to the PIC

The PIC:

- Removes the seal from the key box after all workers have removed their personal locks.
- Directs a qualified worker in unlocking and ensuring removal of grounding / bonding and blocking devices and restoring the isolating devices to return the equipment to service.



The Group Lockout Sheet

Like the Personal Lockout Sheet, the Group Lockout Sheet provides a list of all protective devices. The Group Lockout Sheet is the official record of isolating devices for a Group Lockout. Isolation schematics, operating one-line diagrams, and other aids used to locate isolating devices shall not be used by workers as an alternative to the Group Lockout Sheet for determining the energy sources that have been isolated.

The PIC prepares the Group Lockout Sheet based on input from work leaders (or crews) who will be performing work on the protected equipment.

Note: If the rightmost column for any device (✓) is checked, the isolation has not been verified. Any unverified devices will be discussed in a Tailboard (SPR 704).

BC Hydro

G.L.O. Sheet #: KCL-GLO451 WPJ26640 : KCL T5 Zone PM
Switching Order #: KCL-SO451
Switching Lock Sets #:
Visual Check Lock Sets #:

Group Lockout Sheet

For Work On: T5 Zone
Purpose: Maintenance

No.	Device designation	Device description	Device status	Visually checked by	*
1	12D1CB5	12D1CB5	Opened and Locked		
2	12PT5 sec	12PT5 secondary	Opened and Locked		
3	2D5-129DC	2D5 DC knife switch	Opened and Locked		
4	2D5-HW	2D5 handwheel	Disconnect opened and handwheel locked		
5	2D5-Mot/Man	2D5 motor manual switch	In manual and lock		
6	60D21 MOT/MAN	60D21 motor manual switch	In manual and locked		
7	60D21-129DC	60D21- DC knife switch	Opened and Locked		
8	60D21-HW	60D21 handwheel	Opened and Locked		
9	60PT1 Sec.	60PT1 Secondary (2 Switches)	Opened and Locked		
10	60PT5 sec	60PT5 secondary(2 Switches)	Opened and Locked		
11	GND-60D21/60CB5 Side	Ground at 60D21 on 60CB5 Side	Applied and Locked		
12	GND-T5/12	ground at T5 12kv	Applied and Locked		
13	GND-T5/230	Grounds at T5 230kv	Applied and Locked		
14	GND-T5/60	Ground at T5 60kv	Applied and Locked		

* - Indicates an isolation point which could not be verified

Switching completed by: _____ Signature: _____ Date: _____ Time: _____

Visually checked by: _____ Signature: _____ Date: _____ Time: _____

Seal applied by: _____ Signature: _____ Date: _____ Time: _____

Key box seal #_____

Returned by: _____ Signature: _____ Date: _____ Time: _____

Workers and equipment clear? Yes ___ No ___ Equipment ready for service? Yes ___ No ___

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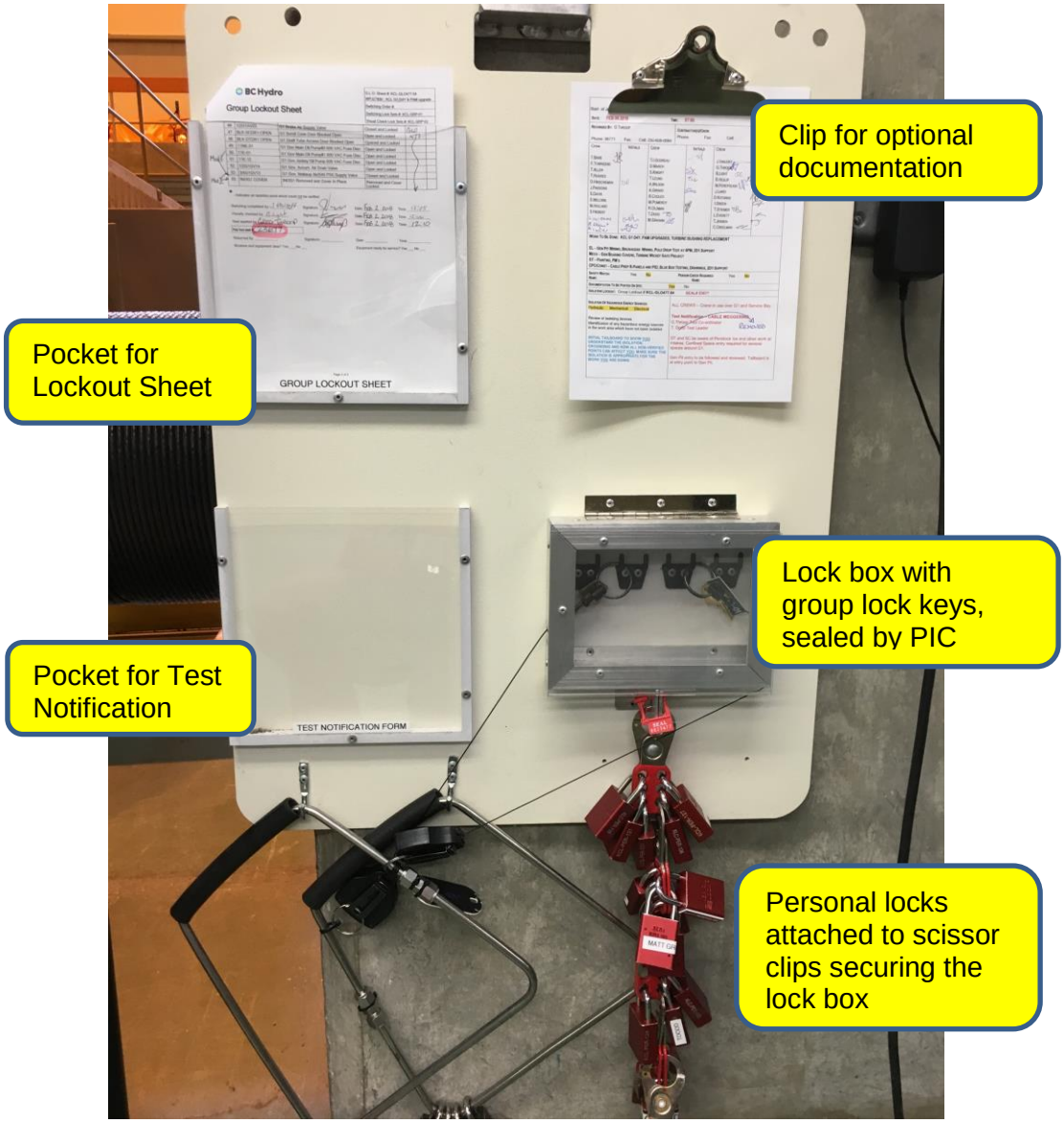
The Lockout Board

The Lockout Board holds the Lockout Sheet, the sealed key box, and any other information pertinent to the lockout. It is placed in a location accessible to all workers.

All workers who need to work under the Group Lockout must be made aware of its location so they can review the details of the lockout and attach their personal locks to the key box before going to work



Roles and Responsibilities

Category B workers can assume a variety of roles and responsibilities in the Group Lockout process.

BC Hydro Work Leaders

A worker leader is any worker who takes a lead role in ensuring the safety of a group of workers while they perform a specific set of tasks under Group Lockout. Typically, the leader of a BC Hydro or contractor's crew would act as work leader for that crew.

A work leader is responsible for the following:

- Advise the PIC of the work to be done and the specific isolation requirements for the job, as well as any changes to these requirements in the course of the job
- Ensuring that the planned lockout is appropriate for the work for which he or she is responsible
- Holding documented tailboards at required times to ensure all workers assigned to the job understand:
  - Which energy sources have been isolated and which equipment is in a protected state
  - Any modifications to the isolation during the course of the work
- If any hazardous test procedure is to be performed, appointing a Category C worker as the Test Coordinator
- When the job is complete:
  - Ensuring all work is completed, all workers and equipment are clear, and workers have removed their personal locks
  - If they are responsible for the final work under the lockout, returning the Lockout Sheet to the PIC

Contractor's Representative

The contractor's representative or work leader is responsible for:

- Ensuring that each of their workers has been appropriately trained in WPP procedures
- Ensuring that they have a complete understanding of the Safety Protection that is in place for the lockout and that the lockout is appropriate for the work their crew is to do
- Checking the Lockout Board to ensure all details are complete and correct:
  - The Lockout Board is the correct one for the work to be done
  - The key box seal number matches the seal number recorded on the Group Lockout Sheet

    - The time and date the seal was applied are valid
- Holding documented tailboard meetings at required times to ensure the workers assigned to the job understand the Safety Protection in place and any modifications to the Lockout as they occur in the course of the job
- When their work is complete:
    - Ensuring all work is completed, all workers and equipment are clear, and workers have removed their personal locks
    - Returning the Personal locks to BC Hydro's representative

Each Worker

Each worker who requires safety protection under the Group Lockout is responsible for the following:

- Attending all tailboards relevant to the work they are doing. If a worker is not available for a tailboard meeting, he or she must have a documented tailboard discussion with the work leader before locking on to the key box and proceeding with any work
- Checking the Lockout details:
    - Checks that the Lockout Board is the correct one for the job
    - Checks that the key box seal number matches the seal number recorded on the Group Lockout Sheet
    - Checks the time and date the seal was applied
- Placing a Personal Lock on the scissor clip on the Lockout Board key box at the beginning of the job and at the start of each shift.
- Performing their work safely under the Lockout
- Removing their personal lock from the Lockout Board key box at the end of each shift and at the end of the job

Note: By locking on to the Lockout Board key box, each worker accepts that the Safety Protection that has been applied is appropriate for the work that he or she will perform.

In Case of a Broken Key Box Seal

A broken seal on the key box indicates that the group lockout is not secure.

If you find a broken (or missing) key box seal:

- Notify the PIC or crew leader immediately
- Do not lock on to the lockout or do any work
- If your lock is attached to the lockout, remove it
- Warn other workers not to lock on and not to do any work

The PIC will follow the procedure in SPR 724 to ensure the integrity of the isolation and lockout.

Modifying a Group Lockout

During the course of the project, it may be necessary to expand, reduce, or otherwise modify the lockout. If this becomes necessary, the following procedure is followed:

1. The Worker Leader(s):
   - Directs all workers to remove their personal locks from the Lockout Board
   - Informs the PIC of the Lockout modifications required
2. The PIC:
   - Prepares a Group Lockout Modification form and a Switching Order describing the changes
   - Removes the Group Lockout Sheet from the Board and removes the key box seal and applies their Personal Lock to the key box to control the keys so that no worker shall possess both keys
   - Directs qualified workers in making the required changes
   - Seals the Group Lock keys in the key box, applies a new seal, and records the seal number, date and time on the Group Lockout Modification form
   - Posts the Group Lockout Modification form in front of the Group Lockout Sheet on the Lockout Board
3. The Work Leader holds a tailboard meeting for all workers, describing the changes in the Safety Protection
4. All Workers:
   - Attend the tailboard to ensure they understand the modification
   - Check the key box seal to ensure it matches the seal number on the Group Lockout Modification form
   - Place a Personal Lock on the Lockout Board key box and proceed to work

Group Lockout Modification Form

The Group Lockout Modification form documents the changes made to the Group Lockout, guides the modification process, and acts as a means of communication between workers. It is posted on the Group Lockout board in front of the Group Lockout sheet.

Note: If there are more than two (2) modifications to a Group Lockout, a new Group Lockout sheet is prepared and posted on the Lockout Board.

BC Hydro

Group Lockout Modification

G.L.O. Sheet #: KCL-GLO451 WPJ26640 : KCL T5 Zone PM
Modification #: 1
For Work On: T5 Zone
Switching Order #: KCL-SO451 Mod-1
Switching Lock Set #: KCL-GRP-03
Visual Check Lock Set #: KCL-GRP-04

Reason for Modification: KCL 60CB5 Timing test

Isolating Devices Removed From Lockout Sheet

No.	Device designation	Device description	Visual check lock removed by
11	GND-60D21/60CB5 Side	Ground at 60D21 on 60CB5 Side	

Visual check locks removed by: _____ Signature: _____ Date: _____ Time: _____

Isolating Devices Added To Lockout Sheet

No.	Device designation	Device description	Device status	Visually checked By	*

* - Indicates an isolation point which could not be verified

Switching completed by: _____ Signature: _____ Date: _____ Time: _____

Devices added visually checked by: _____ Signature: _____ Date: _____ Time: _____

Key box seal # _____

Seal applied by: _____ Signature: _____ Date: _____ Time: _____

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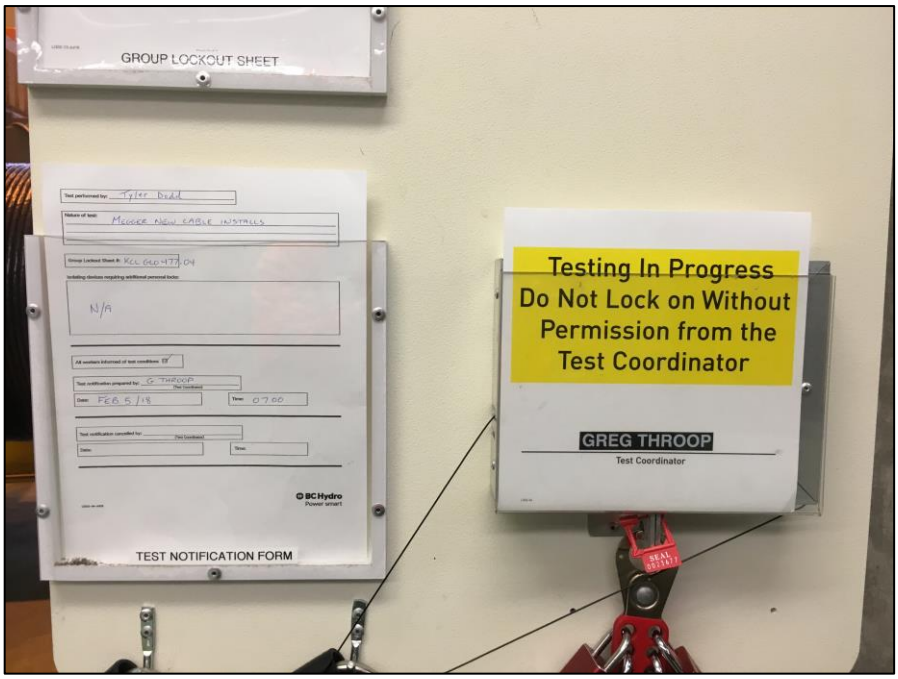
Hazardous Testing under Group Lockout

Hazardous Testing may be carried out under Group Lockout using specific procedures.

If testing may result in the release of energy potentially harmful to workers, the designated Test Coordinator does the following:

- Places a “Testing in Progress” sign over the Lockout Board key box. The “Testing in Progress” sign clearly identifies the name of the Test Coordinator. You must not lock on without permission from the Test Coordinator.
- Holds a tailboard meeting with all workers to inform them of the hazards created by the testing
- Post a Test Notification form on the Lockout Board for each individual test procedure



Category B workers can assume the following roles with respect to testing:

Test Leader

Every test procedure requires a **Test Leader** who is responsible for overseeing the testing and ensuring that the sources of test energy do not create a hazard to other workers. The Test Leader is responsible for:

- Erecting the necessary barriers and signs around the equipment being tested to ensure that other workers do not come into contact with potentially hazardous energy
- Overseeing the test procedures to ensure they are done safely
- Informing the Test Coordinator when the test is completed

Worker

If you are directly involved in the testing, you **must** do the following:

- Place your personal lock on the Lockout Board key box
- Place a personal lock on any additional protective devices that are applied solely for the purposes of testing, as listed on the Test Notification form.

If you cannot work safely while testing is in progress, you will be asked to remove your lock from the Lockout Board key box and to stay clear of the protected equipment.

If your work is not affected by the testing, you may receive permission from the Test Coordinator to place your lock back on the key box and return to work. Always check the Test Notification form to ensure that the testing does not affect you, before asking permission to lock on.

Test Notification

Test performed by: _____

Nature of test:

_____

_____

_____

Group Lockout Sheet #:

Isolating devices requiring additional personal locks:

All workers informed of test conditions ☐

Test notification prepared by: _____
(Test Coordinator)

Date: Time:

Test notification cancelled by: _____
(Test Coordinator)

Date: Time:

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Review

As a Category B worker, you are authorized to:

- place personal locks and work under lockout
- act as a Host, Work Leader, or Test Leader

When you are working under lockout, you must:

- Attend and participate in tailboards relevant to your work
- Review the lockout sheet and ensure that the lockout provides sufficient protection for your work
- Apply and remove your personal locks according to WPP procedures
- Follow the directions of the PIC or other authorized workers when there are changes to the lockout

End of course.