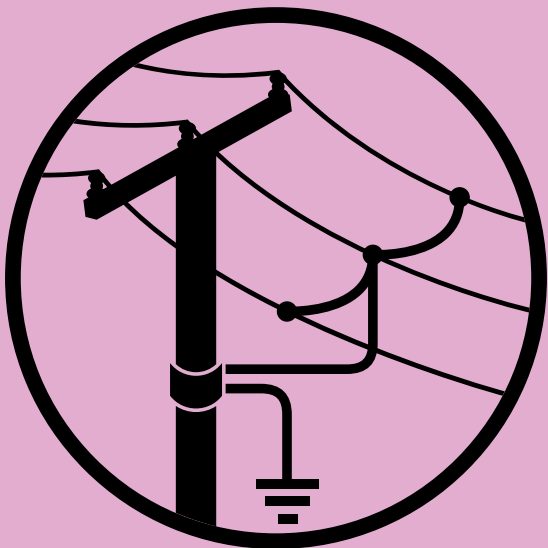


Safety Practice Regulations



FEBRUARY 2024

 **BC Hydro**
Power smart

Name

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Your safety manual

The Safety Practice Regulations (SPR) manual has been developed out of years of experience operating electric utilities. The joint labour–management Safety Practices Committee (SPC) has reviewed and agreed to all of its contents.

You owe it to yourself, your co–worker, and your family to become familiar with and to follow the rules and instructions in this book.

It is a requirement that all on site workers be in possession of the SPRs.

Consult the periodic SPC Bulletins, FYIs, and the online version of **SPR Guidelines and FAQs** document on SafeHub, which describe changes to the regulations and clarify existing regulations. For an electronic (PDF) version of the SPR that includes all changes and additions since this edition was released, refer to SafeHub.

Safety committees and individual workers are encouraged to refer any unresolved safety issues or concerns to the Safety Practices Committee Secretary by writing to either Management (direct report to a Vice–President or higher) or the International Brotherhood of Electrical Workers (IBEW) Business Manager or delegate. Questions

or concerns about Section 700 rules, or any planned deviations from its rules and procedures, should be referred directly to the Work Protection Practices Committee (WPP).

The rules, practices, and procedures contained in the Safety Practice Regulations supersede all previous BC Electric (BCE) Operating Orders, the IBEW Agreement Safety Appendix dated 1st August, 1959, BC Power Corporation S154, and all other related written instructions.

It is my responsibility to understand and follow the Safety Rules and Regulations specific to my work, as outlined in this book.

Signature of holder: _____

Date: _____

Corporate Safety Policy

Safety is core to everything we do, all the time and at every level of our organization. It shapes our decision-making, how we think and talk about our work and how we act each day. For us, even one injury is unacceptable. All our employees and our contractors must go home safe every day. Safety at BC Hydro is everyone's responsibility.

Our mission reflects our safety value “to safely provide our customers with reliable, affordable, clean electricity throughout B.C.”.

Safety starts with leadership. We set clear expectations, taking the guess work out of how a person's role and its responsibilities contribute to safety. We ensure that our plans, designs and how we resource all our work removes hazards or puts in place effective barriers and minimizes safety risks.

We provide the necessary rules, procedures, structures, training and tools to ensure everyone can work safely. We enable and require our managers, supervisors, employees and contractors to be accountable for safety. We will comply with all safety rules and applicable regulations and strive to meet or exceed industry best practice.

Our employees are involved in work plans and decisions that impact their safety. Our culture encourages employees to raise concerns or stop work any time they feel their safety may be at risk. We measure our safety performance and learn from our failures and our successes. Learning from our near misses is as important as learning from our injuries as we believe 100% of all injuries can be prevented.

Our goal is zero injuries and we challenge every person to achieve this.



SAFETY STOP

Speak up and call a safety stop

Stop work authority

- Each of us is required to comply with BC Hydro's safety rules, regulations and/or procedures, including the Life Saving Rules
- As an employee or contractor of BC Hydro, you are responsible and authorized to stop any work that does not comply with the above

KEY PRINCIPLES

- Do it safely or not at all
- There is always time to do it right



Life saving rules

Overarching Value: Have the Courage to Intervene if you see an unsafe act or condition or you observe someone unfit for work.



① Maintain your Limits of Approach



② Ensure there is a Safety Protection Guarantee or Lock out in place and check that it is appropriate for your work



③ Test for hazardous energy



④ Ensure that Worker Protection Grounding/Bonding is applied



⑤ Protect yourself from falling when working at height



⑥ Maintain a safe atmosphere in a confined space and ensure you can be rescued



⑦ Prevent harmful exposure to known carcinogens, toxins and bio-hazards



⑧ Don't work while under the influence of alcohol or drugs



⑨ Adjust your driving to the weather and road conditions

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General safety rules

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101 Compliance with safety regulations

- 1 All workers shall comply with the WorkSafeBC Occupational Health and Safety Regulation.
- 2 The rules in this book shall govern all work done by or for BC Hydro and all access to its Power System. Every worker shall observe all of the rules that apply to their particular job and worksite.
- 3 Anyone who works on the Power System shall comply with the appropriate safety protection protocol:
 - Section 600 rules of this book specifies the rules for Tag Out on the Power System where WPP is not applied. Power System Safety Protection (PSSP), System Operating Order 1T-12, specifies requirements for consistent application of Tag Out rules.
 - Section 700 rules of this book specifies the rules for Lock Out safety protection (Work Protection Practices or WPP) in Generating Stations and Non-Integrated Substations.
 - System Operating Order 1J-18 describes the interface between WPP and PSSP. The Boundary between WPP and PSSP in each generating facility is identified on the facility

operating one-line diagram and defined in a Joint or Local operating order.

- All equipment associated with VHF/UHF radio repeater communication sites that are not directly associated with a generation, substation or microwave facility may be isolated and made safe for work using either WPP or PSSP. WPP CAT B or PSSP CAT 3 are the minimum qualifications for working on this equipment where an approved procedure has been permanently posted at the equipment.
- 4 Where transmission or distribution lines interconnect with other (non BC Hydro) systems, the rules and procedures of the customer or foreign utility shall prevail with respect to all equipment outside and beyond the point of intersection (see rule 603.7, 603.8, 605.9, 609, and 610).
 - 5 In addition to observing the specific precautions and instructions included in these Safety Practice Regulations, all workers are expected to act with due diligence to protect themselves, other workers, and the public against any injury that might result from their work.

-
- 6 If you have any difficulty understanding, or doubt the meaning of, any of these rules, consult your manager, Trades Training Instructor, Safety Advocate or a member of the SPC for clarification or explanation.

102 Distribution of the Safety Practice Regulations

- 1 The Safety Practice Regulations shall be distributed by the Senior Vice-President, Safety & Compliance.
- 2 The employer is responsible for issuing a copy of the Safety Practice Regulations to every worker who requires them and for reviewing with the worker those rules that pertain to their duties, so as to ensure that the worker understands them before being assigned to the work.
- 3 When a worker is transferred to a new location or new responsibilities, the employer shall ensure that the worker has their own up-to-date copy of the Safety Practice Regulations and understands those rules that apply to their new duties before being assigned to the work.

- 4 If a worker loses their copy of the Safety Practice Regulations, it is their responsibility to request a replacement copy without delay.

103 Revisions to the Safety Practice Regulations

- 1 The Safety Practice Committee shall use Bulletins and FYIs to notify all holders of the Safety Practice Regulations of revisions, amendments, and interpretations of the regulations.
- 2 Periodically, revisions and amendments shall be incorporated into a new edition of the Safety Practice Regulations. Significant revisions are identified by **shading**.
- 3 When a new edition of the Safety Practice Regulations is issued by the Senior Vice-President, Safety & Compliance, the employer shall distribute a copy of the revised regulations to every worker who requires one.

104 Responsibility of supervisors

All supervisors shall be responsible for the safe execution of all work in their area of responsibility, including:

- Assigning qualified and authorized workers to all jobs.

- Ensuring the safety of the workers and contractors under their supervision and the general public in connection with the work.
- Assigning tools and equipment adequate for the work, supervising the manner in which they are used, and removing defective tools and equipment from the workplace.
- Investigating verbal or written reports of alleged hazardous conditions and correcting such conditions.
- Promptly investigating and reporting all incidents (refer to Section 200 rules).
- Enforcing these Safety Practice Regulations.

105 Responsibility of workers

- 1 A worker shall not carry out or cause to be carried out any work process, or operate or cause to be operated any tool, appliance, or equipment, if that person has reasonable cause to believe that to do so would create an undue hazard to the health and safety of any person (refer to WorkSafeBC OHS Regulation, Part 3.12).

Note: In the event of an unforeseen hazard that makes it unsafe to continue, the work shall be

- stopped and the hazard shall be eliminated or controlled before work resumes.
- 2 No worker shall report for work, or be permitted to work, while they are in any way unfit to perform their duties in a safe and effective manner.
 - 3 Workers shall use appropriate personal protective equipment and protective devices for the work they are doing and must care for and treat these devices and equipment to ensure they perform as designed.
 - 4 Workers shall report to their supervisor any situation, practice, or procedure that they consider hazardous to power system workers or the public. Where the public is in danger, a worker shall remain on guard or adopt other suitable protective measures.
 - 5 Workers must not indulge in horseplay or scuffling while on duty or while off duty on property or in vehicles owned, rented, or leased by BC Hydro.

106 Conducting Tailboards

- 1 Documented Tailboards must be held for all high hazard work involving one or more workers:

- Every day before work begins; and
- Whenever there is a significant change in the work plan.

A documented tailboard is always required, **where a switching order has been issued by the PIC (verbal or written)**, even if the only work being done is switching.

For jobs that do not involve any high hazard work, verbal tailboards can be used.

- 2 For documented tailboards, workers must list each hazard that has a potential to cause a fatality or permanent disability, as well as any job-specific or site-specific hazards that are of concern at the time of the job. For each listed hazard that has the potential to cause a fatality or permanent disability, workers must record multiple independent barriers, and include at least one barrier from the MOST effective column of the Hazard Barrier Reference sheet (HBR).
- 3 For all tailboard discussions (verbal and documented), supervisors and workers must:
 - Ensure that each worker is aware of all hazards that have the credible or realistic potential of causing any level of harm; and

- Fully agree on safety precautions before work begins.
- 4 When multiple crews are working at a worksite, including those from BC Hydro, contractor(s) and/or other employer(s), the site representative of the employer responsible for site safety coordination must ensure all site safety coordination requirements, hazards and precautions are shared and understood by all crews.

107 Statements by unauthorized workers

Unauthorized workers shall not make statements that might lead anyone to believe that a conductor or electrical or mechanical equipment is safe to work upon or touch.

108 Entering unattended stations

Only authorized workers or those accompanied by an authorized worker shall enter unattended stations, and their time of arrival and departure shall be recorded in the station log or visitor's book.

109 Hazardous areas—identification of

Hazardous areas shall be identified by warning signs, barriers, and/or approved yellow and black safety rope or tape.

110 Piping identification

Piping containing oil, water, compressed air, or other controlled products shall be clearly identified, as required by WorkSafeBC OHS Regulation, Part 5.11.

111 Fire prevention—general

- 1 All workers shall understand the site fire safety plan for facilities in which they work.
- 2 Smoking and vaping at all work places (indoor and outdoor) is prohibited except when conducted in a designated smoking area as per **Requirements for Designated Smoking Areas.** Designated Smoking Areas are prohibited when there is a high risk of wildfire.
- 3 Fire doors shall not be blocked open at any time.
- 4 Waste receptacles in non-office areas shall be equipped with self-closing or flame-tamer lids.
- 5 Flammable substances shall be dispensed and stored in conformance with the requirements of the Safety Data Sheet.
- 6 Hot Work (welding, burning, etc.) shall be planned to ensure the safety of the facility and

occupants. Appropriate fire protection equipment shall be provided.

- 7 Fire hoses and other fire protection equipment shall be used for emergency purposes only.
- 8 Discharged or out-of-date fire extinguishers shall be reported immediately.
- 9 The person responsible for each facility shall ensure that life-safety facilities and systems are maintained to protect facility occupants. This includes ensuring access to exits and maintaining fire detection systems, fire suppression systems, and related equipment in conformance with National Fire Protection Association (NFPA) Standards and other applicable standards.

112 Housekeeping for elimination of fire hazards

- 1 Free access shall be maintained to all fire extinguishers and associated equipment, fire escapes, stairways, and passageways.
- 2 Flammable and combustible waste materials shall be cleaned up daily and disposed of safely.
- 3 Unnecessary flammable and combustible materials shall not be stored in facilities.

-
- 4 Flammable liquids shall be stored in approved flammable-liquid storage cabinets.

113 Fires

- 1 Upon discovery of a fire, workers shall immediately notify other building occupants in the manner described in the site fire safety plan and call for fire fighting assistance.
- 2 If workers are adequately trained and equipped and it is safe to do so, they may attempt to extinguish the fire.
- 3 All fires must be reported to the manager or to their representative promptly to facilitate investigation.
- 4 Open fires are prohibited for warming or cooking purposes at BC Hydro work sites, except in the case of an emergency to protect life or prevent injury.

114 Fire permits

It is the responsibility of the worker in charge to obtain the necessary fire permits from the provincial and/or municipal fire authorities (for slash burning or for propane or oil-fired heating or cooking installations in trailers or buildings, for example).

115 Transportation, storage, handling, and use of hazardous substances

- 1 All hazardous substances—both Hazardous Wastes and materials controlled by Workplace Hazardous Materials Information System (WHMIS)—shall be handled, stored, and used in an approved manner.
- 2 All containers for hazardous substances shall be identified, as required by WHMIS, with the appropriate safety marks, information, and references to Safety Data Sheets (SDS) on either BC Hydro's or the supplier's website.
- 3 Transportation and shipping of dangerous goods shall comply with the requirements of OSH Standard 404.

116 Explosives

- 1 Only workers who fully understand all applicable municipal, provincial and federal regulations and are qualified in the use of explosives shall handle or transport explosives.
- 2 All handling and transportation of explosives shall comply with applicable regulations.

117 Blasting areas

- 1 Because of the danger of inductive currents setting off explosives, conductors must not be lowered to the ground or remain on the ground in an area that is loaded for electric blasting.
- 2 Before workers are permitted to enter an area that has recently been blasted, the worker in charge must obtain assurance from the blaster in charge that loose material in the area has been scaled or barred down, and that it is safe to enter.

118 Helicopter, fixed wing and Remotely Piloted Aircraft Systems (RPAS) work—requirements

- 1 Prior to starting any work involving helicopters and fixed wing aircraft, all workers on the job must be adequately trained and follow approved procedures.
- 2 Drones/Remotely Piloted Aerial Systems (RPAS) must be operated in accordance with Transport Canada Regulations and BC Hydro requirements (see the Aircraft Operations Program).

119 Wheel chocks for parked vehicles

When a vehicle equipped with wheel chocks is parked, the emergency brakes must be set and

wheel chocks must be placed when there is a risk of the vehicle moving.

120 Confined space—requirements

Prior to commencing any work involving a confined space, the following shall be completed by a Qualified Person (Confined Space), as per the WorkSafeBC Regulations:

- A written hazard assessment
- An approved safe work procedure
- An approved rescue plan that specifies the roles of personnel assigned to ensure Viable Rescue and their qualifications

For further details refer to the **Confined Space Program Overview**.

121 Watercraft—requirements

Prior to commencing any work involving watercraft, all workers shall meet the requirements of OSH Standard 408.

122 Distracted Work

Workers must not use Personal Electronic Devices during high hazard work, with the following exception:

-
- Use is permitted in emergency circumstances, or
 - As a work tool.

When used as a work tool, the use must be discussed and documented prior to start of work.

Personal Electronic Devices is in reference to Cellular phones, Tablets, Satellite phones, or a similar personal electronic device.

Workers are also expected to follow the BC Hydro Safety Policy “Phone and Two-Way Radio Use in Motor Vehicles”.

Notes:

Incidents and first aid

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201 First aid and assistance

- 1 Immediate first aid treatment shall be obtained by workers for each injury, however minor it may appear.
 - If an employee experiences an electrical contact, at or above hazardous low voltage, the employee is to seek immediate medical attention and report the incident to their manager.
- 2 When planning any job, workers shall meet all requirements for ensuring quick and efficient first aid treatment and/or Emergency Medical Services (EMS) Response.
- 3 Every worker shall have access to a written procedure for requesting assistance in cases of emergency, for the work being done.

202 Incidents

- 1 All incidents shall be reported to the supervisor promptly (no later than the end of the shift).
- 2 The following types of incidents shall be reported on the Intranet using the BC Hydro Incident Management System:
 - Those requiring first aid treatment or medical attention

-
- Lost time incidents requiring medical treatment.
 - Those in which there is no treatment but there is a possibility of future disability.
 - Motor vehicle incidents.
 - “Near-miss” incidents in which there is no injury, but potential for injury was high and/or there are lessons that could prevent future incidents.
- 3 Motor vehicle incidents must be reported to the appropriate external authorities, if required by the Motor Vehicle Act.
 - 4 The workers’ first responsibility is to make the scene of the incident safe for both workers and the public.
 - 5 If the scene of an incident is critical to an investigation, workers shall retain as found the scene of the incident and any equipment connected with the incident. If the conditions surrounding the scene of the incident are likely to change, photographs should be made promptly to illustrate the circumstances of the incident.

203 Rescue procedures

- 1 All workers shall have access to, and be instructed in, approved rescue procedures for the type of work in which they are engaged.
- 2 Workers shall practice applicable rescue procedures as follows:
 - workers who perform such work on a regular basis shall practice applicable rescue procedures a minimum of once per year or more frequently if specified in an approved rescue procedure.
 - workers who perform such work infrequently shall practice rescue procedures immediately prior to commencing the job.
- 3 Where appropriate, workers shall contact their supervisors or the Trades Training Instructor (TTI) or Occupational Safety and Health (OSH) Specialist for assistance with rescue procedure training needs.

Personal protective equipment and tools

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301 General

All personal protective equipment and tools shall be inspected before each use.

302 Clothing and footwear

- 1 All workers shall wear clothing and footwear that protects them from the hazards associated with their type of work.
- 2 Where safety footwear is required, such footwear shall be CSA approved.
- 3 Flame-resistant clothing shall be worn when there is a risk of exposure to high temperature, open flames, molten metal, sparks, or electrical arcing.
- 4 Gloves shall be worn for jobs with a risk of injury due to abrasion, chemicals, etc.
- 5 Loose fitting clothing or jewelry shall not be worn around rotating machinery and tools.
- 6 Conductive jewellery or adornments shall not be worn while working closer than the Unqualified Distance to the electrical system.

For further details refer to the PPE Program Overview.

303 Personal protective equipment

- 1 **Eye protection:** Approved safety eye protection shall be worn in all work areas as per OSH Standard 601. Additionally, properly fitted goggles, face shields or other suitable protection shall be worn in all work areas as per the **PPE Program Overview**.
- 2 **Hard hats:** Approved safety head gear shall be worn in all work areas requiring Personal Protective Equipment. **For further details refer to the PPE Program Overview**.
- 3 **Hearing protection:** Workers shall wear hearing protection at all times when noise levels exceed or may exceed 85 dBA and shall use and maintain hearing protectors according to instructions provided.
- 4 **Respiratory protection:** All workers who are required to wear a tight-fitting respirator must pass an annual respirator fit test. For further details refer to the Respiratory Protection Program on SafeHub.
- 5 **High visibility clothing:** Workers shall wear High Visibility Clothing in Work Yards and Work Sites or if they are exposed to the hazards of

moving vehicles or equipment in other work areas. **For further details refer to the PPE Program Overview.**

PPE shall be worn as per the following table.

6 Fall protection equipment: Appropriate fall

| Workplace PPE Area | PPE to be worn at all times | PPE Required to be readily accessible and worn in the presence of hazards |
|--|--|--|
| Work Yards (e.g., district office yards, MMBU, including adjacent warehouses and loading bays) | <input type="checkbox"/> Safety boots <input type="checkbox"/> Hi Vis attire <input type="checkbox"/> Hard Hat <input type="checkbox"/> Eye Protection | <input type="checkbox"/> Hearing Protection <input type="checkbox"/> Gloves appropriate for the task |
| Work Sites (e.g., OH and UG work, Stations, Generating Stations, Microwave Sites, CUA work, etc.) | <input type="checkbox"/> Safety boots <input type="checkbox"/> Hardhat * <input type="checkbox"/> Eye Protection <input type="checkbox"/> Hi Vis attire <input type="checkbox"/> FR Clothing | <input type="checkbox"/> Hearing Protection <input type="checkbox"/> Gloves appropriate for the task <input type="checkbox"/> Arc Flash Face Shield |
| Work Shops and all other areas (work shop defined as facilities with large equipment such as lathes, drill presses, pneumatic tools, Fleet Garages etc.) | <input type="checkbox"/> Safety boots <input type="checkbox"/> Eye Protection | <input type="checkbox"/> Hearing Protection <input type="checkbox"/> Gloves appropriate for the task <input type="checkbox"/> FR Clothing <input type="checkbox"/> Hi Vis attire <input type="checkbox"/> Hard Hat |

* Hard hats are not required in Control Rooms.

arrest and/or fall restraint equipment shall be used in accordance with **Fall Protection Equipment Requirements.**

7 Arc Flash PPE requirements: For work on exposed energized 347/600 distribution secondary conductors or equipment

| Arc Flash Incident Energy (Cal/cm ²) | Arc Flash PPE Requirements in addition to worksite PPE as per table 303.5 |
|---|---|
| 5–12 (Enclosed and 3ph Open Air Equipment) 9–12 (1ph Open Air Equipment) | Rubber gloves with leather protectors or arc-rated gloves and FR clothing meeting or exceeding the calculated incident energy, and Arc Flash Face shield, and Balaclava required for 9–12 Cal/cm ² Enclosed and 3ph Open Air equipment |
| 12–40 | Rubber gloves with leather protectors or arc rated gloves, and Arc Flash suit |
| >40 | De-energize or use approved procedure |

304 Tools and equipment—general

1. Workers must:

- Be trained and knowledgeable about tools and equipment used to perform the work.
- Inspect tools and equipment prior to use. Only use tools and equipment that are in good condition and only for the purpose for which they are designed.
- Follow or be aware of all manufacturer operating instructions.

- Follow all BC Hydro approved work procedures related to tools and equipment.
 - Purchase, maintain, inspect and test tools and equipment following all manufacturer requirements and BC Hydro **Tool and Equipment Requirements** where they exist.
- 2 Metal rulers, metal measuring tapes, or wire reinforced fabric tape must not be used in areas where electrical energy could make their use hazardous.

305 Climbing equipment

- 1 Gaffs on pole climbers shall be not less than 3.2 cm (1 ¼ inches) long, measured on the inside. For tree climbers, the minimum shall be 6.0 cm (2 3/8 inches).
- 2 All rope positioning or safety belts must be designed, used, and inspected in accordance with the applicable CSA or ANSI standard in effect when it was manufactured.
- 3 Only approved fall restrict devices shall be used.

306 Life jackets

- 1 When workers are over or adjacent to water where there is a hazard of drowning, they shall

wear approved buoyancy equipment (life jackets, vests, etc.).

- 2 Workers shall select buoyancy equipment that is rated for the extra weight of any attached tools and equipment.

307 Rigging, jacks, and lifting devices

- 1 All workers who are required to use rigging and lifting devices shall use proper work methods and shall not exceed the rated working load limit (WLL) for the equipment.
- 2 An approved inspection program shall be carried out on rigging and lifting devices, to ensure that such equipment is maintained in a safe condition.
- 3 When using jacks for lifting machinery or mobile equipment, workers shall obtain firm and secure footings for the jacks and shall apply safety blocking (chocks) to the wheels.

For further details, refer to **Cranes, Hoists, and Rigging Program Overview**.

308 Ladders and scaffolding

- 1 Only approved ladders, which conform to the requirements of WorkSafeBC OHS Regulation, Part 13, and OSH Standard 609, shall be used.

-
- 300
- 2 All straight and extension ladders except those used for tower work shall be equipped with non-slip feet.
 - 3 Where a ladder is used against a pole, it shall be equipped at the top with a proper fitting that conforms to the shape of the pole.
 - 4 Metal ladders or ladders containing wire reinforcing in the side rails shall not be used near energized conductors or equipment except as follows:
 - a Use of metal ladders in Extra High Voltage (EHV) Areas must conform to the requirements of rule 515.3.
 - b Tower ladders may be used for work on metal transmission and station structures only by, or under the direct supervision of, a qualified electrical worker.
 - 5 Metal scaffolding may be used in a station near energized conductors or electrical equipment under the following conditions:
 - a Limits of Approach shall be observed at all times.

-
- b The scaffold shall be erected or dismantled only by or under the direct supervision of a qualified electrical journeyman.
 - c A safety watcher shall be appointed whenever the scaffold is moved.
 - d The scaffold shall be securely immobilized when in the working position.
 - e The scaffold shall be connected to a point of Worker Protection Grounding with approved flexible copper grounds.

309 Machinery guards

The moving parts of machinery shall be safeguarded as required by WorkSafeBC OHS Regulation, Part 12, and such safeguards shall be kept in place at all times when the equipment is operating.

Notes:

Work near, or on, energized conductors and equipment

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401 Limits of Approach (LOA)

Limits of Approach is the closest distance an Authorized Worker is permitted to approach exposed energized conductors or equipment.

The distances to exposed energized conductors and/or equipment for workers and their uninsulated equipment are listed in Table 401.

All LOA distances must be signed and sealed by a BC Hydro professional engineer following IEEE 516:2009. Any procedures that allow workers to get closer than the LOA distances in Table 401 must be approved by the Safety Practices Committee.

Table 401
Limits of Approach (LOA)

| Nominal Voltage (kV) | Actual Voltage Range Phase to Phase | Qualified Electrical Worker | | Uninsulated equipment or Unqualified Worker and their equipment when continuously directed by Qualified Electrical Worker | | Unqualified Worker | |
|----------------------|-------------------------------------|-----------------------------|-----|---|----|--------------------|----|
| | | m | ft | m | ft | m | ft |
| .751 to 35 | 751V to 40kV | 0.75 | 2.5 | 1.20 | 4 | 3.00 | 10 |
| 60 | 40kV to 75kV | 0.90 | 3 | 1.50 | 5 | 3.00 | 10 |
| 138 | 75kV to 150kV | 1.50 | 5 | 2.40 | 8 | 4.50 | 15 |
| 230 | 150kV to 250kV | 2.10 | 7 | 3.00 | 10 | 4.50 | 15 |
| 287 | 250kV to 325kV | 2.60 | 8.5 | 3.70 | 12 | 6.00 | 20 |
| 345 | 325kV to 425kV | 3.00 | 10 | 4.30 | 14 | 6.00 | 20 |
| 500 | 425kV to 550kV | 3.70 | 12 | 4.90 | 16 | 6.00 | 20 |

1 LOA—Qualified Electrical Worker

Applies to:

- All work performed by Authorized and Qualified Electrical Workers except as specified in SPR 403.
 - Vehicles or uninsulated equipment driven **underneath** exposed energized conductors or equipment when under the direct and continuous supervision of a Qualified Electrical Worker. In this circumstance boom equipped vehicles must have their booms in a stowed and secured position.
- 2 LOA—Uninsulated equipment or unqualified worker and their equipment when continuously directed by a Qualified Electrical Worker.

Applies to:

- Uninsulated equipment that is operated by a Qualified Electrical Worker
- Uninsulated equipment that is operated by unqualified Workers when continuously directed by a Qualified Electrical Worker
- Unqualified workers when continuously directed by a Qualified Electrical Worker

Note: The Uninsulated equipment distances specified applies to all parts of uninsulated equipment, including: aerial lifts, booms, hoisting cables, and any part of a suspended load being raised.

3 LOA—Unqualified Worker

Applies to unqualified workers and their equipment.

402 Worker Positioning

Workers must maintain a position where their range of reasonably likely movements, including conductive objects held or equipment operated by the worker, will never get closer than the Limits of Approach distance.

The range of reasonably likely movements, includes a worker's adjustments to tools, equipment, working positions and all movements needed to perform the work.

When a worker cannot maintain work positioning the following apply.

- The energized conductor or equipment must be insulated through the application of approved cover up and/or physical barrier(s), or

-
- The worker must use an approved procedure (example: rubber glove work methods, barehand methods)

Note: When approved cover-up or barriers are in place, qualified electrical workers can work up to but are to avoid contact with the cover-up. Refer to OSH 602.

403 LOA—Restricted work

The restricted work distances listed in Table 403 requires an Approved procedure including the use of a live line permit.

Three or more qualified electrical workers must be present and one must act as a dedicated Safety Watcher.

Any procedures that allow workers to get closer than the LOA distances in Table 403 must be approved by the Safety Practices Committee.

| Table 403 Limits of Approach (LOA) | | | |
|--|-------------------------------------|-----------------|-----|
| Nominal Voltage (kV) | Actual Voltage Range Phase to Phase | Restricted Work | |
| | | m | ft |
| 138 | 75kV to 150kV | 1.10 | 3.5 |
| 230 | 150kV to 250kV | 1.40 | 4.5 |
| 287 | 250kV to 325kV | 1.70 | 5.5 |
| 345 | 325kV to 425kV | 2.10 | 7 |
| 500 | 425kV to 550kV | 2.70 | 9 |

404 Working on poles or structures

- 1 Before beginning work on any pole or structure, such pole or structure shall be tested for soundness. When any doubt as to such soundness exists, the work method shall not rely on the structural strength or stability of the pole. Refer to Work Procedures in the Work on Poles Manual.

- 2 Workers shall be permitted to remove signs and other obstructions from poles or structures on which they are required to work. Approved signs shall be re-installed.
- 3 Workers shall not climb poles unless the pole includes a butt gain and is appropriately set, or is secured as specified in the Procedures.
- 4 A tool bag or hand line shall be used for raising or lowering tools or materials to workers on poles, trees, or structures. Articles shall not be thrown to workers. It is permissible to drop items of scrap material if special care is exercised to make sure the area below is clear.
- 5 Pole straps shall be connected to both “D” rings on the work positioning belt.
- 6 When a worker is supported by a pole strap while operating a power saw, a second pole strap shall be used for backup.

405 Climbing suspension insulators

Workers shall be permitted to climb suspension insulators provided that the suspension insulator string is loaded by the conductors and the proper fall restraint is used.

406 Stringing conductors

When stringing, sagging, removing, or replacing conductors directly above or below, or within 1.8 metres (6 feet) horizontally of, energized high-voltage conductors, workers shall use approved tension-stringing methods, as described work procedures **Stringing Conductors on Energized Distribution Structures** and **Stringing Conductors on Transmission Structures**.

407 Tree trimming and clearing

- 1 Only qualified electrical workers or Certified Utility Arborists (CUAs) shall perform tree trimming and clearing that may come closer to high-voltage lines or equipment than the distances specified in Unqualified Worker Limits of Approach (table 401).
- 2 Only qualified electrical workers shall trim or clear vegetation where there is contact, or the possibility of contact, between such vegetation and an energized high-voltage line. The following rules shall apply:
 - a A Live Line Permit must be in effect for the duration of the work.
 - b Step and touch potential must be taken into consideration.

-
- c Approved live line tools and equipment must be used to remove any trees or portions thereof that are closer to energized high-voltage lines than the distances specified in the Qualified Electrical Worker Limits of Approach (table 401).
 - d In proximity to energized lines 138 kv and above, workers shall remove trees or portions of trees that are within the Restricted Work Limits of Approach (table 403) in one of the following ways:
 - From an approved aerial lift using approved live line tools and procedures.
 - With a Safety Protection Guarantee in place and Worker Protection Grounding/Bonding applied.
- 3 Certified Utility Arborists may engage in tree trimming and clearing near energized conductors under the following conditions:
- a Work shall be governed by the WorkSafeBC OHS Regulation and BC Hydro supplementary instructions.
 - b Workers shall be authorized and shall obtain an Assurance of No Reclose Permit from the

PIC before commencing work (refer to rule 425).

- c The PIC shall establish any required operating conditions before the work proceeds.
- 4 To remove trees or portions of trees that are in contact with energized primary conductor, Certified Utility Arborists must work under an existing Self Protection or Clearance or a Protection Extension. Refer to Section 600 rules for details.

408 Work near the station perimeter

When working close to a station perimeter (either inside or outside), workers shall use approved methods, as defined in the **Work Adjacent to Stations** work procedure to avoid the hazard posed by a difference in potential between the station ground grid and the surrounding area.

409 Working on communications equipment in stations

- 1 When work on communications equipment is high risk or is being performed in a hazardous location, no fewer than two workers shall be assigned to the job.

-
- 2 Fault conditions could occur due to equipment failure, lightning or during high voltage electrical switching, causing a dangerous potential between station and remote ground connections. Workers must avoid coming into contact with the station and remote ground connections at the same time. Precautions must be taken to control the hazard, including:
- Using a 20kV rated isolation mat when working on communications equipment, and
 - Attaching a sign to the outside of the equipment that reads “Caution—Keep Clear of Station Ground When Working in This Cabinet.”
- 3 During fault conditions (ie: equipment failure, lightning, or electrical switching) hazardous voltages or transient energy may exist in the Interconnect and Coupling equipment associated with Powerline Carrier installations. This includes the coax cable and the Line Matching Unit. Workers will ensure proper grounding and surge suppression is in place before working with Interconnect or Coupling equipment.

410 Batteries and battery rooms

- 1 Open flames shall not be permitted in battery rooms.
- 2 Appropriate Personal Protective Equipment shall be worn when working on batteries (refer to OSH Standard 317).
- 3 If any work is to be performed on or near battery cell covers, the worker shall first touch a grounded metallic object in order to release any static potential.
- 4 The charger and electric load shall be disconnected before disconnecting any cell of a storage battery.

411 Working with cranes, excavators, and booms—general

- 1 When a crane or hoist is in use, all workers exposed to the hazards must wear high-visibility clothing and stand well clear of the hazardous area. Approved hand signals (refer to Appendix A) must be used to direct the equipment operator, and such signals must be given by one worker only, as required by WorkSafeBC OHS Regulation.

-
- 2 **Inside stations:** When working near energized electrical conductors or equipment in stations, boom-equipped vehicles shall be grounded with an approved grounding conductor that is connected from the station ground grid to the equipment frame.
 - 3 **Outside stations:**
 - a When working near energized electrical conductors or equipment outside stations, boom-equipped vehicles shall not normally be grounded.
 - b Where such ungrounded equipment or the materials being handled (such as poles being set) could make accidental contact with energized high-voltage conductors or equipment, the worker in charge must warn all workers to stay clear of the equipment.
 - c Equipment such as cranes, excavators, and trucks with booms that are working near energized electrical conductors or equipment shall not be controlled by a worker standing on the ground. If the operator stands beside the equipment, they must stand on an approved groundmat that is bonded to the equipment.

412 Using hand signals

- 1 Where the nature of the work requires the use of signals, such signals must be given only by one worker at any one time. All workers must thoroughly understand the signals before starting work.
- 2 Where practicable, hand signals (refer to Appendix A) shall be used in preference to oral signals (refer to WorkSafeBC OHS Regulation).

413 Aerial lift equipment—general

- 1 The worker in charge must ensure that the crew inspects and functionally tests aerial lift devices (refer to OSH Standard 405).
- 2 All work from aerial lift equipment must be performed by workers who are qualified to do the work, have been trained, and are familiar with the operation of the equipment, the controls, and the electrical and load-carrying capabilities of the equipment being used.
- 3 Aerial lift load limits specified by the manufacturer must not be exceeded. Workers must follow the instructions and proper sequences prescribed by the manufacturer for operating the equipment. Capacity charts must

be installed in places conspicuous to the operator and kept in legible condition.

- 4 When parked in a position for work, the vehicle must be secured against motion or upset. Where applicable, outriggers shall be fully extended and implanted on firm ground or pads to maintain as near a level position as possible.
- 5 For aerial lifts with articulated booms that are exposed to traffic:
 - a Except on equipment that is limited to vegetation work, the boom knuckle must be equipped with a flashing or rotating amber light. On equipment that is limited to vegetation work, reflective tape may be installed at the knuckle as an alternative to the knuckle light.
 - b Whenever the boom is in the working position, the amber flashing light, the knuckle light (if so equipped), and the four-way vehicle flashers shall be operated.
 - c The knuckles of articulated booms shall not extend outside the guarded work area.
- 6 Aerial lift equipment that is specifically designed and approved for the purpose may be moved

short distances under the continuous direction of a worker in the bucket.

- 7 Any worker in the aerial lift must use an approved fall arrest system.
- 8 When workers are aloft, the aerial lift shall not be operated from lower controls without the permission of the workers aloft except in an emergency, or in training for an emergency.
- 9 Work must be done from inside the bucket. No one shall sit or stand on the bucket's edge, stand on a plank placed across the bucket, or work from a ladder set inside the bucket.
- 10 During work, the bucket shall not be rested on a fixed object in such a manner that the weight of the boom is supported by the bucket.
- 11 When positioning buckets near energized high-voltage conductors, the Limits of Approach to energized conductors must apply (refer to Limits of Approach table 401). Buckets shall not be considered as approved insulating devices except for barehand approved buckets.

414 Aerial lift equipment—live line work

- 1 Only approved, insulated aerial lift equipment must be used for live line work, including

barehand or rubber glove work. Such equipment must have a non-destructive test and be tested dielectrically every year. Refer to OSH Standard 405.

- 2 Immediately prior to using approved aerial lifts for barehand or high-voltage rubber glove work (4 kV and above), such aerial lifts must:
 - a have all insulated portions wiped clean and anything that may adversely affect the insulation of the aerial lift removed; and
 - b be tested using approved methods, as described in the relevant Work Procedures.
- 3 Power cords must not be permitted in a bucket while workers are doing barehand work or rubber glove work on energized conductors or equipment. For all other work, power tools and their cords must be protected against contact with energized conductors or equipment and must be disconnected from the source of power and removed from the bucket when not in use.
- 4 Aerial lift equipment that is certified for barehand work must have bucket and boom covers installed whenever the aerial lift is not in use. Covers are optional for equipment used only for high-voltage rubber glove work.

- 5 Insulated aerial lift vehicles that are bonded to energized electrical lines or equipment for barehand work must be protected with appropriate barriers and/or markers, and all workers except those necessary to perform the work or operate the equipment must stay clear of such vehicles.

415 Equipment for work on energized conductors

- 1 Use only approved live line equipment and protective equipment (rubber blankets, hose, hoods, gloves, etc.) and have all such equipment inspected and tested, as required by OSH Standard 602. See also **Arc flash work requirements for line.**
- 2 Live line tools and rubber protective equipment must be kept free from dirt and moisture and must not be laid directly on the ground.
- 3 Blocks, ropes, slings and other tackle provided for live line work must not be used for any other purpose and must be kept clean, dry, and free from foreign substances.
- 4 Workers must thoroughly inspect live line tools and rubber protective equipment prior to use and when damage is suspected.

- 5 Tools or equipment that are damaged or show any signs of leakage must be withdrawn from service immediately and forwarded with an explanatory report to an approved safety service shop.
- 6 Only an approved safety service shop shall be permitted to repair or alter live line tools or equipment.
- 7 Live line tools and rubber protective equipment must be transported and stored in a manner that prevents damage and provides protection.
- 8 Workers shall not depend for protection upon high-voltage rubber equipment that has been left in service overnight. Such equipment shall be removed, cleaned, and visually inspected before re-use and, if suspect, submitted to an electrical test.

416 Conditions for work on energized conductors or equipment

- 1 Before any work is carried out on energized conductors or equipment, arrangements shall be made to obtain a Live Line Permit (refer to rule 424). Live Line Permits are not mandatory for:
 - a Application or removal of hot taps.

- b Installation or removal of approved bolt-on stirrups to conductors #2 or larger, provided rule 803 is followed.
- c Application or removal of stick mounted ammeters.

d Application or removal of approved change of state signage with a hot tap.

- 2 Work on energized conductors shall be done only under the following conditions:
 - a With approved tools and equipment (including aerial lift devices, live line rope, and shielding suits) that have been specifically designed, constructed, and tested for the purpose.
 - b During favourable weather conditions and visibility. Work on energized conductors shall not be done during fog, rain or lightning (and for fifteen minutes after the last lightning is seen or thunder is heard). High-voltage rubber glove work shall not proceed when moisture is visible on cover-up, conductors, or structures.
 - c By qualified electrical workers familiar with or trained in the type of live line work that is to be performed or, if this is not possible,

under the direct supervision of a qualified Trades Training Instructor using approved procedures.

- d In the case of the barehand method, by qualified Power Line Technicians who have been trained by a qualified Trades Training Instructor. A Power Line Technician who has been qualified in the barehand method must act as a safety watcher while barehand work is in progress.
- 3 No work shall be done on #6 copper High Voltage conductors or #4 ACSR High Voltage conductors unless it is de-energized and grounded.

417 Work on energized conductors and equipment—general

- 1 Where work is to be performed on energized high-voltage conductors or equipment, the following rules apply:
 - a All assigned qualified electrical journeypersons shall work on the same phase conductor or the same task at the same time.

- 400
- b For the removal or installation of hot tap risers, two qualified electrical journeypersons may work from different aerial lifts.
 - c In every other case, when qualified electrical journeypersons are needed to perform the job, they must both work from the same pole, room, structure, or aerial lift.
- 2 No other work shall be carried out in the immediate area or on the pole or structure upon which live line work is to be done.
 - 3 When performing live line work, workers shall take care not to bring energized metal parts of live line tools or energized conductors into contact with crossarms, poles, hardware, or equipment. Workers must install adequate protective equipment (such as pole guards, line guards, insulator guards, and/or crossarm guards). **Second points of contact must be adequately covered when bringing a conductive object into the work zone that could initiate an arc.**
 - 4 Before climbing through, or working in, a hazardous position, workers must protect their climbing space and working position. This must be done by placing line guards, insulator hoods,

shields of the correct voltage rating, etc., on all conductors and equipment with which it is possible for them to come in contact.

- 5 Hold-out ropes or live line tools being used to spread or raise energized conductors must be secured and shall not be held by workers except as necessary to secure or release them. Two workers must be used to move hold-out ropes wherever there is a hazard to workers on the pole should the ropes get out of control.
- 6 When there is less than 1.8 metres (six feet) separation between two circuits that are both operated at 12 kV or higher, workers shall not work on one circuit while the other is energized unless the work can be done safely by live line tools or other approved methods.
- 7 Live line insulator cleaning must be carried out only in accordance with approved methods.

418 Live line tool work

- 1 Approved live line procedures, tools, and equipment specifically designed, constructed, and tested for the purpose shall be used for work on conductors or equipment energized at 750V or above. Refer to the **Arc flash work requirements for line.**

-
- 2 While working with live line tools, workers shall not use rubber gloves except when working in compliance with approved high-voltage rubber glove work procedures.

419 Rubber glove work

- 1 Class O rubber gloves must be worn when:
- Working on exposed energized low voltage (31VAC–750VAC or 150VDC–750VDC) conductors/terminals.
 - Working on insulated energized low voltage distribution overhead/underground conductors or equipment.
 - Performing tasks other than the above when required by specific work procedures.

Exceptions:

Class O rubber gloves are not required when:

- Contacting voltage rated, insulated, energized conductors in buildings/cabinets.
- Approved barriers have been installed.
- Using insulated and voltage rated tools or test equipment in good condition.

-
- Approved written work procedures are being followed for a specific task, which do not require gloves.

For additional requirements refer to OSH Standard 602.

- 2 Work on conductors and equipment energized from 751V to 25 kV must be done using approved rubber gloves and cover up equipment specifically designed, constructed, and tested for the purpose, unless live line tools are used.
- 3 Each worker shall use only the class of high voltage rubber gloves for which they are trained and qualified.
- 4 Rubber gloves must not be worn inside-out or without approved covers, and such covers must not be used for any other purpose under any circumstances.
- 5 Workers must work in compliance with approved rubber glove work procedures.
- 6 When performing high-voltage rubber glove work, rubber gloves must be worn continuously when within 3 metres (10 feet) of the energized area.

7 For crew complement refer to rule 803.3 b.

420 Barehand work

- 1 Barehand work on energized conductors or equipment shall be permitted only at voltages of 60 kV or higher. Such work must be logged by the PIC of the conductors or equipment.
- 2 Barehand work must not be permitted from a live line platform (board) whether or not such platform has been treated with insulating material.
- 3 During barehand work, the Working Clearances to workers, tools, equipment and material they may be handling with respect to objects at ground potential (including poles, towers and crossarms) and to conductors other than the one on which they are working shall be as specified in the BC Hydro Barehand Manual.
- 4 Barehand work must not be permitted within:
 - a 2.4 metres (8 feet) of a worker at ground potential for work up to 345kV.
 - b 2.7 metres (9 feet) of a worker at ground potential for work at 500kV (see Table 403 restricted LOA).

- 5 During barehand work, one worker on each job must be designated to be first on and last off with a wanding device.
- 6 Workers in barehand contact with energized conductors or equipment must not pass tools, materials, or equipment to or from workers at ground potential (on poles, structures, etc.) without the aid of live line tools adequate for the voltage.

421 Work involving open neutral conductors

- 1 When connecting or disconnecting neutrals, ground wires, static wires, counterpoise, etc., extreme caution must be used to avoid placing oneself in the open circuit between two sections of the neutral, as hazardous differences in potential may exist.
- 2 A bond must be installed prior to making hand contact to open or close a neutral conductor, a multi-grounded neutral, or the static wire or counterpoise on a high-voltage circuit (except the neutral of a service drop). Failing this, a Worker Protection Ground lead must be installed on either side of the opening at the work site and connected to a single point of Worker Protection Grounding (refer to rule 512).

- 3 When bonding is not practicable, approved and tested Class 1 or above rubber gloves or approved live line tools must be used for handling neutral conductors that are lying on the ground.

422 Phasing tests

When conductors or equipment are being connected where incorrect phasing could occur (such as when replacing pothead jumpers or risers or UD switching), “phasing” tests must be used.

423 Paralleling distribution transformers

- 1 Making and breaking of parallel connections on distribution transformers requires special attention be given to voltage backfeed hazards. Matching transformer ratings, checking for correct phasing, voltages and loadings shall also be considered.
- 2 The worker in charge of the job shall ensure that the hazard of voltage backfeed and the procedures for paralleling distribution transformers are reviewed at the tailboard discussion.
- 3 The making and breaking of a parallel between distribution transformers shall always be done on the secondary of the transformer.

4 Single-Phase Distribution Transformers— Making Parallel:

- a Complete all ground and neutral connections of the new installation.
- b Prepare transformer secondary drop leads and ensure that they are in the clear of all other conductors (taping is advised).
- c Connect the primary riser of the transformer disconnect to the same primary phase as the transformer to be paralleled and energize the newly installed transformer.
- d Check the secondary voltages of the newly installed transformer and ensure that they are normal.
- e Check the existing secondary voltages and ensure that they are normal.
- f Check the secondary voltages across each set of conductors to be paralleled. The voltage readings shall be zero or near zero (+/- 10%) before parallel connections are made.
- g Connect secondary drop leads to corresponding phases as identified in rule 423.4f.

5 Single-Phase Distribution Transformers— Breaking Parallel:

- a Disconnect the energized transformer secondary drop leads from the secondary run and position them in the clear (taping is advised).

Caution: Secondary drop leads are still energized.

- b Open the transformer disconnect.
- c Disconnect the primary riser from the line and position it in the clear.
- d Remove the neutral and ground connections to completely isolate the transformer.

6 Three Phase Distribution Transformers:

For procedures for making and breaking a temporary parallel between three-phase transformers, refer to the **Transformation reference Manual chapter 23.**

424 Live line permit

A live line permit is issued by the PIC to qualified electrical workers for live line work or **nonelectrical workers for** hazardous tree trimming near energized lines when it is required that reclosing not occur and Hot Line Tag (HLT) is enabled (if available).

- 1 Before issuing a Live Line Permit, the PIC must make arrangements to prevent immediate re-energizing of the circuit or equipment and enable any Hot Line Tag functionality. If HLT is not available the PIC must inform the receiver of the permit.

Note: HLT enable is not required to issue a Live Line Permit for the purpose of underground cable fault testing.

- 2 The PIC must have a means of direct communications with the permit holder.
- 3 In case of de-energization, the PIC will contact the permit holder before the circuit or equipment is re-energized, unless the circuit or equipment has been de-energized by other than its own protection or the cause is verified by a qualified person.
- 4 When a live line permit is in effect on a distribution circuit, the circuit must not be paralleled unless the live line work is suspended for the duration of the paralleling.

425 Assurance of no reclose permit

An Assurance of No Reclose Permit is issued by the PIC to qualified electrical or nonelectrical workers work near energized conductors or equipment

when it is required that reclosing not occur if automatic tripping takes place. An Assurance of No Reclose Permit provides no personal protection in case of direct contact with an energized conductor or equipment by a worker. The worker's protection depends on proper work practices and use of approved, tested, and well maintained tools.

1. Before issuing an Assurance of No Reclose Permit, the PIC must make arrangements to prevent immediate re-energizing of the circuit or equipment

Note: HLT enable is not required to issue an Assurance of No Reclose Permit

- 2 The PIC must have a means of direct communications with the permit holder.
- 3 In case of de-energization, the PIC will contact the permit holder before the circuit or equipment is re-energized, unless the circuit or equipment has been de-energized by other than its own protection or the cause is verified by a qualified person.

426 Arc flash requirements for work on energized distribution conductors or equipment

Arc flash hazard mitigation must be discussed and documented during the tailboard. For additional requirements, including feeders with interconnected IPPs and paralleling refer to **Arc flash work requirements for line.**

1. For live line work on overhead distribution primary no additional rated Arc flash PPE is required if HLT is enabled. When HLT is not available second points of contact must be covered and/ or use a minimum 6' hotstick.
2. For Work on exposed energized 347/600 distribution secondary conductors or equipment the following apply:
 - Workers must wear Arc Flash PPE rated to the calculated incident energy closer than 10 feet of the equipment to be worked on, (see table 3O3.7), or
 - Workers must use secondary cover up as per 426.3, or
 - Worker must use an approved procedure. Procedures for this purpose shall be approved by Work Methods.

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3. Approved secondary cover up for work on energized 347/600 distribution secondary conductors or equipment:

Workers must apply and remove adequate secondary coverup wearing rated Arc Flash PPE.

When secondary coverup has been securely applied workers may remove additional rated Arc Flash PPE.

427 Barriers or distinctive identification

Barriers or distinctive identification must be used to identify the energized conductors or equipment whenever there is a change of state, from having a Safety Protection Guarantee (SPG) or Lockout in effect to Energized in the ongoing work zone. For further details, refer to OSH Standard 603.

Isolation, grounding, and blocking

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501 Operating authority and responsibility

- 1 The Integrated power system is controlled through the delegation of Operating Authority and Responsibility in a hierarchical arrangement that includes the Control Centres (FVO/SIO) and generating stations. The FVO/SIO has ultimate responsibility for monitoring, controlling, and operating the system as defined in SOO 1J11 and 1T-11A.
- 2 The Non-Integrated area power system is controlled through the delegation of Operating Authority and Responsibility in a hierarchical arrangement that includes the District Central Control Facilities (DCCF) (Masset (MAS), Sandspit (SPT), Ah-Sin-Heek (ASK) and unattended Diesel Generating Stations. The DCCF has ultimate responsibility for monitoring, controlling and operating the non-integrated area, and may delegate responsibility to an authorized on-site worker for a portion of the non-integrated system within their areas. Refer to 3D-NIA-O8.
- 3 The exact location of boundaries between areas of different Operating Authority (such as structure numbers, conductor disconnect

switches, circuit breaker disconnect switches, etc.) shall be defined in Operating Orders.

- 4 No work, including switching, shall be done on any conductor, electrical equipment, or mechanical equipment without prior arrangement with, and approval of, the person with Operating Responsibility for the conductor or equipment, unless the equipment is not identified on the operating one-line diagram and does not adversely affect the Power System.
- 5 No work shall be done in any part of an energized station compound without prior notice being given to the person with Operating Responsibility for the station, unless otherwise specified in an Operating Order.
- 6 Isolation procedures are required for customer power supplies that are by definition a customer infeed. For each customer connection 60kV and above and for each customer connection less than 60kV with customer infeeds, a jointly signed Local Operating Order shall identify all isolation procedures.

502 Duties of person in charge (PIC)

- 1 The PIC coming on duty shall become familiar with all operating conditions and shall understand all details necessary to competently operate the assigned portion of the Power System.
- 2 Prior to taking charge, the relieving PIC shall not take part in the operation of the assigned portion of the Power System except under instruction from the PIC still on duty.

503 Project controller

- 1 On a construction project where there is a requirement for a PIC and no Operating Authority exists, the trained and authorized (Category 6 PSSP or D WPP) Construction Representative shall automatically be the Project Controller and shall assume PIC duties for the project.
- 2 On a construction project where Operating Authority already exists, one of the following strategies shall be used:
 - a The construction work may be completed under the existing Operating Authority, with the PIC assuming Project Controller duties.

- b A construction zone may be established and the Operating Authority and Operating Responsibility for the project delegated to the Construction Representative, who becomes the Project Controller. The construction zone shall be established using Guarantees of Isolation on all points required to separate the construction zone from the existing authority.
- 3 There shall be only one Project Controller at any time for a project. They shall remain in charge until, in writing, they are relieved of Project Controller duties or delegates the Project Controller duties to another individual or Operating Authority.
- 4 The name of the Project Controller shall be posted in a conspicuous location on the construction site.
- 5 The duties of the Project Controller may be delegated to the appropriate Operating Authority with mutual consent.

6 Duties of the Project Controller:

- a The Project Controller shall issue Safety Protection Guarantees and/or establish and prepare Group and Personal Lockout as may be required for the safe undertaking of work during the construction period.
- b The Project Controller shall keep appropriate documentation, including the following:
 - A formal log of all Safety Protection Guarantees and Lockouts.
 - A file of cancelled Safety Protection Guarantee and Lockout forms and correspondence.

Such records shall be turned over to the appropriate Operating Authority when responsibility for the operation of the project is handed over, and shall not be destroyed for at least two years following their cancellation date.

- c Immediately before turnover to the appropriate Operating Authority, the Project Controller shall recall all outstanding Safety Protection Guarantees and Lockouts on the construction project or the portion to be turned over.

- d If suitable Guarantee of Isolation points have not been established (as specified in rule 503.2b), the Project Controller shall arrange in writing to turn over to the appropriate Operating Authority all responsibilities for the operation of the project (or portions of it) before the project (or portions of it) can be energized from power system sources.

504 Equipment to be treated as energized

All high-voltage conductors and electrical or mechanical equipment that may be operated or energized by conventional means or by backfeed shall be treated as energized unless a Clearance, Test and Work Permit, Self Protection, or Lockout is in effect and Worker Protection Grounding/ Bonding or blocking has been applied on such conductors or equipment.

- 1 Work that requires the application and removal of worker protection grounding and bonding, for any purpose, shall be completed using an approved procedure developed using section 400 rules. Work procedures for this purpose shall be approved by the responsible engineer in Generation or Work Methods.

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- 2 No work shall be done on equipment where worker safety depends on:
- Interlocking (mechanical or electrical) with the exception of CSA approved transfer switches or CSA approved key interlock switches.
 - Devices which require oil, gas, air, or hydraulic pressure for the isolation of hazardous energy.

Note: In Generating Stations and Non-Integrated Substations, all electrical equipment, regardless of voltage, shall also be considered energized unless lockout is in effect.

505 Identification—power system

High-voltage lines, equipment, and stations shall be identified by a unique numeric or alphanumeric identifier, and workers shall use this identification at all times when referring to them.

506 Guarantee of isolation

- 1 The PIC may receive or issue a Guarantee of Isolation (GOI) to establish part of the isolation for work protection.

Note: In NIA, a qualified worker may be PIC for both PSSP and WPP at the same time and issue

a GOI to themselves for the purposes of establishing work protection.

- 2 Within the BC Hydro Power System, the PIC who issues or receives a Guarantee of Isolation shall use a Safety Protection form or a Safety Protection Record form to record the conditions established (refer to Appendix B).
- 3 The isolating devices for the portion of the system for which the Guarantee of Isolation is issued shall be secured using “Do Not Operate—Guarantee of Isolation” tags.

507 Station log

The following activities shall be logged in the station log:

- Transfer of Operating Authority
- Assignment of Operating Responsibility
- PIC sign in and out after assignment of Operating Responsibility to the station
- Station entry/exit (unattended stations): record name, time, and purpose of visit
- Switching instructions related to equipment identified on the operating one-line diagram, or the number and purpose of the

Switching Order and the date and time it was completed

- Description of equipment status changes initiated at the station, including auxiliary equipment status changes not recorded at the Control Centre.
- Protective relay flags
- Issue, receipt, and return of Guarantee of Isolation (GOI)
- Names of workers and isolating devices for which Personal Lockout or Self Protection remains in effect beyond a shift. If Self Protection has three or more points of isolation, they must be logged.
- Tags applied to Power System equipment to indicate abnormal status.

508 Communications protocol

- 1 Anyone issuing **switching** instructions (whether verbally or in writing) shall make certain that these instructions are specific and follow the intended sequence of operation.
- 2 In all **switching** instructions and communications, participants shall use clear, precise terms:

- Switches shall be described as “open” or “closed”.
 - Conductors and electrical or mechanical equipment shall be described according to their specific state (for example: isolated, grounded, blocked, energized, or de-energized).
- 3 A worker receiving verbal instructions shall repeat them back to the issuer word for word and shall receive acknowledgement (repeat-back procedure). Clear and legible instructions sent electronically (by fax or email) do not require the repeat-back procedure.
 - 4 When direct, verbal communication is lost or unreliable, the person with Operating Responsibility for the equipment may relay switching instructions by telephone or radio through a third qualified worker, providing repeat-back procedures are followed.

509 Switching devices identified on the operating one-line diagram

- 1 An isolating device identified on an operating one-line diagram shall not be operated other than by order of the person with Operating

-
- Responsibility, except in the case of an emergency to protect life or prevent injury.
- 2 Each switching **order** shall be carefully planned, and shall be checked for accuracy and completeness with respect to the work to be done, by a second person qualified and authorized to do so.
 - 3 The person with Operating Responsibility shall ensure that the worker doing the switching is qualified and authorized and understands the switching **order**.
 - 4 Before manually operating a station disconnect switch, the worker doing the switching shall check open the mechanism or semaphore position of the associated circuit breaker(s).
 - 5 Before manually operating any station disconnect switch, the remote or automatic closing operation of the associated circuit breaker shall be rendered inoperable.
 - 6 A worker doing the switching for Worker Protection purposes shall:
 - a Confirm the designation of each device and the action required by the switching instruction before operating the device.

-
- b Obtain a visual confirmation of the position (open or closed) of the device after operating a switch.
 - c Notify the PIC when the switching is completed.
- 7 A disconnect switch shall not be used to break load, magnetize or parallel current, or pick up load unless it is known that the disconnect switch is adequate for the intended purpose.
- 8 When operating manual disconnect switches that cannot be inched open, operate the switch using a continuous swift motion. Visually confirm that all blades are fully opened.
- 9 When operating manual disconnect switches that can be inched open, use the following procedure:
- a Gradually open the switch until the blades just part to determine whether arcing is present.
 - b If arcing is unacceptable, quickly close the switch and advise the person who ordered the switching.
 - c If arcing is acceptable, open the switch with a continuous swift motion if practicable.

Visually confirm that all blades are fully opened.

- 10 When closing a manual disconnect switch, close it with one continuous deliberate motion, if practicable. Visually confirm that all blades are properly closed.
- 11 Manually and electrically operated switches that are provided with locking facilities shall be locked in the appropriate position.
- 12 Approved and tested class 1 or above rubber gloves shall be used when hand-operating high-voltage switches and high-voltage rackout circuit breakers.
- 13 When switching on the Underground Distribution (UD) System:
 - a Load break elbows shall be operated with an approved live line tool.
 - b For work in manholes and street vaults:
 - i Approved confined space entry procedures shall be used.
 - ii Load break elbows shall not be used to make or break load.
 - iii Load break elbows employed with transition modules shall not be operated

while either the elbow or the module is energized.

14 Switching Order forms shall be retained for two years from the date of switching completion.

15 When making or breaking parallel through overhead distribution primary single pole switches refer to the **Arc flash work requirements for line.**

510 Voltage regulator bypass disconnects

Bypass disconnect switches of voltage regulators shall not be operated unless:

- The automatic control is in the OFF position
- And the regulator has been verified by two methods to ensure it is in the NEUTRAL position

511 Verifying isolation

The intent of verification is to positively ensure that the required isolation has been effective.

1. Isolation must be carefully planned and must be checked for accuracy and completeness for the work to be done, by a person qualified and authorized to do so.

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2. An electrical isolation point must have visual separation (all phases of a conductor or bus cut, disconnect, or multi-breaker are open), except where a CSA approved transfer switch or a rack-out breaker is used.
 3. Workers must verify that normal sources of hazardous energy have been isolated. Methods of verification include, but are not limited to:
 - Using an approved Voltage-Checking Device.
 - Attempting to start a motor via its manual control, provided there are no interlocks in the manual control circuit.
 - Checking a vent or drain valve.

Note: The racking-out of draw-out type switchgear is considered the equivalent of the visual opening of a disconnect switch.

512 Work on a device being used as an isolation point

No work shall be performed on a device that is being used as an isolation point for lock-out or a safety protection guarantee unless there is an approved work procedure. This includes physical connections to the isolation device.

The approved work procedure shall ensure that the work being performed will not affect the ability of the isolation point to control the hazardous energy.

Work procedures for this purpose shall be approved by the responsible Engineer in Generation or by Work Methods.

513 Worker Protection Grounding/Bonding

Before working on de-energized High Voltage conductors and electrical equipment, Worker Protection Grounding / Bonding must be established.

Until Worker Protection Grounding / Bonding is established, treat all equipment as energized.

Worker protection grounding and bonding must be applied or removed by, or under the direct and continuous supervision of, a qualified electrical journeyman authorized to a minimum of:

- PSSP Category 5 with a Safety Protection Guarantee in place
 - WPP Category C with switching authorization
1. Establishing Equipotential Grounding / Bonding
 - a. To establish an equipotential zone under PSSP, do all of the following in this order:

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- Isolate the conductor or equipment.
 - Obtain a Safety Protection Guarantee (SPG).
 - Test for potential
 - Apply Worker Protection Grounding/
Bonding (WPG). (including neutral
conductors, uninsulated guy wires and static
wires)
 - Grounds that are not under the direct and
immediate control of the SPG holder must
be secured with personalized Grounding/
Blocking Protection Tags (refer to rules 611
and 612)
- b. To establish an equipotential zone under
WPP, do all of the following in this order:
- Isolate the conductor or equipment.
 - Verify the isolation, including test for
potential.
 - Apply Worker Protection Grounding/
Bonding (WPG).
 - Establish Lockout.

In cases where it is not possible or is highly impractical to create an equipotential zone, an approved worker protection grounding/bonding

procedure for work without an equipotential zone must be used to provide adequate worker protection.

2. Prior to hand-contact on high-voltage conductors or electrical equipment, whether new, existing, or under construction, Worker Protection Grounding/Bonding must be applied when there is a hazard of accidental energization from any source including the following:
 - Electro-magnetic or electrostatic induction (from wind, dust storms, adjacent conductors, power cables, static capacitors, etc.)
 - A power source (including backfeed).
 - Contact with crossed or fallen conductors.
 - Lightning (direct or induced).

Note: Work on or in proximity to de-energized conductors or equipment must not be done when lightning is nearby (and for fifteen minutes after the last lightning is seen or thunder is heard).

3. Only approved Ground Points (for **stations**, **distribution** and **transmission**) are permitted to

be used for the establishment of Worker Protection Grounding.

4. When using an approved driven temporary ground rod, the location of the temporary ground rod must be chosen so that it provides the best ground possible at least 5 meters (preferably 10 meters) from the base of the structure or from any area where workers on the ground must work, and in a direction away from the main work area.
5. Workers on the ground must stay a minimum distance of 5 meters from the ground rod, anchor rods or tower legs to minimize the danger from Step and Touch Potential.
6. Appropriate measures must be taken to prevent the public or unauthorized workers from accessing Worker Protection Grounding.
7. A bond must be installed across any existing or impending opening of any high-voltage conductor, including the neutral. If this is not possible, a common ground connection must be provided on both sides of the opening being worked on.
8. Worker Protection Grounding/Bonding leads must be assembled, maintained, and tested

according to the **Assembling, Inspecting and Testing Ground Leads procedure.**

514 High-Voltage Capacitors

When high-voltage capacitors are isolated, workers must wait a minimum of five minutes before applying Worker Protection Grounding/Bonding. Short circuits and Worker Protection Grounding/Bonding must be applied using approved live line methods and tools, and must remain in place until the work is completed and all workers have reported clear. For testing purposes only, short circuits and Worker Protection Grounding/Bonding may be removed briefly during the test and then reapplied after five minutes.

515 Work in extra high voltage (EHV) station areas

These rules shall apply, in addition to the Worker Protection Grounding/Bonding requirements, when work is performed in designated areas in stations that are energized at Extra High Voltage (EHV). EHV is defined as 325 kV phase to phase and above.

Note: The requirements outlined in this rule may have application in lower voltage stations where similar conditions exist.

- 1 When working in a strong electric field, inadvertent movements, caused by electrical discharges (bites), may result in incidents such as falling or dropping tools. Workers who experience such discharges shall take action to eliminate the condition by any one or a combination of the following methods:
 - a By standing on a metallic surface connected to the station ground.
 - b By wearing a suitable drainer such as a metallic shoe insert connected to the work.
 - c By adjusting the work arrangement to provide electrical shielding.
 - d By wearing boots with semi-conducting soles. Such boots shall be worn only in the immediate work locations and precautions (rubber gloves, rubber over-shoes) shall be taken to avoid the electric shock hazard of low-voltage circuits.
- 2 **Draining:** All metallic parts between ground leads that are insulated from ground (for example, an Capacitive Voltage Transformer (CVT)), with which workers may come in contact, shall be electrically drained to ground. A flexible conductor equipped with a large

alligator or battery clip connected to the scaffold or the bucket grid shall be used to establish contact.

- 3 **Metal Ladders:** Metal ladders may be used in designated EHV areas only under direct supervision of qualified electrical workers.
- a When a metal ladder is moved around in the EHV area, great caution shall be exercised. The ladder shall be carried as close to the ground as practicable (not on the shoulder) to reduce the hazard from step and touch potential.
 - b When a metal ladder is used, it shall have a Worker Protection Ground installed before placing it into position.
 - c When a metal ladder is left unattended, steps shall be taken to prevent its removal by unauthorized workers. If the ladder is not used, it shall be placed in its designated storage area and locked in position such that unauthorized workers cannot remove it from its storage position.
- 4 **Scaffolds:** In addition to the requirements of rule 308.5:

-
- a Non-metallic platforms forming parts of the scaffold shall be covered with metallic gridding that is electrically drained to the scaffold.
 - b A metallic wand electrically connected to the scaffold shall be used to established initial contact with metallic objects.
 - c All metallic objects except small items, such as hand tools, bolts and nuts, with which workers may come in contact shall be electrically drained to the scaffold.
- 5 **Aerial Lifts:** When uninsulated aerial lifts are used, Table 4O1 Limits of Approach shall be maintained. When work is to be performed from an aerial lift with a non-metallic bucket, the bucket shall be equipped with a metallic grid that covers at least 90% of the floor area.
- a The grids shall be electrically drained to the work area via flexible conductors equipped with large alligator or battery clips.
 - b Both grids shall be electrically connected together and also to all metallic parts at the head of the boom.
 - c All metallic objects except small items such as hand tools, bolts, and nuts, with which

workers may come in contact, shall be drained to the bucket grid.

6 Vehicles and equipment: All large vehicles (flatdecks, trucks, etc.) and all large pieces of equipment (transformers on low bed trailers, for example) shall be grounded to the station ground using a Worker Protection Ground lead (refer to rule 411).

7 Power hand tools and test equipment:

- a Power hand tools (except double insulated) shall be grounded to the station ground grid via the three-wire supply cable and also via a flexible ground lead attached from the tool case to the ground grid at the work location.
- b Extension cables shall be stretched out rather than coiled up.
- c Isolating transformers shall also be used with AC operated test equipment to protect the equipment.

516 Power cables and duct banks

- 1 No cutting, splicing, soldering bonds, wiping joints, or repairing armour shall be done on energized cables in excess of 750 volts AC or 300 volts DC.

- 2 Before cutting into any high-voltage cable that has been in service, it shall be isolated, and a Safety Protection Guarantee shall be in place or lockout established. The cable shall be identified and tested with approved equipment to ensure that it is isolated. High-voltage cables shall be cut only after the cable has had Worker Protection Grounding/Bonding applied at the cutting site, unless an approved remote-operated cutting device is utilized.
- 3 A qualified electrical journeyman shall be in attendance when breaking the concrete portion of a duct bank that contains high-voltage cables.
- 4 Ducts containing energized high-voltage cables shall be broken into by or under the direction of a qualified electrical journeyman at the work site using approved non-powered hand tools.
- 5 Whenever “windows” are being cut with a jack hammer in a vault or manhole containing energized high-voltage cables, two workers, one of whom shall be a qualified electrical journeyman, shall be assigned to carry out the work.

- 6 Where manholes are to be built around duct banks containing energized high-voltage cables with the intention of opening such ducts into the manhole, the ducts shall be broken-out before the roof slab is constructed.
- 7 All entry into manholes and street vaults shall be in accordance with approved confined space work procedures.

517 Blocking

- 1 When mechanical equipment (such as hydraulic waterways, storage tanks or other sealed areas, pressurized pipes or vessels, or machinery) is to be isolated for work, suitable blocking shall be employed to prevent inadvertent energization or activation of the equipment through direct, indirect, accidental, gravitational, inertial, or other means.
- 2 Blocking of equipment shall consist of physically securing parts and attachments against inadvertent movement. Blocking of electrical equipment may consist of additional openings or physical barriers to prevent the possibility of any flow of electricity.
- 3 Blocking shall not depend upon:

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- a The maintaining of oil, gas, air, or hydraulic pressure
 - b Interlocking, wedging, or other mechanical devices that may fail or shear upon normal movement.

518 Civil infrastructure

These rules will only apply to new or existing civil infrastructure containing conductors or electrical equipment either energized or de-energized on BC Hydro's power system.

- 1 BC Hydro workers shall only be assigned to, and carry out work for which they are qualified and authorized to perform.
- 2 Only BC Hydro qualified and authorized civil contractors may conduct work on BC Hydro civil infrastructure.
- 3 Work will be overseen by a Qualified Electrical Journeyman, whose responsibility will be to act as a safety watcher.

Note: For work on Power Cables and Duct Banks refer to SPR 516.

519 Worker Protection Grounding/Bonding for rescue to protect life

For rescue to protect life, temporary Worker Protection Grounding/Bonding may be applied without a Safety Protection Guarantee using **procedures** approved by Work Methods. The procedures will address the following:

- Consulting with emergency first responders to determine urgency (if applicable)
- Limiting use of the procedure for rescue
- Coordinating with the PIC
- Control of hazardous step and touch potential
- Testing for potential
- Applying grounds

Note: A SPG is required to complete repairs (if applicable)

520 Worker Protection Grounding/Bonding for inaccessible isolation point(s)

When isolation point(s) are inaccessible (eg. due to windstorms, landslides, fires, floods, etc.), temporary Worker Protection Grounding/Bonding may be applied using a **procedure** approved by

Work Methods. The procedure will address the following:

- Coordinating with the PIC to isolate all accessible isolation point(s)
- Receiving a SPG
- Limiting use of the procedure to complete the isolation
- Control of hazardous step and touch potential
- Testing for potential
- Applying grounds
- Accessing and switching inaccessible isolation point(s)
- Returning the SPG
- Coordinating with the PIC to establish complete isolation and receive a subsequent SPG to facilitate repairs

Notes:

Isolation and tag out: PSSP

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601 General

- 1 This section specifies the rules and requirements for isolation and tag out on the Distribution and Transmission Power System.
- 2 For areas off the Power System, as described in Local Operating Orders, workers shall use lockout procedures, as described in OSH Standard 204 and Part 10 of the WorkSafeBC Occupational Health & Safety Regulation.

602 Safety protection guarantees

- 1 Three types of Safety Protection Guarantee (SPG) are approved for use on the power system to ensure that high-voltage conductors or electrical or mechanical equipment are isolated and will remain isolated:
 - Clearance (including Protection Extension)
 - Test and Work Permit
 - Self Protection
- 2 Safety Protection Guarantees are enforced by “Do Not Operate” tags (refer to rule 614.1 and Appendix B).
- 3 After receiving a SPG, workers shall verify isolation (refer to rule 511) and shall apply Worker Protection Grounding/Bonding and/or

blocking before they commence work on high voltage conductors or equipment.

Note: The racking out of draw-out type switchgear shall be considered as the equivalent to Worker Protection Grounding/Bonding while working on such switchgear.

603 Clearance—general

The rules in this section apply to all Clearances, including Protection Extension.

- 1 A Clearance is a stated assurance that one or both of the following is true:
 - a A specified conductor or electrical equipment is isolated, and it is safe to apply Worker Protection Grounding/Bonding and go to work.
 - b A specified piece of mechanical equipment is isolated, and it is safe to apply blocking and go to work.

The protection provided by a Clearance may be extended to another authorized worker through a Protection Extension.

- 2 A Clearance shall be issued only by the PIC of the affected line or equipment.

- 3 A Clearance shall be issued only to a worker who is authorized to PSSP category 5 or 6.
- 4 A Clearance issuer who believes that the planned work exposes the workers or the system to undue risk shall refuse to issue a Clearance.
- 5 Where appropriate, a single Clearance may be used to provide both mechanical and electrical protection.
- 6 A Clearance shall not be issued on a line or equipment on which a Test and Work Permit has been issued.
- 7 Operating Orders shall define the exact location of any boundaries between areas of different Operating Authority, such as structure numbers, line disconnect switches, circuit breaker disconnect switches, etc. (refer to 101.4). A Clearance shall be issued from only one Operating Authority.
- 8 Before issuing a Clearance that depends in whole or in part upon a Guarantee of Isolation from a different Operating Authority, the Clearance issuer shall ensure that the PIC is qualified to provide such a guarantee. If the

Clearance issuer is not satisfied, the Clearance shall not be issued.

- 9 Because of the hazard of backfeed from station voltage transformers (VTs) and Station Service transformers, a Clearance shall not be issued unless such transformers have first been rendered safe against backfeed. Protection against backfeed may be by one of the following methods:
- Opening secondary knife switches
 - Removal of drawout gear
 - Removal of fusing
 - Short-circuiting by the attachment of an adequate secondary (low-voltage) short circuit at or near the transformer's terminals.

Exceptions:

- This rule does not apply to devices equipped with non-conductive connections, such as optical fibre to the secondary of a voltage/current transformer.
- It is not necessary to isolate VT secondaries at series capacitor stations for line work.
- It is not necessary to isolate VT secondaries at substation(s) that are completely de-

energized to allow work to be done under a Clearance on the transmission line (no sources of hazardous infeed).

- 10 Within a zone covered by a Clearance, the following procedures are permissible, provided the PIC has been informed:
- The operation of a disconnect switch for the purpose of adjustment, provided the disconnect switch is not one of the Clearance isolation points, and both sides of the disconnect switch are bonded together and grounded for the duration of the adjustment.
 - The operation of a circuit breaker (locally or by supervisory control), provided no hazardous electrical or mechanical tests are required and Worker Protection Grounding/Bonding is in place.
- 11 Where more than one crew is required to work on the same line or equipment, an authorized worker on each crew shall obtain a separate Clearance or work under the Protection Extension of an existing Clearance. Multiple Clearances on the same line or equipment shall have the same isolation points.

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- 12 The worker receiving a Clearance, including cases in which it is sent electronically (by fax or email), shall verbally repeat back all components of the Clearance word-for-word and receive acknowledgement (repeat-back procedure).
 - 13 A Clearance shall be obtained directly from, and returned directly to, the PIC of the affected line or equipment. When direct communication is lost or is unreliable, it is permissible to relay the communications by phone or radio through a third qualified worker, using repeat back procedure.
 - 14 A Clearance shall cover all work to be done by the Clearance holder's crew. The Clearance holder shall be personally responsible for each worker allowed to work on or to inspect the line or equipment to which the Clearance applies. If the Clearance holder leaves the job, personal responsibility ceases, and the authorized worker left in charge shall take out a separate Clearance or work under a Protection Extension on the existing Clearance. In either case, the new Safety Protection Guarantee holder becomes personally responsible for anyone working under their Clearance or Protection Extension.

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- 15 A Clearance or Protection Extension shall be returned only by the worker to whom it was issued. If this is not possible, the matter shall be referred to the Senior Manager in charge of the work (or their designate or a higher authority), who shall be responsible for the return of the Clearance in a safe manner, as governed by circumstances.
- 16 Completed Safety Protection and Safety Protection Record forms shall be retained for at least two years from the date of Clearance return.

604 Clearance requirements

1 Worker Requesting a Clearance:

- a Give your name and request a Clearance.
- b State clearly what line or electrical and/or mechanical equipment you require isolated and the purpose of the isolation.
- c In the case of station work where there may be enclosed or concealed equipment, discuss the location of hazards using station diagrams and drawings and, if so desired, ask to have the location of the various associated switches or equipment specifically shown to you.

2 PIC Issuing a Clearance:

- a Obtain the name of the worker asking for the Clearance, the type of work to be done, and the exact designation of lines or equipment to be isolated.
- b Ensure that no Test and Work Permit is in place and that the requesting worker is authorized to receive a Clearance.
- c Arrange for the isolation of the specified line or equipment, with “Do Not Operate—Clearance” tags on isolating devices and on mimic displays to establish the protective conditions. When the PIC issues two or more Clearances that depend upon an identical set of isolation points, a single set of field isolation tags is sufficient, provided that the PIC’s mimic display board is enforced with a separate set of tags for each Clearance. If a Clearance shares an isolation point with an adjacent SPG, a separate field tag shall be used for each SPG.
- d Log the switching steps. When a switching order consists of three or more steps, the PIC shall use a Switching Order form and

shall record the Switching Order number in the Log.

- e Complete the Safety Protection form, including all the isolation points that establish the Clearance. Record in the log the Clearance number, the designation of lines or equipment to which the Clearance applies, and the time and date. Where Clearances have one or more isolating points in common, the Safety Protection forms shall be cross-referenced to indicate the number of Clearances issued.
- f Advise the worker requesting the Clearance that the line or electrical and/or mechanical equipment is isolated, stating the Clearance number.

3 **Worker Receiving a Clearance:**

- a When you have been notified that the required conductor or equipment is isolated and have been given the Clearance number, complete the Safety Protection Record form, marking it as a Clearance and recording the number.
- b Warn all workers under your Clearance to maintain limits of approach until appropriate

Worker Protection Grounding/Bonding or blocking is in place.

4 Issuing and Returning a Protection Extension:

- a A Protection Extension from an existing Clearance may be issued only to a worker authorized to PSSP category 3 or higher.
- b Ensure the existing Clearance is appropriate for the work to be done.
- c On the Safety Protection Record form for the Clearance, under the heading “Protection extended to,” record the name of the worker receiving the Protection Extension, the time, and the date.
- d Inform the worker receiving the Protection Extension of the hazards involved. If necessary, install barriers or take other means to ensure that the work to be undertaken does not create a hazard to life, property, or service. For a worker authorized to PSSP category 3 or 4, direct and personally observe the worker applying any Grounding/Blocking Protection tags they may require (refer to rules 611 and 612).

- e Inform the worker who requested the Protection Extension that work may proceed.
- f When work under a Protection Extension has been completed, ensure that the worker holding the Protection Extension has advised their crew to stay clear of the lines or equipment. For a worker authorized to PSSP category 3 or 4, direct the worker to remove any Grounding/Blocking Protection tags they have applied.
- g On the Safety Protection Record form for the Clearance, have the worker returning the Protection Extension, sign and records their name, the time and date of return.

If this is not possible, the worker can verbally return the Protection Extension to the Clearance holder.

5 Worker Returning a Clearance:

- a Ensure that all workers and equipment are clear and that any Protection Extension(s) have been returned.
- b Advise all workers under your Clearance that the conductor or equipment shall be treated as energized, and warn them to stay clear.
- c Report to the Clearance issuer, stating your name and Clearance number, that all workers under your Clearance (including workers under a Protection Extension) are clear of the conductor or equipment, and that they have been warned to stay clear. Advise the issuer whether or not all Worker Protection Grounding/Bonding or blocking that you have placed has been removed and whether or not the line or equipment is ready for service.
- d Sign the Safety Protection Record form and record the time and date.

Note: A Clearance shall be returned before a Test and Work Permit is issued.

6 PIC Accepting the Return of a Clearance:

- a Obtain the Clearance holder's name, the Clearance number, the proper designation of the conductor or equipment on which the Clearance holder and crew have been working, and a statement that all workers under the Clearance (including Protection Extensions) are clear and have been warned to stay clear of the conductor or equipment. Determine whether or not Worker Protection Grounding/Bonding or blocking has been removed and whether or not the conductor or equipment is ready for service.
- b Record in the log the Clearance number and the exact time of the Clearance return.
- c Complete the Safety Protection form.
- d Direct the removal of all Clearance tags connected with the Clearance.

605 Test and work permit—general

- 1 A Test and Work Permit is required when hazardous electrical or mechanical tests are to be conducted on a conductor or electrical or mechanical equipment. During such tests, the isolation points specified in the Test and Work Permit shall not be altered.

Note: Electrical testing from an external test source on low-voltage equipment does not require a Test and Work Permit, but the isolating device and equipment must be under the exclusive and immediate control of the worker at all times while testing the machine or equipment.

- 2 A Test and Work Permit is a stated assurance that one or both of the following is true:
 - a A specified conductor or electrical equipment is isolated, and it is safe to apply Worker Protection Grounding/Bonding and go to work.
 - b A specified piece of mechanical equipment is isolated, and it is safe to apply blocking and go to work.

Worker Protection Grounding/Bonding and blocking devices shall remain in place except during the tests.

- 3 A Test and Work Permit shall be issued only by the PIC of the affected line or equipment.
- 4 Not more than one Test and Work Permit shall be issued or be in force on the same conductor or equipment at any one time.

- 5 While a Test and Work Permit is in place, a Clearance (including Protection Extensions) or Self Protection shall not be permitted on the same conductor or equipment.
- 6 A Test and Work Permit shall be issued only to a worker who is authorized to PSSP category 5 or 6.
- 7 Where appropriate, a single Test and Work Permit may be used to provide both mechanical and electrical protection.
- 8 A Test and Work Permit issuer who believes that the planned work exposes the workers or the system to undue risk shall refuse to issue a Test and Work Permit.
- 9 Operating Orders shall define the exact location of any boundaries between areas of different Operating Authority, such as structure numbers, line disconnect switches, circuit breaker disconnect switches, etc. (refer to rule 101.4). A Test and Work shall be issued from only one Operating Authority.
- 10 Before issuing a Test and Work Permit that depends in whole or in part upon a Guarantee of Isolation from a different Operating Authority, the Permit issuer shall ensure that the

PIC is qualified to provide such a guarantee. If the Permit issuer is not satisfied, the Test and Work Permit shall not be issued.

- 11 Because of the hazard of backfeed from station voltage transformers (VTs) and Station Service transformers, a Test and Work Permit shall not be issued, unless such transformers have first been rendered safe against backfeed. Protection against backfeed may be by one of the following methods:
- Opening secondary knife switches
 - Removal of drawout gear
 - Removal of fusing
 - Short-circuiting by the attachment of an adequate secondary (low voltage) short circuit at or near the transformer's terminals.

Exceptions:

- This rule does not apply to devices equipped with non-conductive connections, such as optical fibre to the secondary of a voltage/current transformer.
- It is not necessary to isolate VT secondaries at series capacitor stations for line work.

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- It is not necessary to isolate VT secondaries at substation(s) that are completely de-energized to allow work to be done under a Test and Work on the transmission line (no sources of hazardous infeed).
- 12 The worker receiving a Test and Work Permit, including cases in which it is sent electronically (by fax or email), shall verbally repeat back all components of the Test and Work Permit word-for-word and receive acknowledgement (repeat-back procedure).
 - 13 A Test and Work Permit shall be obtained directly from, and returned directly to, the PIC of the affected conductor or equipment. When direct communication is lost or is unreliable, it is permissible to relay the communications by phone or radio through a third qualified worker, using repeat back procedure.
 - 14 A Test and Work Permit shall cover all work to be done by the Permit holder's crew. The Permit holder shall be personally responsible for each worker allowed to work on or to inspect the conductor or equipment to which the Test and Work Permit applies. If the Permit holder leaves the job, they must surrender the Permit, and their personal responsibility ceases. No work

shall be done until the authorized worker left in charge receives a separate Test and Work Permit. The new Permit holder becomes personally responsible for anyone working under their Test and Work Permit.

- 15 The Test and Work Permit holder is responsible to ensure that sources of energy do not create a hazard to others.
- 16 Before work is resumed on conductors or equipment on which tests have been conducted, the Test and Work Permit holder shall ensure that safe working conditions are established, including the re-establishment of Worker Protection Grounding/Bonding or blocking, and shall advise their crew of any changes in conditions from those that were in effect prior to the tests.
- 17 A Test and Work Permit shall be returned only by the worker to whom it was issued. If this is not possible, the matter shall be referred to the Senior Manager in charge of the work (or their designate or a higher authority), who shall be responsible for the return of the Test and Work Permit in a safe manner, as governed by circumstances.

- 18 Completed Safety Protection and Safety Protection Record forms shall be retained for at least two years from the date of Test and Work Permit return.

606 Test and work permit requirements

1 Worker Requesting a Test and Work Permit:

- a Give your name and request a Test and Work Permit.
- b State clearly what conductor or electrical or mechanical equipment you need isolated, and state the type of tests you need to perform.
- c In the case of station work where there may be enclosed or concealed equipment, discuss the location of hazards using station diagrams and drawings and, if so desired, ask to have the location of the various associated switches or equipment specifically shown to you.

2 PIC Issuing a Test and Work Permit:

- a Obtain the name of the worker asking for the Test and Work Permit, the type of testing to be done, and the exact designation of conductors or equipment to be isolated.
- b Ensure that no Safety Protection Guarantee is in place and that the worker is authorized to receive a Test and Work Permit.
- c Arrange for the isolation of the specified conductor or equipment, with “Do Not Operate—Test and Work Permit” tags on isolating devices and on mimic displays to establish the protective conditions. If the Test and Work Permit shares a common isolation point with an adjacent SPG, a separate field tag shall be used for each SPG.
- d Log the switching steps. When a switching **order** consists of three or more steps, the PIC shall use a Switching Order form and shall record the Switching Order number in the Log.
- e Complete the Safety Protection form, including all the isolation points that

establish the Test and Work zone. Record in the log the Test and Work Permit number, the designation of conductors or equipment to which the Test and Work Permit applies, and the time and date. Where Test and Work Permits have one or more isolating points in common, the Safety Protection forms shall be cross-referenced to indicate the number of Test and Work Permits issued.

- f Advise the worker requesting the Test and Work Permit that the conductor or equipment is isolated, stating the Test and Work Permit number.

3 **Worker Receiving a Test and Work Permit:**

- a When you have been notified that the required conductor or equipment is isolated and have been given the Test and Work Permit number, complete the Safety Protection Record form, marking it as a Test and Work Permit and recording the number.
- b Warn all workers under your Test and Work Permit to maintain limits of approach until appropriate Worker Protection Grounding/ Bonding or blocking is in place.

4 Worker Returning a Test and Work Permit:

Note: A Test and Work Permit shall be returned before a Clearance is issued.

- a Ensure that all workers and equipment are clear.
- b Advise all workers under your Test and Work Permit that the conductor or equipment shall be treated as energized, and warn them to stay clear.
- c Report to the Permit issuer, stating your name and the Permit number, that all workers under your permit are clear of the conductor or equipment, and that they have been warned to stay clear. Advise the issuer whether or not all Worker Protection Grounding/Bonding or blocking that you have placed has been removed and whether or not the conductor or equipment is ready for service.
- d Sign the Safety Protection Record form and record the time and date.

5 PIC Accepting the Return of a Test and Work Permit:

- a Obtain the Test and Work Permit holder's name, the Permit number, the proper designation of the conductor or equipment on which the Test and Work holder and crew have been working, and a statement that all workers under the Permit are clear and have been warned to stay clear of the line or equipment. Determine whether or not Worker Protection Grounding/Bonding or blocking has been removed and whether or not the line or equipment is ready for service.
- b Record in the log the Test and Work Permit number and the exact time of the Permit return.
- c Complete the Safety Protection form.
- d Direct the removal of all Test and Work tags connected with the Permit.

607 Self protection—general

- 1 Self Protection is a Safety Protection Guarantee that a worker authorized to PSSP category 5 or 6 can apply on conductors or equipment for which a Clearance or Test and Work Permit is

not required. Such equipment includes: auxiliary sources to equipment; compressors or pumps and associated piping systems; high-voltage lateral distribution lines (below 60 kV); low-voltage distribution lines or equipment; and low-voltage station equipment not shown or listed on operating one-line diagrams.

- 2 Self Protection may be applied on high-voltage distribution lines where looped or multiple feeds do not exist and where the isolation of a particular line section can be carried out from a single isolation point.
- 3 No more than one Self Protection shall be in place on a high-voltage distribution line isolation point. Clearances shall be issued if there is a requirement for more than one crew to work in an area using the same isolation point.
- 4 Self Protection shall not be applied on station equipment where transformers remain connected, unless such transformers have first been rendered safe against backfeed. This may be accomplished by lifting leads, removing fuses, or by attaching a short circuit at or near the transformer terminals.

- 5 Self Protection can only be applied by an authorized worker. The worker applying the Self Protection is personally responsible for each worker allowed to work under their Self Protection. If this worker leaves the job, their personal responsibility ceases, they must remove all “Do Not Operate” tags that bear their name, and the worker left in charge must apply a separate Self Protection.
- 6 Hazardous testing shall not be permitted under Self Protection.
- 7 A Self Protection tag shall be removed only by, or under the direction of, the worker who has applied it. If this is not possible, the matter shall be referred to the senior manager in charge of the work (or designate or a higher authority), who shall be responsible for the removal of the Self Protection in a safe manner.
- 8 For work on high voltage distribution three phase systems when a Self Protection is used; all three phases will be isolated, tagged, tested and grounded prior to work involving hand contact.

608 Self protection requirements

1 Isolating and Tagging for Self Protection:

- a Assess the level of system risk, and notify the PIC if the risk is high.
- b Isolate the conductor or equipment to be worked on, or verify by personal observation that it is isolated.
- c Where station auxiliary isolation involves three or more devices or remains in place past the end of the shift, that isolation shall be logged in the station log.
- d Place, or arrange for the placing of, a “Do Not Operate—Self Protection” tag bearing your own name on each isolating device.
- e Warn all workers under your Self Protection Permit to maintain limits of approach until appropriate Worker Protection Grounding/Bonding or blocking is in place.

2 Removal of Self Protection:

- a Ensure that all workers and work equipment are clear and that all Worker Protection Grounding/Bonding and blocking has been removed.

- b Advise your crew that the conductor or equipment shall be treated as energized and warn them to stay clear.
- c Remove all “Do Not Operate—Self Protection” tags that bear your name.
- d For distribution lines, you may return the line to service.
- e You may return station and low-voltage conductors or equipment to service only if no tags remain.

609 Customer isolation—general

- 1 Customer Isolation may be applied by BC Hydro for work on customers’ systems below 60 kV that are supplied from a single BC Hydro feed and have no customer infeeds.
- 2 Customer Isolation may be applied only by BC Hydro representatives authorized to PSSP Category 5 or 6.
- 3 With the agreement of BC Hydro and provided BC Hydro Customer Isolation remains in place, customers may elect to apply their own safety procedures to BC Hydro isolating devices.

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- 4 Customer Isolation shall be cancelled only by the customer representative who signed the Customer Isolation form.

610 Customer isolation requirements

- 1 BC Hydro and the customer representative shall meet at the work site and shall review the Customer Isolation procedures and the requirements of the particular isolation.
- 2 BC Hydro shall open a switch or other device to isolate the customer's electrical system from the BC Hydro power system and shall place a "Do Not Operate—Customer Isolation" tag on this isolation point.
- 3 BC Hydro shall fill out the Customer Isolation form and give the original to the customer. BC Hydro shall advise the customer that it is the customer's responsibility to test for voltage and apply Worker Protection Grounding/Bonding.
- 4 The customer representative shall notify BC Hydro when they wish to cancel the Customer Isolation and shall provide to BC Hydro the signed off Customer Isolation form and confirmation that the customer's workers are clear, Worker Protection

Grounding/Bonding has been removed, and the equipment is ready for service.

- 5 BC Hydro shall sign off the Customer Isolation form and advise the customer that the Customer Isolation is no longer in effect.
- 6 BC Hydro shall close the isolating switch or device to reconnect the customer and advise the customer that the line or equipment is energized.
- 7 BC Hydro shall retain signed off Customer Isolation forms for two years.

611 Grounding/blocking protection tag—general

- 1 The “Do Not Operate—Grounding/Blocking Protection” tag is an enforcing tag that assures worker control of Worker Protection Grounding/Bonding and blocking devices (such as mechanical blocking, station grounds, removed risers, and physical barriers).

Warning: A Grounding/Blocking Protection tag shall not be used to replace the requirement for a Safety Protection Guarantee to effect proper isolation.

- 2 A Grounding/Blocking Protection tag shall be applied to any grounding or blocking device that is not at all times under the immediate and exclusive control of the Safety Protection Guarantee holder. These may include devices that appear on operating one-line diagrams (such as ground switches on SF6 buses) and that are already tagged for a Safety Protection Guarantee.
- 3 A Grounding/Blocking Protection tag shall be applied only by a worker who is authorized to receive Safety Protection Guarantees. Protection Extension holders who are not authorized to receive a Clearance shall apply and remove their Grounding/Blocking Protection tags only under the direction of the Clearance holder (refer to rule 6O4.4d and f).
- 4 The Grounding/Blocking Protection tag is for the worker whose name appears on the tag, as well as for their crew. The worker is personally responsible for maintaining grounding/blocking protection for themselves and their crew. If the worker leaves the job, personal responsibility ceases, and the worker left in charge shall apply their own Grounding/Blocking Protection tag.

- 5 A Grounding/Blocking Protection tag shall be removed only by the worker who applied it and whose name is on it. If this is not possible, the matter shall be referred to the senior manager in charge of the work (or designate or a higher authority), who shall be responsible for removing the tag and the Worker Protection Grounding/Bonding or blocking in a safe manner, as governed by circumstances.
- 6 A Grounding/Blocking Protection Tag can be used to provide worker control of worker Protection Grounding and Bonding on high-voltage conductors or electrical equipment being decommissioned or under construction where a Safety Protection Guarantee is not required.

612 Grounding/blocking protection tag requirements

- 1 **Tagging for Grounding/Blocking Protection:**
 - a Ensure that the electrical or mechanical equipment to be worked on is isolated, a Safety Protection Guarantee is in effect, and it is safe to apply Worker Protection Grounding/Bonding or blocking.

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- b Apply the grounding/bonding or blocking devices that are required for protection while working under the Safety Protection Guarantee and place a “Do Not Operate—Grounding/Blocking Protection” tag bearing your name on each device that is not under the immediate and exclusive control of the SPG holder.

2 Removing Grounding/Blocking Protection

Tags:

- a Ensure that all workers and work equipment are clear.
- b Ensure that all workers under your Safety Protection Guarantee are advised that the electrical or mechanical equipment shall be treated as energized, and warn them to stay clear.
- c Remove the “Do Not Operate—Grounding/Blocking Protection” tags that you applied to Worker Protection Grounding or blocking devices.

Note: Grounding/Blocking protection tags may remain in place when the SPG holder is transitioning between Safety Protection

Guarantees provided Worker Protection
Grounding/Bonding is not being removed.

613 Tags—general

Tags illustrated in Appendix B (or, on a mimic display, electronic equivalents with back-ups), must be used to enforce protective conditions or inform of unusual conditions. These tags must be attached or removed by authorized PSSP Cat 5 or Cat 6 in accordance with the rules and procedures as defined in the SPR and PSSP SOO 1T-12.

- 1 Field Tags must be attached or removed only by the on-site worker arranging the protection or on the instructions of that worker.
- 2 The application and removal of Clearance, Test and Work, and Guarantee of Isolation tags is considered switching and will require switching authorization through PSSP Manager.
- 3 Self Protection, Customer Isolation, and Grounding / Blocking Protection tags may be attached or removed by the on-site worker arranging the protection or on the instructions of that worker without direction from the PIC.
- 4 Tags must be used only for the purpose for which they are approved.

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- 5 Tags must be attached so they are clearly visible to workers and must indicate what the associated tag is enforcing or the protective conditions it supports.
 - 6 Tags must not be placed where they are accessible to the public unless adequate precautions are taken to prevent tampering/removal.

614 Requirements for tags

- 1 **Do Not Operate Tags:** Do Not Operate Tags are enforcing tags that shall be applied only by authorized workers and only to establish and maintain protective conditions for the following.
 - a **Do Not Operate—Clearance** tags shall be used only for Clearances (including Protection Extensions) (refer to rule 604).
 - b **Do Not Operate—Test and Work Permit** tags shall be used only for Test and Work Permits. Only one set of such tags shall be permitted on any conductor or electrical or mechanical equipment at any one time (refer to rule 606).
 - c **Do Not Operate—Self Protection** tags shall be used for Self Protection on conductors and equipment for which a Clearance or Test

and Work Permit is not required. Each Do Not Operate–Self Protection tag shall be inscribed with the name of the worker who applied it (refer to rule 608).

- d **Do Not Operate–Customer Isolation** tags shall be used to secure the isolation of customer conductors or equipment below 60 kV that are supplied from a single BC Hydro feed and no customer infeed exists (refer to rule 610).
- e **Do Not Operate–Grounding/Blocking Protection** tags shall be used to secure Worker Protection Grounding/Bonding and blocking devices that are not at all times under the immediate and exclusive control of the Safety Protection Guarantee holder (refer to rule 612).
- f **Do Not Operate–Guarantee of Isolation** tags shall be used to secure Guarantees of Isolation (refer to rule 506).

2 Caution Tags:

- a Caution tags shall be used to advise workers of a condition that might lead to a service interruption, create an unusual situation, or require a special operating procedure. This is

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- an information tag only and is not issued as a permit.
- b The Caution tag shall include either a description of the condition or a reference to where that information is recorded.
 - c Caution tags shall not be used to allow any work that could result in an unsafe condition if the equipment on which the Caution tag is applied is operated.
 - d Paper Caution tags shall be destroyed after use.
- 3 **Grounded Tags:** Grounded tags shall be used on the PIC's mimic display to indicate that Worker Protection Grounds have been left on conductors or equipment that remain isolated when no Safety Protection Guarantee is in effect.
- 4 **Live Line Permit Tags:** Live Line Permit tags shall be used on the PIC's mimic display to indicate that a Live Line Permit has been issued on a conductor or equipment (refer to rule 424).
- 5 **Assurance of No Reclose Permit Tags:** Assurance of No Reclose Permit tags shall be used on the PIC's mimic display to indicate that

an Assurance of No Reclose Permit has been issued (refer to rule 425).

- 6 **Guarantee of No Reclose Tags:** Guarantee of No Reclose tags shall be used on the PIC's mimic display to indicate that a Guarantee of No Reclose is in place (refer to Glossary, rule 424, and 425).
- 7 **Reclose Off Tags:** Reclose Off tags shall be used to indicate that reclosing is turned OFF for the issuance of Live Line Permits, Assurance of No Reclose Permits, Guarantees of No Reclose, or other operating conditions requiring reclosing off (refer to rules 424 and 425).
 - a When reclosing is turned off locally in the field, Reclose Off tags shall be placed on the Reclose control in the field and on the PIC's mimic display.
 - b When reclosing is turned off by supervisory control, Reclose Off tags are not required in the field or on the PIC's mimic display.
- 8 **Line Cut Tags:** Line Cut tags shall be used on the PIC's static mimic board to indicate a temporary line cut. Not applicable to an electronic mimic display.

Isolation and lockout: WPP

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Introduction

The policy, rules, and requirements in this section, collectively known as Work Protection Practices (WPP), apply to all work performed on equipment in Generating Facilities and Non-Integrated Substations for which hazardous sources of energy must be isolated and locked out for worker safety.

701 General policy

- 1 If the energization or startup of equipment or the release of a hazardous energy source could cause injury, the energy source must be isolated, grounded/bonded and/or blocked, and locked out prior to the start of work, according to the requirements in this section.
- 2 Only workers who have been trained and authorized in WPP procedures may access or work on protected equipment, except as stipulated in rule 701.3.
- 3 Visitors may be given access to, or work on, protected equipment only under the direct and continuous supervision of an authorized worker (the Host). The Host shall be authorized to at least Category B at that facility and locked on to the lockout. The Visitor shall be within sight and voice contact of the Host at all times, and the

Host shall ensure that the Visitor stays within the safe work zone.

- 4 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 according to the requirements in this section. 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.
- 5 If two or more workers will be using the same isolation, each worker shall attend a documented tailboard to discuss all aspects of the isolation, the hazards of the job, and the work plan each time they place their personal lock, in addition to any other times as specified in this section.
- 6 If the work procedure for a specific job requires the placement and removal of personal locks several times in one day, the requirement for separate tailboards can be met by fully describing the placements/removals of personal locks and the reasons in the initial tailboard for the day.

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- 7 Each worker locking on to a group lockout shall attend a documented tailboard meeting with the work leader before locking on and starting work.
 - 8 A personal lock is to be used for the sole purpose of worker protection and may be placed only by the worker to whom it has been assigned. The worker shall control access to the personal lock key while locks are applied. The personal lock shall be labelled with the person's name.
 - 9 A personal lock shall be removed only by the worker who placed it. When this is not practicable, the matter shall be referred to the facility manager, who shall be responsible for its removal, according to the requirements in this section.
 - 10 Hazardous testing is permissible under a lockout, provided the requirements in rule 713 or 722 are followed. Testing is considered hazardous if the answer to any of the following is "yes":
 - Is it necessary to modify Group Lockout isolation to perform the testing?

- Is it necessary to perform additional isolation requiring personal locks to prevent the test energy source from creating hazard to other workers?
 - To protect other workers from possible injury, is it necessary to advise them of the test being carried out, or to place barriers or signs?
 - If a worker were unaware that testing was being conducted, could he or she potentially be harmed?
- 11 Where a Guarantee of Isolation (GOI) forms part of the isolation for a lockout, the original copy of the GOI Safety Protection Record form shall be posted with the Personal or Group Lockout Sheet, and the GOI isolating devices shall be listed on the lockout sheet. The GOI record form is to remain with the lockout sheet until the lockout is returned to the PIC or the Project Controller, as applicable. WPP locks shall be applied to the GOI isolating devices as per System Operating Order 1J-18.
- 12 When station service fed by Level 5 feeders located on the PSSP side of the boundary are required as part of the isolation for a lockout,

the Customer Isolation process rule 609 and 610 are to be used. Also refer to System Operating Order 1J-18. The original copy of the Customer Isolation form shall be stapled to the Personal or Group lockout sheet, and the Customer Isolation isolating devices listed on the lockout sheet. The Customer Isolation form is to remain with the lockout sheet until the lockout is returned.

702 Isolation of hazardous energy

- 1 a The status and the means of securing all isolating grounding/bonding and blocking devices shall be clearly indicated on the Lockout sheet. Example: open and locked, closed and locked, installed and secured.
- b For the purposes of Section 700, all Worker Protection Grounding/Bonding and Blocking devices required for worker protection shall be included as part of the isolation, listed on the Lockout sheet, and secured by locks.

Note: The racking out of draw-out type switchgear shall be considered as the equivalent to Worker Protection Grounding/Bonding while working on such switchgear.

- 2 All permanently installed isolating, Worker Protection Grounding/Bonding, and blocking devices in Generating Facilities and Non-Integrated Substations shall be clearly labeled with a unique alphanumeric designation at the device.
- 3 All sources of stored hazardous energy shall be controlled and locked out before work commences (for example, draining air from a receiver, or discharging or blocking springs).
- 4 Where isolation is effected by a temporary bus cut, flex link/riser removal, or removal of a section of piping, a lockable method shall be used to prevent restoration.

The temporary bus cut flex link/riser or piping section removal is to be identified and tagged on the mimic display in accordance with the requirements of rule 706.

- 5 Where energy sources to an isolating device must be isolated in order to immobilize the isolating device (for example, power sources to the hydraulic operator of an intake operating gate or to a motor-operated disconnect), the isolating device itself and the isolation of power

sources to the isolating device are to be listed as separate line items on the lockout sheet.

- 6 Workers applying or removing Worker Protection Grounding/Bonding or blocking devices shall ensure the isolation of hazardous energy sources is appropriate for this purpose. When performing this work, they shall secure isolating devices using one of the following methods:
 - By placing a personal lock on each relevant isolating device.
 - By maintaining control of the group lock key if all relevant isolating devices are secured by group locks.
- 7 Worker Protection Grounding/Bonding and/or blocking may be removed for the purpose of testing under the direction of the worker responsible for testing. The protective grounds or blocking shall be replaced immediately after testing and prior to work continuing on the protected equipment. Similarly, a hazardous energy source to equipment not identified on the operating one-line diagram may be temporarily restored for the purpose of testing (for example, bump testing a motor).

- 8 Because of the hazard of backfeed from station voltage transformers (VTs) and Station Service transformers, a Group Lockout and/or Personal Lockout shall not be issued unless such transformers have first been rendered safe against backfeed. Protection against backfeed may be by one of the following methods:
- Opening secondary knife switches
 - Removal of drawout gear
 - Removal of fusing
 - Short-circuiting by the attachment of an adequate secondary (low voltage) short circuit at or near the transformer's terminals.

Exceptions:

- This rule does not apply to devices equipped with non-conductive connections, such as optical fibre to the secondary of a voltage/current transformer.

703 Switching orders

- 1 A WPP Switching Order form shall be used for all switching initiated by a PIC to isolate sources of hazardous energy identified on the operating one-line diagram.

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- 2 All WPP Switching Orders shall be checked for accuracy and completeness with respect to the work to be done by a second person qualified to do so.

The qualifications to check a Switching Order include:

- WPP Category D authorization;
- WPP Category C authorization plus either authorization to switch isolating devices identified on the operating one-line diagram, or specific knowledge of the equipment to be isolated. If no qualified person is available, the Switching Order shall be compared with a Switching Reference appropriate for the work to be done. The Switching Reference must have been checked for accuracy in the last 12 months and include the following information:
 - a Equipment and scope of work for which the isolation is intended
 - b Name, signature and date of person who prepared the Switching Reference

- c Device designation, device description and specific action required for each switching step, listed in the required sequence of switching.

704 Verification of isolation

The worker performing verification shall initial the “verified by” column on either the Switching Order or the Personal Lockout Sheet as a record that verification has been completed. Where applicable, the “verified by” column on the Switching Order or Personal Lockout Sheet is not to be initialed until effectiveness of isolation has been proven in a subsequent step (for example, checking vent or drain valve after closing a supply line valve). Where it is not possible to perform verification at the time of switching, workers must be informed in a documented tailboard of additional procedures or precautions that may be required to verify energy sources are effectively isolated before they lock on.

705 Isolating devices

- 1 All isolating devices used in WPP must be lockable.
- 2 For isolation that depends on the removal of links or fuses, locking up the removed links or fuses is not an acceptable method of preventing

the break from being reclosed. A WPP Lock(s) is to be secured at the open break.

706 Mimic display

- 1 There shall be only one mimic display at any one time, suitably stamped with the words “MIMIC DISPLAY.”
- 2 An operating one–line diagram may be used as a switchyard mimic display. The rule for listing isolating devices not displayed on the mimic applies.
- 3 Immediately following switching, isolating devices that are locked out for work protection associated with equipment identified on the operating one–line diagram shall be displayed or listed on the mimic display and tagged “Lockout Applied.” For those devices not permanently displayed on the mimic, a temporary list of isolating devices is acceptable—in this case, a single “Lockout Applied” tag secured to the list is sufficient.

At thermal facilities, where plant complexity renders this requirement impracticable, alternative procedures are acceptable.

- 4 Bus cuts and riser removal must be either displayed or listed on the mimic display.

707 Retention of documentation

- 1 WPP documentation will be retained for a minimum of two years at each facility to facilitate auditing of work protection practices at that facility.
- 2 “WPP documentation” includes the following documents:
 - Switching Orders
 - Personal Lockout Sheets
 - Group Lockout Sheets
 - Group Lockout Modification sheets
 - Test Notification forms
 - Tailboard Discussion Records
 - Requests for Isolation (where applicable)
 - Lock Removal Forms
 - Personal and Group Lock Logs
 - Guarantees of Isolation (GOIs)
 - Transfers of Operating Authority
 - Training Records

708 Personal lockout—general

- 1 Under personal lockout, each worker shall personally:
 - a ensure that each source of hazardous energy that may affect their safety during the work they are going to perform has been isolated.
 - b apply a Personal lock to each isolating device, Worker Protection Grounding/ Bonding device, and blocking device required for their personal safety.
- 2 If a worker has insufficient Personal locks, he or she may sign out a set of Group Locks for this purpose. The worker shall record the number of the Group lock set in the facility Group Lock Log.
- 3 Personal lockout may be applied with a Group Lockout when a worker requires additional work protection for a specific job. Where isolation depends on Personal Lockout in addition to a Group Lockout, a Personal Lockout Sheet shall be used to list all devices locked with Personal Locks. The Personal Lockout Sheet shall reference the Group Lockout Sheet and be posted visibly at the Lockout Board.

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- 4 If a worker requiring personal lockout does not place a personal lock at the time of switching, an “Attention” tag shall be secured to each isolating device, pending placement of a personal lock.
 - 5 Workers who are authorized to Category B at a facility may lock out shop equipment and auxiliary equipment not directly associated with the power system if there are less than 3 isolating devices and a specific written procedure has been permanently posted at the equipment. The written procedure shall include the following steps:
 - a Identify the equipment to be locked out.
 - b Stop the equipment.
 - c Disconnect the hazardous energy sources (specify isolating devices).
 - d Verify lockout effectiveness (specify method).
 - e Apply personal locks.
 - 6 Workers who are authorized to Category B at NIA low voltage generating stations may lock out equipment for regular minor maintenance where the isolation points only involve the

starting battery disconnect/s and a specific written isolation procedure has been permanently posted at the equipment. The written procedure shall include the following steps:

- a Identify the equipment to be locked out.
- b Stop the equipment.
- c Disconnect the hazardous energy sources (specify isolating devices).
- d Verify lockout effectiveness (specify method).
- e Apply personal locks.

709 Preparing personal lockout— equipment on the one-line diagram

- 1 Each worker requiring Personal Lockout provides the following information to the PIC: the work to be done, the equipment to be isolated, and any Worker Protection Grounding, blocking or special isolation requirements.
- 2 The PIC shall do the following:
 - a Identify the hazardous energy sources that must be isolated for the work to be done, determine the necessary isolating devices, including those not on the operating one-

-
- line diagram, and establish the sequence of switching.
- b Record the isolating, Worker Protection Grounding/Bonding, and blocking devices and their required status on a Personal Lockout Sheet.
 - c List the switching steps on a Switching Order in the proper sequence.
 - d Have the Switching Order checked for accuracy and completeness with respect to the work to be done by a second qualified worker.
- 3 The worker performing the switching completes each switching step in the sequence listed on the Switching Order and verifies isolation, applying personal locks or Attention tags as required. At the completion of switching, the worker returns the completed Switching Order to the PIC.
 - 4 The PIC updates the station log and mimic display.
 - 5 The PIC marks the appropriate column of the Personal Lockout Sheet to indicate any isolating devices that could not be verified at the time of

switching and completes the Personal Lockout Sheet.

- 6 The worker(s) place the Personal Lockout sheet in a location identified to all workers required to work under that Personal Lockout.

710 Preparing personal lockout— equipment not on the one-line diagram

- 1 The worker preparing Personal Lockout shall:
 - a Identify the hazardous energy sources that must be isolated for the work to be done and determine the necessary isolating, Worker Protection Grounding/Bonding, and blocking devices.
 - b List the isolating, Worker Protection Grounding/Bonding, and blocking devices and their required status on a Personal Lockout Sheet.
 - c Acquire approval from the person with Operating Responsibility if any device to be switched affects the power system.
- 2 The worker switches the isolating devices, verifies isolation, installs Worker Protection Grounding/Bonding and blocking devices, and

applies personal locks or Attention tags as required.

- 3 The worker marks the appropriate column to indicate any isolating devices that could not be verified at the time of switching and completes the Personal Lockout Sheet. The Personal Lockout Sheet is placed in a location identified to all workers required to work under that Personal Lockout.

711 Working on equipment protected under personal lockout

- 1 Each worker authorized to prepare Personal Lockout at the facility shall:
 - a Review the Personal Lockout Sheet and ensure that the devices listed provide the protection required for the work to be done.
 - b Visually check that each device listed on the Personal Lockout Sheet is switched to the required position and properly secured.
 - c Apply their personal lock to each device.
- 2 Workers not authorized to prepare Personal Lockout at the facility shall:

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- a Visually check that each device listed on the Personal Lockout Sheet is switched to the required position and properly secured.
 - b Be directed by an authorized worker in placing their personal lock on each device.
- 3 Each worker shall ensure that the number of personal locks they have placed matches the number of devices listed on the Personal Lockout Sheet.
 - 4 If personal locks are to stay on devices overnight, each worker shall enter, in the station log, their name and a list of the devices on which their locks are placed.

712 Visitor access to equipment protected under personal lockout

Each visitor who requires access to equipment protected under Personal Lockout shall place a Visitor Lock on each device listed on the Personal Lockout Sheet under the direction of a worker authorized to prepare Personal Lockout at that facility. Visitors shall remain under the direct and continuous supervision of a host who has signed out the required Visitor Locks. The host shall be authorized to work at the facility and be locked onto the Personal Lockout.

713 Hazardous testing under personal lockout

Hazardous testing is permissible under Personal Lockout, subject to the following rules:

- 1 The Personal Lockout is not applied or associated with a Group Lockout.
- 2 Only one test procedure shall be carried out at any one time.
- 3 The worker responsible for testing shall take possession of the Personal Lockout Sheet for the duration of testing to ensure that no workers lock on without being fully aware of the testing.
- 4 Prior to the start of testing, the worker responsible for testing shall hold a documented tailboard with all workers who will be locked on.
- 5 The worker responsible for testing shall ensure that sources of test energy will not harm any worker.
- 6 The worker responsible for testing shall place barriers and signs, as required, to protect all workers from the hazards created by testing.
- 7 If the worker responsible for testing directs the removal of Worker Protection Grounding/ Bonding or blocking devices for the purpose of testing, those devices shall be replaced

immediately after testing and prior to work continuing on the protected equipment.

- 8 For equipment NOT identified on the operating one-line diagram, a hazardous energy source may be temporarily restored for the purpose of testing (for example, bump testing a motor). The hazardous energy source shall be isolated again immediately after testing

714 Removing personal lockout— equipment on the one-line diagram

- 1 If the equipment is not ready for service:
 - a The last worker to remove their personal locks shall:
 - secure a completed “Attention” tag to each isolating device
 - return the Personal Lockout Sheet to the PIC.
 - b The PIC shall log the equipment status in the station log.
- 2 If the equipment is ready for service:
 - a The last worker to remove their personal locks shall return the Personal Lockout Sheet to the PIC.

- b The PIC shall:
 - ensure that all work is completed and all workers and equipment are clear
 - prepare a Switching Order to return the equipment to service.

715 Removing personal lockout— equipment not on the one-line diagram

- 1 If the equipment is not ready for service:
 - a The last worker to remove their personal locks shall secure a completed “Attention” tag to each isolating device, and shall return the Personal Lockout Sheet to the PIC. If there is no PIC signed on, the worker shall return the Personal Lockout sheet to the worker who prepared the Personal Lockout or, if not available, to another worker who is authorized to prepare Personal Lockout.
 - b The PIC or other authorized worker who receives the Personal Lockout sheet shall log the equipment status in the station log.
- 2 If the equipment is ready for service:
 - a The last worker to remove their personal locks shall return the Personal Lockout Sheet to the worker who prepared the Personal

Lockout or, if not available, to another worker who is authorized to prepare Personal Lockout.

- b That worker shall ensure all work is completed and all workers and equipment are clear, and then shall return the equipment to service. If the equipment affects the power system, the worker shall inform the person with Operating Responsibility prior to switching.

716 Group lockout—general

- 1 Group Lockout may be used as an alternative to Personal Lockout when a large number of workers require work protection or a large number of isolating devices are required to complete the work safely.
- 2 Under Group Lockout:
 - a An authorized worker shall switch isolating devices, verify the isolation, apply Worker Protection Grounding/Bonding and blocking devices, and place a group lock on each device.
 - b At a later time, a different authorized worker shall visually check each device and place a second group lock on each device.

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- c The keys to the group locks shall be placed in a key box on a Lockout Board, and the key box shall be secured by a seal.
 - d Before going to work, each worker shall place their personal lock on the key box to ensure the equipment remains in a protected state.
- 3 While switching or visually checking an isolation, a worker shall not possess both group lock keys, except during lockout removal at the end of a job.
 - 4 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.
 - 5 No Group Lockout may depend on the isolation provided by another Group Lockout to establish safe work conditions.
 - 6 Where it is not practicable for two workers to independently travel to remote isolating devices, Local Operating Orders may establish alternate procedures for switching and visual checking of

these devices. The independence of the switching and visual checking of these devices must be maintained.

717 Establishing group lockout

- 1 Each work leader requiring a Group Lockout shall provide the following information to the PIC: the work to be done, the equipment to be isolated, and any Worker Protection Grounding/Bonding, blocking, or special isolation requirements.
- 2 The PIC shall do the following:
 - a Identify the hazardous energy sources for the work to be done, determine the necessary isolating devices, and establish the sequence of switching.
 - b Record the isolating, Worker Protection Grounding/Bonding, and blocking devices and their required status on a Group Lockout Sheet.
 - c List the switching, Worker Protection Grounding/Bonding, and blocking steps on a Switching Order in the proper sequence.
 - d Have the Switching Order checked for accuracy and completeness with respect to

the work to be done by a second qualified worker.

- e Issue the Switching Order and a set of group locks to a worker who is authorized to switch.
- 3 The worker performing the switching shall do the following:
- a Complete each switching step in the sequence listed on the Switching Order, verify the isolation, and secure each device in the required position with a group lock.
 - b At the completion of switching, return the completed Switching Order, group lock key, and any remaining locks to the PIC. Discuss with the PIC any Isolating Devices that could not be verified while switching.
 - c Sign the switching order and Group Lockout (GLO) sheet to indicate switching is completed.
- 4 The PIC shall:
- a Place the first group lock key in the key box and secure it with their Personal Lock to control the key.
 - b Update the station log and mimic display.

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- c Mark the appropriate column on the Group Lockout Sheet to indicate any isolating devices that could not be verified at the time of switching.
 - d Issue the Group Lockout Sheet and a second set of group locks to a second authorized worker.
- 5 The worker performing visual checking shall:
- a Check the Group Lockout Sheet against the Switching Order for clerical accuracy.
 - b Visually check that each listed device has been switched to the required position and properly secured with the first group lock.
 - c Apply a lock to each device and initial the Group Lockout Sheet.
 - d Complete and return the Group Lockout Sheet to the PIC with the key to the second set of group locks and any remaining locks.
- 6 The PIC shall:
- a Place the second group lock key in the key box with the first and apply a key box seal.
 - b Record the seal number on the Group Lockout Sheet.

718 Working under group lockout– BC Hydro workers

- 1 Each work leader shall do the following:
 - a Ensure that the Group Lockout is appropriate for the work to be done.
 - b Hold a documented tailboard meeting to ensure all workers assigned to the job understand which energy sources have been controlled and which equipment is in a protected state.
- 2 Each worker shall do the following:
 - a Check that the Lockout Board is the correct one for the work to be done and that the seal number recorded on the Lockout Sheet matches the seal number on the Lockout Board key box.
 - b Attach their personal lock to the scissor clip on the Lockout Board key box and proceed to work. By locking on to the key box, each worker accepts that the work protection is appropriate for the work that they will perform.

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- 3 At the end of each shift, each worker shall remove their personal lock from the Lockout Board key box.

719 Working under group lockout— contractors' workers

- 1 BC Hydro's Representative (or delegate) shall ensure that the contractor's workers have been provided the training required under the terms of the contract, authorized to work at that facility, and assigned the required personal locks. The Contractor's Representative shall be responsible for ensuring that each of the contractor's workers has been adequately trained in BC Hydro's Work Protection Practices.
- 2 BC Hydro's Representative shall ensure that the isolation is appropriate for the work to be done, and shall ensure that the Contractor's Representative (or delegate) understands which energy sources have been isolated and which equipment is in a protected state.
- 3 The Contractor's Representative shall:
 - a Check that the Lockout Board is the correct one for the work to be done and that the Lockout Board key box seal number matches

the seal number recorded on the Lockout Sheet.

- b Hold a documented tailboard meeting to ensure the contractor's workers assigned to the job understand which energy sources have been isolated and which equipment is in a protected state.
- 4 Each contractor's worker shall:
 - a Check that the Lockout Board is the correct one for the work to be done and that the seal number recorded on the Lockout Sheet matches the seal number on the Lockout Board key box.
 - b Attach their personal lock to the scissor clip on the Lockout Board key box and proceed to work. By locking onto the key box, each contractor's worker accepts that the isolation is appropriate for the work they will perform.
 - 5 At the end of each shift, the contractor's workers shall remove their personal locks from the Lockout Board key box.
 - 6 At the completion of the job, the Contractor's Representative shall ensure that all work is completed, all workers and equipment are clear,

and all the contractor's workers have removed their personal locks.

720 Visitor access to equipment protected under group lockout

Each visitor who requires access to, or needs to work on, protected equipment shall place a Visitor Lock on the key box of a Lockout Board that provides work protection for that equipment. Visitors shall remain under the direct and continuous supervision of a host who has signed out the required Visitor Locks. The host shall be authorized to work at the facility and be locked onto the Lockout Board key box.

721 Modifying a group lockout

Note: Modification of a Lockout may require adding devices, removing devices, or a combination of the two. Where a Group Lockout Modification does not involve both adding and removing devices at the same time, the sequence of issuing Switching Orders and Group Lockout Modifications must reflect this. Rules in 716 and 717 Group Lockout must be met. The following process outlines a Group Lockout modification that involves removing and adding devices.

- 1 The Work Leader shall ensure that all workers have removed their personal locks from the Lockout Board key box and then shall inform the PIC of the reasons for the lockout modification and the changes required for work to proceed.
- 2 The PIC shall do the following:
 - a Determine the isolating devices to be removed from and/or added to the lockout.
 - b Prepare a Group Lockout Modification form listing all isolation, Worker Protection Grounding/Bonding, and blocking changes required.
 - c Remove the Group Lockout Sheet from the Lockout Board and the seal from the key box, and apply their personal lock to the key box to control the keys.
 - d List the switching steps for the devices to be added and/or removed from the lockout on a Switching Order form, including any Worker Protection Grounding/Bonding and blocking devices, and have the Switching Order checked for accuracy and completeness, with respect to the work to be done, by a qualified worker.

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- e Issue the Group Lockout Modification form and the Visual Check lock set key to an authorized worker.
- 3 The authorized worker shall:
 - a Remove the Visual Check locks from the isolating devices listed to be removed on the Lockout Modification form.
 - b Return the Group Lockout Modification form, the Visual Check lock set key, and the locks to the PIC.
 - 4 The PIC shall issue the Switching Order and the Switching lock set key to a different worker who is authorized to switch.
 - 5 The worker shall:
 - a Remove the Switching lock from each of the devices to be removed from the lockout.
 - b Switch the devices to be added to or removed from the Group Lockout in the sequence listed on the Switching Order.
 - c Verify the isolation for each device to be added to the Group Lockout and secure each device in the required position with a Switching lock.

- d Return the completed Switching Order, the Switching lock set key, and any remaining locks to the PIC and discuss with the PIC any isolating devices that could not be verified while switching.
 - e Sign the switching order and Group Lockout Modification form to indicate switching is completed.
- 6 The PIC shall:
- a Update the station log and mimic display.
 - b Mark the appropriate column on the Group Lockout Modification form to indicate any isolating devices that could not be verified at the time of switching.
 - c Issue the Group Lockout Modification form and the Visual Check lock set and key to a worker who did not perform the switching.
- 7 The worker shall:
- a Visually check that each of the devices added to the lockout has been switched to the required position and properly secured and locked.

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- b Apply a lock from the Visual Check lock set to each device, and initial the Lockout Modification form.
 - c Return the Visual Check lock set key, any remaining locks, and the completed Group Lockout Modification form to the PIC.
- 8 The PIC shall:
- a Place both keys in the Lockout Board key box, apply a new seal to the key box and record the new seal number on the Group Lockout Modification form.
 - b Post the Group Lockout Modification form in front of the Group Lockout Sheet at the Lockout Board.
- 9 The work leader shall hold a documented tailboard meeting and ensure that all workers assigned to the job understand the modifications to the lockout.
- 10 Workers shall place their personal locks on the Group Lockout Board and proceed with the work.
- 11 No more than two Group Lockout Modification forms shall be attached to a Group Lockout Sheet. If modification to a Group Lockout is

required after two modifications have been completed, the PIC must prepare a new Group Lockout Sheet listing all current isolating devices after the third modification is complete. A new Group Lockout Sheet may be produced after each modification, if desired. The worker performing the Modification Visual Check also checks the new Group Lockout Sheet for clerical accuracy and signs it. Previous Group Lockout Modification forms and Group Lockout Sheets are to be kept by the PIC. New Group Lockout Sheets are to retain the number of the original Group Lockout Sheet together with a suffix indicating the number of the revision.

722 Hazardous testing under group lockout

The following procedure is required only if testing may result in the transmission or release of energy of potential harm to workers not directly engaged in the test activity. If these conditions do not apply, testing may proceed using safe work procedures.

- 1 The work leader shall appoint a test coordinator (authorized Category C or higher worker at that facility), who shall be responsible for coordinating and ensuring the overall safety of all test activities. Each test shall have a test leader (authorized Category B or higher worker),

who shall be present for all testing for which they are responsible and shall ensure that sources of energy do not create a hazard to other workers. If only one test is conducted at one time, the test coordinator may carry out both roles.

- 2 The test coordinator shall place a “Testing in Progress” sign over the Lockout Board key box.
- 3 Worker Protection Grounding/Bonding and Blocking must remain in place except during any actual testing that requires its removal.
- 4 If testing can proceed without modifying the Group Lockout:
 - a The test coordinator shall hold a documented tailboard with all workers working under the Group Lockout, at which the following topics shall be discussed: the test sequence, any additional isolating devices that may require personal locks, specific safety procedures, and location of safe work areas.
 - b The test coordinator shall prepare a Test Notification form for each test and shall post it at the Lockout Board. All additional

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- isolating devices requiring personal locks shall be listed on the Test Notification form.
- c Workers who are not directly involved in the testing but cannot work safely while testing is in progress, shall remove their personal locks from the Lockout Board key box and stay clear of the protected equipment.
 - d Workers not affected by the testing may return to work with the permission of the test coordinator.
- 5 If the Group Lockout must be modified to allow for testing:
- a The test coordinator shall request all workers to remove their personal locks from the Lockout Board key box and to stay clear of the protected equipment.
 - b The Group Lockout isolation shall be modified using the “Modify Isolation” procedure. An “Attention” tag shall be secured to each isolating device removed from the Group Lockout for the purpose of testing, and remain on each device until the completion of the testing.
 - c The test coordinator shall hold a documented tailboard with all workers

working under the Group Lockout, at which the following topics shall be discussed: the changes to the isolation, the test sequence, any additional isolating devices that may require personal locks, specific safety procedures, and location of safe work areas.

- d The test coordinator shall prepare a Test Notification form for each test and shall post it at the Lockout Board
 - e Workers who require access to the protected equipment and are not directly involved in or affected by the testing may place their personal locks on the Lockout Board key box and proceed to work with the permission of the test coordinator.
- 6 The test leader shall place barriers and signs as required to protect all workers from the hazards created by testing.
- 7 Workers directly involved in the testing shall place their personal locks on the Lockout Board key box and also on any additional isolating devices required to establish safe working conditions during testing. Personal locks placed on the additional isolating devices may be removed and the isolating devices operated

under the direction of the test leader (with the permission of the PIC where required).

- 8 At the completion of testing, the test leader shall inform the test coordinator that testing is complete.
- 9 The test coordinator shall:
 - a Ensure all personal locks have been removed from the additional isolating devices and initiate restoration of the isolation, using “Modify Group Lockout” procedure, as required.
 - b Remove the “Testing in Progress” sign and the Test Notification form from the Lockout Board.
- 10 The test coordinator is not required to remain at the specific test location, but must remain within the facility during testing. However, in the test coordinator’s absence, workers who are not already locked on to the Group Lockout cannot lock on, and there can be no change in approved test activity.

If the original test coordinator is not available, the work leader who appointed that test coordinator (or another knowledgeable work leader directed by the facility manager to act as

work leader) may appoint a new test coordinator using the following procedure:

- a The work leader removes the Test Notification(s) from the lockout board and appoints a new test coordinator.
- b The new test coordinator places their name on the “Testing in Progress” sign over the lockout board key box.
- c The new test coordinator discusses the testing in progress with the test leader(s) and prepares a new Test Notification(s).
- d The test coordinator holds a tailboard with all workers to inform them of the change in test coordinator.
- e The work leader advises the original test coordinator upon their return to work.

723 Removing group lockout

- 1 The work leader shall:
 - a Ensure that all workers and equipment are clear and all personal locks have been removed from the Lockout Board key box.
 - b Complete and return the Group Lockout Sheet to the PIC and inform the PIC whether the equipment is ready for service or not.

2 The PIC shall:

- a Break the seal on the Lockout Board key box and remove the keys.
- b Determine the required switching and list the switching steps, including removal of Worker Protection Grounding/Bonding and blocking devices, on a Switching Order. The Switching Order shall be checked for accuracy and completeness by a qualified person.
- c Issue the Switching Order and both group lock set keys to a worker authorized to switch.

3 The worker shall:

- a Remove both group locks from the listed devices and switch the devices as required.
- b Return the Switching Order and both group lock sets and keys to the PIC.

4 The PIC shall:

- a Update the station log and mimic display.
- b Return the equipment to service, as required.

724 In the event of a broken seal

If a Lockout Board key box seal is found broken:

- 1 The PIC shall immediately have all workers stop work, remove their locks, and secure the key box with their personal lock.
- 2 The PIC shall produce a new Group Lockout Sheet identical to the existing Lockout Sheet. The worker performing the visual check shall check the new Group Lockout Sheet against the previous Group Lockout Sheet for clerical accuracy. The PIC shall have all devices and locks for that lockout visually checked by an authorized worker who will enter their initials beside each device checked and sign the form. No modification to the existing Group Lockout is permitted during this process.
- 3 If the visual checker finds no deviation from the existing lockout:
 - a The PIC shall apply a new seal to the key box and record the number of the new seal on the new Group Lockout Sheet.
 - b The Work Leader shall hold a documented tailboard with all workers before they lock on and proceed with work.

- 4 If the visual checker discovers any deviation from the existing Group Lockout, the Group Lockout shall be removed and no work can proceed until the lockout has been reestablished following the requirements in rule 717.

725 Removal of locks

- 1 A personal lock shall be removed only by the worker who installed it, either at the completion of their job (Personal Lockout) or at the end of shift (Group Lockout). If this is not possible, the matter shall be referred to their manager, who shall be responsible for its removal, as described in this rule.
- 2 If a worker is unable or fails to remove a personal lock at the appropriate time, but that failure does not hamper in any way the work of others or the operation of the equipment, the worker shall be reminded, as soon as possible, of the mandatory requirement for lock removal.
- 3 If a worker cannot remove a personal lock (because they do not have the key in their possession, for example, or are off-site and cannot be contacted) and it is necessary to return the associated equipment to service or to modify the isolation, their manager shall first

make every reasonable effort to have the worker remove the lock. If that is not possible, the manager shall use one of the following procedures to remove the lock.

- 4 Where the Senior manager is able to access the Lockout Key Cabinet personally, they shall do the following:
 - a Conduct an inspection of the work area to confirm that the worker is clear and, if no other personal locks remain, that the machinery or equipment can be operated safely.
 - b Prepare a Lock Removal Form.
 - c Contact the Area Manager (or designate) for permission to access the duplicate key stored in the Lockout Key Cabinet.
 - d Remove the duplicate key from the Lockout Key Cabinet and remove the worker's lock(s).
 - e Return the duplicate key to the Lockout Key Cabinet.
 - f If the worker is not present, inform them immediately upon return to work that their personal lock has been removed and they

- must contact the Area Manager (or designate).
- g Return the personal lock to the worker on instruction from the Area Manager (or designate).
 - h Complete the Lock Removal Form and send a copy to Area Manager (or designate).
- 5 Where it is not practicable for the facility manager to access the Lockout Key Cabinet personally, an additional key to the Lockout Key Cabinet may be stored at the facility in a “code access” key box. In this case, the facility manager shall:
- a Direct the work leader at site to inspect the work area as in rule 725.4a and report back.
 - b Prepare a Lock Removal Form.
 - c Contact the Area Manager (or designate) for permission to access the duplicate key.
 - d Provide the key box access code to the work leader, and direct them to:
 - Retrieve the key for the Lockout Key Cabinet from the code access key box
 - Access the duplicate key stored in the Lockout Key Cabinet

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- Remove the lock(s)
 - Return the duplicate key to the Lockout Key Cabinet
 - Return the key for the Lockout Key Cabinet to the code access key box.
- e If the worker is not present, inform them immediately upon return to work that their personal lock has been removed and that they must contact the Area Manager (or designate).
- f Return the personal lock to the worker on instruction from the Area Manager (or designate).
- g Complete the Lock Removal Form and send a copy to Area Manager (or designate).

Note: The facility manager shall arrange to have the access code to the key box changed as soon as practicable after this requirement is carried out.

726 Attention tags for unusual conditions

- 1 Attention Tags:
 - a Attention tags shall be used to advise workers of a condition that might lead to a service interruption, create an unusual

situation, or require a special operating procedure. This is an information tag only.

- b The Attention tag shall include either a description of the condition or a reference to where that information is recorded.
- c Paper Attention tags shall be destroyed after use.

Minimum crew complement, supervision, and safety watcher requirements

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|-----|--|-----|
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800 Safe crew complement principles

The following principles are to be applied in planning and performing work:

- 1 There shall be enough qualified workers on site to safely perform the assigned work.
- 2 Workers shall only be assigned to, and carry out work for which they are qualified and authorized to perform.
- 3 Viable rescue will be in place for all high hazard work.

801 One worker—work that can be performed and conditions

Conditions:

- a The work does not require two or more workers as per applicable rules and regulations.
- b A worker check, including a rescue plan, must be implemented prior to working in a potentially hazardous situation or traveling in a remote area where immediate assistance cannot be secured. For further details, refer to **Worker Check Requirements for Work Approved Under SPR 801.**

Work:

- 1 Operate a chainsaw in an emergency situation only and for a short duration provided:
 - The worker is qualified in the operation of a chainsaw.
 - The worker is wearing appropriate personal protective equipment. For further details, refer to OSH Standard 208.
- 2 Line patrols may be performed provided they are drive, stop, and inspect line patrols.
- 3 Battery routine maintenance visual inspections, voltage readings, specific gravity checks and topping up of batteries with distilled water.
- 4 The following tasks are permitted to be performed by one qualified electrical journeyman provided they get no closer than the Qualified Electrical Worker Limits of Approach:

Tasks a, b, c and d shall be performed from an aerial lift or from the ground:

- a Change fuses, operate disconnect switches, apply or remove stick mounted ammeters, and **approved change of state signage.**

- b With a live line permit in place and for the sole purpose of restoring service, manageable objects (e.g. tree limbs or kites) may be removed from de-energized overhead conductors.
- c Apply or remove worker Protection Grounding/Bonding leads on electrical equipment that is not subject to hazardous induction.

Hazardous induction is an induced voltage on equipment or a conductor that could produce a fatal outcome if a worker were to get in series with this voltage.

- d Work on low voltage (less than 750 volts AC) energized or de-energized conductors or equipment. Appropriate barriers, e.g. rubber gloves, must be in place for work on energized low voltage conductors. For further details, refer to SPR 419.1, **SPR 426** and OSH Standard 602.

Tasks e and f shall be performed from an aerial lift only:

- e Use a stick mounted measuring device to assess wire gauge or the proper application of a compression splice.

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- f Apply or remove hot taps that connect single phase lines or a single phase distribution transformer to:
- Single phase copper or three phase wye connected copper conductors.
 - Stirrups that are on a single phase or three phase wye connected lines.

Note: Applying and leaving a hot tap connected directly to aluminum conductor is prohibited.

802 Two workers—work that can be performed

- 1 Line patrols while driving, provided the passenger does the line inspection.
- 2 The following tasks require a second worker qualified and equipped to render or request emergency assistance.
 - a Work from an unsecured ladder at a height greater than 3 metres (10 feet). For further details, refer to OSH Standard 609.
 - b Non-routine work and routine corrective maintenance on batteries (including Cellcorder readings). For further details, refer to OSH Standard 317.

- 3 The following tasks require a second worker qualified to perform a viable rescue.

Viable rescue requires the second worker on site be qualified in and equipped to perform the applicable rescue method, including the ability to assess workplace hazards that could pose a risk to rescuers. This worker can attend to various duties at the work site provided they stay out of potential immediate harm presented by work area hazards and they remain on site and in direct communication with the other worker(s).

- a Work from a pole at a height greater than 3 metres (10 feet) the second worker must be qualified to perform pole top rescue.
- b Work from a tower or lattice structure at a height greater than 3 metres (10 feet) the second worker must be qualified to perform tower rescue.
- c Work over water, where workers could fall and drown, and the work area is not protected by guardrails or other means of fall protection. A sufficient number of trained worker(s) must be available to

perform rescue. For further details, refer to WorkSafeBC OSH Regulation 32.9.

- d When work on communications equipment is high risk or is being performed in a hazardous location.
- 4 The following tasks require a minimum of two qualified electrical journeymen on site. The second qualified electrical journeyman shall be qualified and available to perform a viable rescue.
- a All work on exposed energized high voltage (750 volts or greater) conductors or equipment where the work is performed from the ground, other than the tasks set out for one worker.
 - b Work on high voltage cables.
 - c Work on an underground electrical system. This includes operating elbows, exposed switching devices, and applying or removing Worker Protection Grounding/Bonding.
 - d Applying or removing Worker Protection Grounding/Bonding on conductors or equipment that is subject to hazardous induction.

- The qualified electrical journeyman shall be authorized to a minimum of PSSP Category 5, or WPP Category C with Switching Authorization.

803 Three workers—work that can be performed

- 1 A crew complement of 3, including the crane operator, is the minimum acceptable for movement of gates and stoplogs by grappling beam.
- 2 The following tasks require a minimum of two qualified electrical journeymen and a third worker on site. The third worker shall be qualified and available to perform a viable rescue.
 - a All work on exposed energized high voltage conductors or equipment from an aerial lift or structure. Exceptions to this rule are set out in rule 801 and rule 802.
 - b Removal of hot taps from aluminum conductors where no stirrup exists. The following condition applies to this task:
 - A Live Line Permit is required.

-
- c Installation or removal of approved bolt-on stirrups.
 - A Live Line Permit is not mandatory for this work on conductors #2 or larger.
 - d Live line pole setting. For this work the third worker will be a:
 - Qualified electrical journeyman,
 - or a Machine Operator 1 (MO1),
 - or an Apprentice Power Line Technician (PLT) with Level 2 Industry Training Authority (ITA) who is acceptable to the Crew Lead.
- 3 The following tasks require a minimum of three qualified electrical journeymen on site.
- a Work on 138 kV to 500 kV energized conductor or equipment where work will be performed up to the Restricted Work Limits of Approach (table 403).
 - This work is permitted only for planned short duration tasks.
 - Work on 138 kV to 500 kV energized conductor or equipment involving fewer than three qualified electrical journeymen is permitted only when

-
- an approved work procedure is being used.
- BC Hydro procedures for this purpose must be signed off by the Senior Vice-President, Safety.
- b All rubber glove line work from 4 kV to 25 kV. The three qualified electrical journeypersons must be trained in rubber glove procedures.
- Two of the qualified electrical journeypersons shall perform the work from an approved insulated aerial lift equipped with approved bucket liners.
 - The third qualified electrical journeyperson shall be confined to observing and other ground-related duties at the job site directly associated with the work in the aerial lift.
- 4 When three qualified electrical journeypersons are needed to perform a task on the same pole or structure using aerial lift equipment, either of the following arrangements shall be used, provided it does not impede rescue procedures:
- Two qualified electrical journeypersons in the aerial lift bucket and one qualified electrical

journey person on the pole, structure or second aerial lift bucket.

- or Two qualified electrical journey persons on the pole or structure and one qualified electrical journey person in the aerial lift bucket.

804 Supervision—work requiring direct and continuous supervision

When the following tasks are performed by workers other than qualified electrical journey persons, they must be performed under the direct and continuous supervision of a qualified electrical journey person:

- a The use of tower ladders for work on metal transmission and station structures.
- b The use of metal ladders in designated Extra High Voltage (EHV) Station areas.
- c The erection of or dismantling of metal scaffolding in a station closer than Unqualified Worker Limits of Approach (table 4O1) to energized conductors or electrical equipment.

805 Safety watcher—work requiring a dedicated safety watcher

- 1 If the worker in charge of the job considers the work or the location to be hazardous, he or she shall appoint a qualified worker to perform the job of safety watcher.

The safety watcher must:

- Be knowledgeable of the task (or work to be performed) and the hazards involved.
 - And give full attention to this duty from a position outside of the immediate work area and in sight line of the actual work so that emerging hazards can be quickly identified and effectively communicated.
- 2 The worker in charge shall properly identify safety watcher(s) to all workers on the job.
 - 3 A safety watcher has the authority and duty to immediately stop any work that he or she considers hazardous.
 - 4 The following tasks require a qualified electrical journeyman to perform the job of safety watcher.

-
- a Moving metal scaffolding in a station near energized conductors or electrical equipment.
 - b Using a jack hammer to cut windows into a vault or manhole that contains energized high voltage cables.
 - c Breaking the concrete encasing surrounding a duct bank that contains high voltage cables.
 - d Work on 138 kV to 500 kV energized conductor or equipment where work will be performed up to the Restricted Work Limits of Approach (table 4O3).
 - e Barehand work. The safety watcher shall be qualified in barehand work methods.

Notes:

Appendices

| | |
|---|-----|
| A: Hand signals | 204 |
| B: Tag out—forms and tags | 209 |
| C: PSSP categories and authorizations | 217 |
| D: Lockout—forms and tags | 218 |
| E: WPP categories and authorizations | 227 |
| F: Index of OSH Standards | 228 |

A: Hand signals

Hand signals for line work



Hand closed,
thumb up.
Take up



Hand closed,
thumb down.
Lower



Hand open.
Stop

These signals are to be used only when the signalperson is within 50 feet of the truck operator.



Pull up wire



Stop



Slack back signal



All off signal



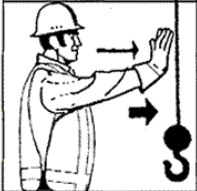







Cut loose signal

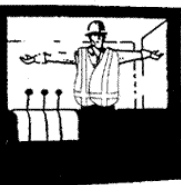



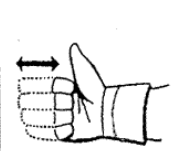
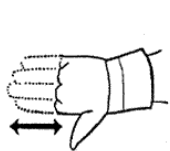
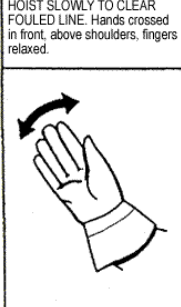

Hand signals for crawler, locomotive, and truck cranes

| | | |
|--|---|---|
| | | |
| <p>HOIST. With forearm vertical, forefinger pointing up, move hand in small horizontal circles.</p> | <p>LOWER. With arm extended downward, forefinger pointing down, move hand in small horizontal circles.</p> | <p>USE MAIN HOIST. Tap fist on head; then use regular signals.</p> |
| | | |
| <p>USE WHIPLINE. (Auxiliary Hoist). Tap elbow with one hand; then use regular signals.</p> | <p>RAISE BOOM. Arm extended, fingers closed, thumb pointing upward.</p> | <p>LOWER BOOM. Arm extended, fingers closed, thumb pointing downward.</p> |
| | | |
| <p>MOVE SLOWLY. Use one hand to give any motion signal and place other hand motionless in front of hand giving the motion signal. (Hoist slowly shown as example.)</p> | <p>RAISE THE BOOM AND LOWER THE LOAD. Arm extended, fingers closed, thumb pointing upward, other arm bent slightly with forefinger pointing down and rotate hand in horizontal circles.</p> | <p>LOWER THE BOOM AND RAISE THE LOAD. Arm extended, fingers closed, thumb pointing downward, other arm with forearm vertical, forefinger pointing upward and rotate hand in horizontal circles.</p> |

Hand signals for crawler, locomotive, and truck cranes (cont'd)

| | | |
|---|---|--|
|  |  | |
| <p>SWING. Arm extended, point with finger in direction of swing of boom.</p> | <p>STOP. Both arms outstretched at the sides horizontally, fingers outstretched.</p> | |
|  |  |  |
| <p>TRAVEL. Arm extended forward hand open and slightly raised, make pushing motion in direction of travel.</p> | <p>DOG EVERYTHING. Clasp hands in front of body.</p> | <p>TRAVEL (Both Tracks). Use both fists in front of body, making a circular motion about each other, indicating direction of travel; forward or backward. (For crawler cranes only.)</p> |
|  |  |  |
| <p>TRAVEL (One Track). Lock the track on side indicated by raised fist. Travel opposite track in direction indicated by circular motion of other fist rotated vertically in front of body. (For crawler cranes only.)</p> | <p>EXTEND BOOM. (Telescoping Booms). Both fists in front of body with thumbs pointing outward. One hand signal may be used.</p> | <p>RETRACT BOOM. (Telescoping Booms). Both fists in front of body with thumbs pointing toward each other. One hand signal may be used.</p> |

Hand signals for crawler, locomotive, and truck cranes (cont'd)

| | | |
|---|--|--|
|  <p>MAGNET IS DISCONNECTED. Crane operator spreads both hands apart – palms up.</p> |  <p>OPEN CLAM SHELL BUCKET. Arm extended, palm down, open hand.</p> |  <p>CLOSE CLAM SHELL BUCKET. Arm extended, palm down, close hand.</p> |
|  <p>HOIST SLOWLY TO CLEAR FOULED LINE. Hands crossed in front, above shoulders, fingers relaxed.</p> |  <p>BOOM UP AND LOWER THE LOAD. One hand.</p> |  <p>BOOM DOWN AND RAISE THE LOAD. One hand.</p> |
|  <p>STOP. One hand.</p> |  <p>WHIP LINE. One hand.</p> | |


Hand signals for overhead and gantry cranes.

| | | |
|---|--|--|
| | | |
| <p>HOIST. With forearm vertical, forefinger pointing up, move hand in small horizontal circles.</p> | <p>LOWER. With arm extended downward, forefinger pointing down, move hand in small horizontal circles.</p> | <p>BRIDGE TRAVEL. Arm extended forward, hand open and slightly raised, make pushing motion in direction of travel.</p> |
| | | |
| <p>TROLLEY TRAVEL. Palm up, fingers closed, thumb pointing in direction of motion, jerk hand horizontally.</p> | <p>STOP. Both arms outstretched at the sides horizontally, fingers outstretched.</p> | |
| | | |
| <p>MULTIPLE TROLLEYS. Hold up one finger for block marked "1" and two fingers for block marked "2". Regular signals follow.</p> | <p>MOVE SLOWLY. Use one hand to give any motion signal and place other hand motionless in front of hand giving the motion signal. (Hoist slowly shown as example.)</p> | <p>MAGNET IS DISCONNECTED. Crane operator spreads both hands apart -- palms up.</p> |

B: Tag out—forms and tags

Tag out—Safety Protection Form—Duplicate copy form used by the Operating Authority, with a copy for the receiver.

10138—Nov15

 **BC Hydro**

Station or circuit: _____ Issued to: _____ (Print name) No.: 008358

Safety Protection Form

Clearance Guarantee of Isolation
 Test and Work Transfer Operating Authority

For work on: _____

Purpose: _____

Isolation points: _____

| | | | |
|--|--|--|--|
| Other Permit No's with common isolating pts. | | | |
|--|--|--|--|

Issued by: _____ Auth.: _____ Time: _____ Date: _____
SIGNATURE

Received by: _____ Time: _____ Date: _____
SIGNATURE

Returned by: _____ Time: _____ Date: _____
SIGNATURE

Returned to: _____ Time: _____ Date: _____


Worker Protection Grounding/Bonding and/or Blocking Clear? Yes No Ready for Service? Yes No

| | Protection extended to | Time | Date | Returned by | Time | Date | Worker Protection Grounding/Bonding and/or Blocking Clear? |
|----|------------------------|-------|-------|-------------|-------|-------|--|
| 1. | _____ | _____ | _____ | _____ | _____ | _____ | <input type="checkbox"/> |
| 2. | _____ | _____ | _____ | _____ | _____ | _____ | <input type="checkbox"/> |
| 3. | _____ | _____ | _____ | _____ | _____ | _____ | <input type="checkbox"/> |
| 4. | _____ | _____ | _____ | _____ | _____ | _____ | <input type="checkbox"/> |
| 5. | _____ | _____ | _____ | _____ | _____ | _____ | <input type="checkbox"/> |
| 6. | _____ | _____ | _____ | _____ | _____ | _____ | <input type="checkbox"/> |

10138—Nov15

Tag out—Safety Protection Record Form—

Single copy form used by the receiver.



10131-1-Nov15

| | | |
|---------------------------|---|-----------|
| STATION OR CIRCUIT: _____ | ISSUED TO: _____ <small>(PRINT NAME)</small> | NO: _____ |
|---------------------------|---|-----------|

SAFETY PROTECTION RECORD FORM

CLEARANCE GUARANTEE OF ISOLATION
 TEST AND WORK TRANSFER OPERATING AUTHORITY

FOR WORK ON: _____

PURPOSE: _____

ISOLATION POINTS: _____

ISSUED BY: _____ AUTH.: _____ TIME: _____ DATE: _____
SIGNATURE

RECEIVED BY: _____ TIME: _____ DATE: _____
SIGNATURE

RETURNED BY: _____ TIME: _____ DATE: _____
SIGNATURE

RETURNED TO: _____ TIME: _____ DATE: _____

WORKER PROTECTION GROUNDING/BONDING AND/OR BLOCKING CLEAR? YES NO READY FOR SERVICE? YES NO

| PROTECTION EXTENDED TO | TIME | DATE | RETURNED BY | TIME | DATE | |
|------------------------|-------|-------|-------------|-------|-------|--------------------------|
| 1. _____ | _____ | _____ | _____ | _____ | _____ | <input type="checkbox"/> |
| 2. _____ | _____ | _____ | _____ | _____ | _____ | <input type="checkbox"/> |
| 3. _____ | _____ | _____ | _____ | _____ | _____ | <input type="checkbox"/> |
| 4. _____ | _____ | _____ | _____ | _____ | _____ | <input type="checkbox"/> |
| 5. _____ | _____ | _____ | _____ | _____ | _____ | <input type="checkbox"/> |
| 6. _____ | _____ | _____ | _____ | _____ | _____ | <input type="checkbox"/> |

WORKER PROTECTION GROUNDING/BONDING AND/OR BLOCKING CLEAR?

Appx

10131-1-Nov15

Tag out—Safety Protection Card—

Form used by the Operating Authority in control rooms.

| | | |
|--|--|---|
|  | | |
| Station or circuit: | Issued to: _____ <small>(PRINT NAME)</small> | No: 204600 |
| Safety Protection Card | | |
| <input type="checkbox"/> Clearance <input type="checkbox"/> Guarantee of Isolation <input type="checkbox"/> Test and Work <input type="checkbox"/> Transfer Operating Authority | | |
| For work on: _____ | | |
| Purpose: _____ | | |
| Isolation points: _____ | | |
| _____ | | |
| _____ | | |
| _____ | | |
| _____ | | |
| <input type="checkbox"/> See reverse side | | |
| Other Permit No's with common isolating pts. | _____ | _____ |
| Issued by: _____ | Time: _____ | Date: _____ |
| Returned by: _____ | Time: _____ | Date: _____ |
| Returned to: _____ | Time: _____ | Date: _____ |
| Worker Protection Grounding/Bonding and/or Blocking Clear? <input type="checkbox"/> Yes <input type="checkbox"/> No | Station Risers Installed? <input type="checkbox"/> Yes <input type="checkbox"/> No | Phasing Req? <input type="checkbox"/> Yes <input type="checkbox"/> No |
| Ready for Service? <input type="checkbox"/> Yes <input type="checkbox"/> No | | |
| 10139—Mar16 | | |

10139 safety prot card_Mar2016

Tag out–Switching Order Form–Duplicate copy form used by the Operating Authority, with a copy for the receiver.



Switching Order No. 337841 No. _____
(When Issuing) (When Issuing)

| | | |
|------------|-------------------------------------|--------------|
| Issued To | Receiving Location | Date |
| Issued By | Time | |
| Purpose | | |
| No. | PIC INSTRUCTIONS | NOTES |
| | <input checked="" type="checkbox"/> | |
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Completed By _____ Time _____
(Signature)

10114–Jan16

Tag out–Customer Isolation Form

CUSTOMER ISOLATION FORM

This isolation from the BC Hydro Electrical System is done at the request of the customer.

The Customer's Representative understands that the WorkSafeBC Occupational Health and Safety Regulation governs any work performed by the customer and it is the customer's responsibility to test for voltage and apply Worker Protection Grounding/Bonding.

This service will not be reconnected without the original customer representative on site to confirm to BC Hydro that the grounds are removed and service is ready to be energized.

The customer's electrical system is isolated from BC Hydro's electrical system and tagged "Customer Isolation".

| CUSTOMER REPRESENTATIVE | |
|-------------------------|----------|
| Print Name: | Company: |
| Work Location: | Phone: |
| Isolation Point: | |

| ISOLATION | | |
|--|--------|-------|
| Isolated by BC Hydro Representative: | | |
| Signature: | Time: | Date: |
| Acknowledged by Customer Representative: | | |
| Signature: | Time: | Date: |
| BC Hydro Representative: | | |
| Print Name: | Phone: | |
| Email: | | |

| RECONNECTION | | |
|---|-------|-------|
| I confirm that all workers are clear, customer Worker Protection Grounding/Bonding has been removed and the equipment is ready to be energized. | | |
| Confirmed by Customer Representative: | | |
| Signature: | Time: | Date: |
| Energized by BC Hydro Representative: | | |
| Signature: | Time: | Date: |

THIS FORM TO BE RETURNED TO BC HYDRO IMMEDIATELY
PRIOR TO RECONNECTION.

 **BC Hydro**
Power smart

10147-Nov15

10147–Nov15

Tag out—Tags ordering information

| Type of tag | BC Hydro form number | | | |
|-----------------------------------|----------------------|------------|------------|---------------|
| | 10cm x 20cm board | 8cm x 15cm | 5cm x 10cm | 1.5cm x 6.5cm |
| Clearance | 10207 | | 10206 | 10213 |
| Test & Work Permit | 10205 | | 10204 | 10212 |
| Self Protection | 10209 | | 10208 | 10188 |
| Customer Isolation | 10209-1 | | | |
| Guarantee of Isolation | 10196 | | | 10199 |
| Guarantee of No Reclose | | | | 10259 |
| Grounded | | | | 10221 |
| Reclose Off | 10239 | 10238 | 10237 | 10241 |
| Live Line Permit | | | | 10228 |
| Assurance of No Reclose Permit | | | | 10256 |
| Caution | 10201-1 | 10201 | 10210 | 10222 |
| Grounding/ Blocking Protection | 10261 | | 10262 | 10263 |
| Line Cut | | | | 10253 |

Tag out–Tags

5 cm x 10 cm Tags

8 cm x 15 cm Tags

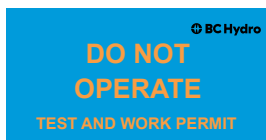
10 cm x 20 cm Boards



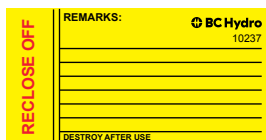
10206 10207



10196 10199



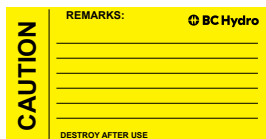
10204 10205



10237 10238 10239



10208 10209



10201 10201-1 10210

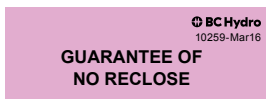
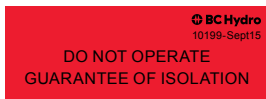
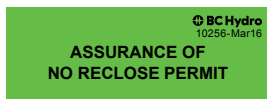
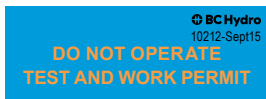


10209-1



10261 10262

1.5 cm x 6.5 cm Tags



Appx

C: PSSP categories and authorizations

| Category | Authorizations |
|----------|--|
| 1 | 1A. Customer below 60 kV without customer infeeds. 1B. Customer with 60 kV and above or customer connections below 60 kV with customer infeeds. |
| 2 | Access the Power System. |
| 3 | Work on the Power System. Receive Protection Extension. |
| 4 | Certified Utility Arborist. |
| 5 | Receive Safety Protection Guarantees and Live Line Permits. Apply Self Protection. |
| 6 | PIC: Issue Safety Protection Guarantees and Live Line Permits |

Note: To perform switching of level 1 to 4 equipment on the power system requires separate training and authorization, in addition to category 5 or 6.

D: Lockout—forms and tags

Attention Tag



A yellow attention tag with a circular hole at the top. It features a black rounded rectangle with the word "ATTENTION" in white. Below this are three white rectangular input fields for "Device designation:", "Applied by:", and "Date:". At the bottom left is the BC Hydro logo and the text "SEE OTHER SIDE".

ATTENTION

Device designation:

Applied by:

Date:

BC Hydro

SEE OTHER SIDE



The back side of a yellow attention tag with a circular hole at the top. It features a black rounded rectangle with the word "ATTENTION" in white. Below this is a "Reason:" label followed by a large white rectangular area with horizontal lines for writing. At the bottom left, there is a small reference code "L002-20-Nov15".

ATTENTION

Reason:

L002-20-Nov15

Lockout: Group Lockout Sheet



Group Lockout Sheet

| | |
|--------------------------|----|
| G.L.O Sheet #: | |
| Switching Order #: | |
| Switching Lock Set #: | |
| Visual Check Lock Set #: | |
| Page | of |

| | |
|--------------|--|
| For work on: | |
| Purpose: | |

| No. | Device designation | Device description | Device status | Visual checked by | * |
|-----|--------------------|--------------------|---------------|-------------------|---|
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* - 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 ____

LGO2-13-JUL16

LGO2-13-Jul16

Lockout: Group Lockout Modification



Group Lockout Modification

| | |
|--------------------------|-------------------------|
| G.L.O. Sheet #: | _____ |
| Modification #: | 1 _____ 2 _____ 3 _____ |
| For Work On: | _____ |
| Switching Order #: | _____ |
| Switching Lock Set #: | _____ |
| Visual Check Lock Set #: | _____ |
| Page: | _____ |

Reason for modification: _____

Isolating Devices Removed From Lockout Sheet

| No. | Device designation | Device description | Visual Check lock removed by |
|-----|--------------------|--------------------|------------------------------|
| | | | |
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Visual check locks removed by: _____ Signature: _____ Date: _____ Time: _____

Isolating Devices Added to Lockout Sheet

| No. | Device designation | Device description | Device status | Visually checked by | * |
|-----|--------------------|--------------------|---------------|---------------------|---|
| | | | | | |
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* – 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: _____

LGO2-12-Jul16

LGO2-12-Jul16

Lockout: Lock Removal

Lock Removal Form

Date: Personal lock number: Personal lock registered to: Lock Location: Name of Facility Manager:

Note: Every reasonable effort must be made to contact worker and have them come in and remove their own personal lock.
Comments:

Note: Entire work area must be thoroughly inspected to ensure all workers and work equipment clear and machinery ready for service.
Comments:

Work area inspected by: Area Manager (or delegate) contacted: Time contacted: Time lock removed: Lock removed by:

Note: Worker must be informed immediately upon return to work that his/her personal lock has been removed.

Signature of Facility Manager: _____

Signature of worker: _____ Date: _____

LGO2-16-Jul16


BC Hydro
 Power smart

LGO2-16-Jul16

Lockout: Isolation Request

Isolation Request Form

Work Order #:

Type of Isolation: Personal lockout Group lockout

Equipment to be isolated:

Grounding and blocking required:

Work to be done:


Special isolation required:

Date of request: Time of request:

Date required: Time required:

Originator: _____

Approved: _____

 **BC Hydro**
Power smart

LGO2-15-Jul16

LGO2-15-Jul16

Lockout: Test Notification

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: _____

LGO2-14-Jul16

 **BC Hydro**
Power smart

LGO2-14-Jul16

Lockout: Testing in progress

**Testing in progress.
Do not lock on without
permission from the
test coordinator**

Test Coordinator

LGO2-54-Aug16
To laminate

 **BC Hydro**

LGO2-54 TestingInProgress

E: WPP categories and authorizations

| Category | Authorizations |
|----------|--|
| 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. |

Note: To perform switching of equipment on the one-line diagram requires separate training and authorization, in addition to category C or D.

F: Index of OSH Standards

This appendix lists the BC Hydro Occupational Safety and Health (OSH) Standards that are currently available in SafeHub.

100 Safety Administration

OSH 110 Hazard Identification and Risk Assessment

OSH 111 Annual Safety Planning

OSH 122 Job Planning

OSH 123 Joint Health and Safety Committees

OSH 130 Safety Incident Management and Investigation

200 Safety Engineering

OSH 201 Worker Qualifications for Limits of Approach Authorization

OSH 203 Welding, Cutting and Hot Tapping

OSH 204 Personal Lockout

OSH 208 Chainsaws and Portable Power Tools

OSH 209 Isolation of Mechanical Apparatus

OSH 212 Safety Handling of Oils, Liquids, and Compressed Gases

OSH 214 Electrical Measuring Instruments

OSH 216 Underwater Diving at BC Hydro Facilities

OSH 217 Work Near Interprovincial and
International Pipelines

300 Occupational Hygiene

OSH 301 WHMIS 2015 and Hazardous Materials

OSH 302 Safety During Spill Response

OSH 304 Polychlorinated Biphenyls (PCBs)

OSH 307 Drinking Water

OSH 310 Selection and Use of Solvents

OSH 317 Battery Safety

400 Transportation Safety

OSH 401 Motor Vehicle Safety

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500 Fire and Emergency Preparedness

OSH 501 Fire and Safety Plans for Buildings

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OSH 503 Earthquakes—Evaluation of Non-
Structural Hazards in the Workplace

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OSH 505 Fire Protection Program

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600 Safety Equipment

OSH 602 Insulated Tools and Equipment

OSH 603 Work Area Barriers

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700 Public Safety

OSH 701 Public Safety

OSH 706 WorkSafeBC Form 30M33 Assurance in Writing

800 Other Safety Topics

OSH 802 Protection of Workers from Violence

OSH 803 Working Safely in Wildlife Habitats

OSH 804 Personal Injury Insurance for External Parties (including Volunteers) Working for BC Hydro

OSH 805 Safety and Health for Travel Outside
Canada

OSH 806 Safety Orientation and Training for New/
Young Workers

OSH 807 Prohibition of Smoking in the Workplace

Notes:

Glossary

COMMON DEFINITIONS

The definitions in this section of the glossary apply to all of the Safety Practice Regulations. Terms that apply only to Section 700, Lockout, are listed in the next section of this glossary.

Aerial lift:

Equipment (such as extending towers, boom-mounted buckets, cages, or baskets, and truck-mounted ladders) primarily designed to place workers and their materials and tools in a position to work on elevated structures and equipment. An insulated aerial lift has sections of the lifting booms fabricated of fiberglass-reinforced plastic materials specifically constructed and tested to provide electrical isolation of the basket and boom tip from ground or energized electrical conductors and equipment.

Note: A bucket shall not be considered an insulating device.

Approved:

Having approval of the Senior Vice-President, Safety.

Authorized:

Having been approved for specific access to or work on the power system or associated equipment by an authorized manager, identified in a local operating order, in accordance with PSSP or WPP.

Blocking:

Physically securing mechanical equipment against inadvertent movement, or maintaining a physical opening in the case of electrical installations.

Bond:

A lead, associated with Worker Protection Grounding/Bonding, used to achieve equipotential conditions between phases, across an opening of a conductor, or around a worker.

Conductor:

Wire, cable, bus, or other conductive component installed for the purpose of conveying electrical current from one piece of equipment to another or to ground. See also “line.”

Construction project:

A line, station, or other type of plant being constructed or reconstructed, or equipment being installed, reinstalled, or removed.

Customer infeed:

Any customer-owned power supply that is not equipped with a CSA approved transfer switch or with CSA approved key interlock switches that are designed to ensure that the supply cannot feed into the power system.

De-energized:

The normal source(s) of hazardous energy have been removed.

Direct and continuous supervision:

”Direct and continuous supervision” and “continuously directed” are both defined as being within direct sight and being able to hear the verbal communication of the supervising qualified worker at all times.

The qualified electrical journeyman performing this role need to be continuously supervising the work perform for the full duration of the task to ensure that:

- The work is conducted safely and in the prescribed manner;
- Effective communication is in place to intervene in a timely and effective manner if needed; and,
- A viable rescue can be performed for all high hazard work if and when needed.

Drainer:

A conductor used for the purpose of reducing a residual charge or induced static charge from a piece of equipment: it is not a substitute for a ground, nor is it necessarily capable of carrying available fault current.

Duct bank:

A structure that consists of conduits (ducts) encased in concrete, which is used for routing buried power cables.

Electrical worker:

WorkSafeBC Occupational Health and Safety Regulation Electrical Safety Part 19—Definitions—means a person who meets the requirements of the Electrical Safety Regulation for installing, altering or maintaining electrical equipment.

Employer:

A person having in their service a person engaged in work in or about an industry (under a contract of hiring or apprenticeship, written or oral, express or implied).

Energized:

See “Hazardous Energy.”

Equipment:

- 1 Electrical or mechanical machinery and equipment that is part of the generation, transmission, or distribution system. Electrical equipment includes electrical cables, machines, fuses, switches, bus bars, transformers, etc. Mechanical equipment includes machinery that can be placed in motion, in whole or in part, by automatic, remote, or direct means. It also refers to:
 - pipes, conduits, tanks, or pressure units that act as conductors of steam, volatile liquid, oil, or gas, including compressed air or water
 - large storage tanks or other sealable areas
- 2 Items such as vehicles and tools used by workers to perform their jobs.

Floating:

Isolated and ungrounded. This term also applies to a cable conductor that has been isolated and grounded to discharge potential and then has all grounds removed.

Grounded:

Electrical equipment on the Power System that has been isolated and worker Protection Grounding/ Bonding applied

Guarantee of isolation (GOI):

A means of effecting guaranteed isolation between different Operating Authorities.

Guarantee of no reclose:

A stated and duly logged guarantee between the PICs of different Operating Authorities that a specified conductor or equipment shall not be reclosed manually or automatically until the PIC who has received the guarantee authorizes reclosing.

Hazardous energy:

Any electrical, mechanical, hydraulic, pneumatic, chemical, or thermal energy, or force such as gravity that could potentially harm workers.

Hazardous induction:

Hazardous induction is an induced voltage on equipment or a conductor that could produce a fatal outcome if a worker were to get in series with this voltage.

High hazard work**(also known as hazardous work):**

Work is considered high hazard (or hazardous) if the uncontrolled release of hazardous energy associated with the work being performed has the potential to cause death or permanent disability.

High voltage:

An alternating or direct current potential of 751 volts or more between conductors or between conductors and ground.

Isolated:

For electrical equipment, the normal sources of hazardous energy have been disconnected by opening and securing all associated switches or by making a line or bus cut. For mechanical equipment, the equipment has been rendered and secured non-operative by installing a blank in a pipe line, closing a valve, depressurizing, draining, venting, or other effective means.

Isolating device:

A device that physically prevents the transmission or release of hazardous energy to equipment, such as a switch, line or bus cut, fuse, or valve.

Line:

An electrical conductor in the transmission and distribution systems.

Live:

Synonym for “energized.” See “Hazardous Energy.”

Live line:

Related to work on energized, high-voltage electrical conductors or equipment. Used in such phrases as “live line tools,” “live line methods,” and “live line work.”

Live line pole—setting:

Pole setting is considered live line pole setting whenever:

- 1 Poles are set closer than Unqualified Worker Limits of Approach (table 4O1), or
- 2 When additional precautions are necessary to control the movement of the pole at Unqualified Worker Limits of Approach (table 4O1), or

beyond (i.e. Setting between phases on transmission voltages).

Low voltage:

An alternating or direct current potential less than 751 volts between conductors or between conductors and ground.

Mimic display:

A representation of the configuration and status of an assigned portion of the power system, complete with device designations.

On-site:

A worker is “On Site” if they are assigned to the job and have both a means of direct communication with the workers assigned to the job, and are physically able to respond to their assigned tasks within the site including performing viable rescue.

Operating authority:

The right to control, as delegated by the hierarchical control arrangement, an assigned portion of the power system to: establish the conditions required for Safety Protection Guarantees, Live Line Permits and Assurance of No Reclose Permits; to issue such Guarantees and Permits; and to establish work protection.

Operating one-line diagram:

An electrical schematic diagram that displays high-voltage equipment and displays or lists the isolating devices for primary sources of energy.

Operating responsibility:

The responsibility for the operation and reliability of an assigned portion of the power system, as delegated by the hierarchical control arrangement

PIC (person in charge):

The worker who has been assigned both Operating Responsibility and Operating Authority for a portion of the power system. On a construction project, this worker is referred to as the Project Controller (refer to rule 502).

Power system:

All generating stations, high-voltage circuits, substations, transformers, reactive equipment, distribution circuits, and other equipment used in the production, transmission, and distribution of electrical energy. The power system can include equipment under construction.

Power System Safety Protection (PSSP):

The constraints that must be applied to the power system (excluding generating stations) to provide

worker protection from power system hazards during prescribed work. See also Work Protection Practices.

Qualified:

Accepted as satisfactory in reference to experience, training, education, personal competency, physical ability, and familiarity with rules, procedures, equipment, and dangers involved in the work and/or operation.

Qualified electrical journey person (worker):

See OSH Standard 201 (4.1) for full context—Only experienced electrical utility trades or technical workers who have achieved and maintained their qualifications may be designated as Qualified Electrical Workers. OSH Standard 201 covers Safety Watchers, Apprentices in further detail.

Qualified person (confined space):

Section 9.11(1) of the WorkSafeBC OHS Regulation requires a hazard assessment and written confined space entry procedures be prepared by a “qualified person who has adequate training and experience in the recognition, evaluation and control of confined space hazards” Section 9.11(2) of the Regulation states “For the purposes of subsection (1)(a) qualifications which are acceptable as

evidence of adequate training and experience include (a) certified industrial hygienist (CIH) or registered occupational hygienist (ROH) with experience in confined space entry, (b) certified safety professional (CSP), Canadian registered safety professional (CRSP) or professional engineer (P. Eng.), provided that the holders of these qualifications have experience in the practice of occupational hygiene as it relates to confined space entry, or (c) other combination of education, training and experience acceptable to the Board.”

Safe crew complement/crew complement:

The required crew size and associated qualifications needed to do the work safely and effectively. The crew complement must cater for:

- Tasks requiring a dedicated Safety Watcher;
- Tasks requiring direct and continuous supervision by a Qualified Electrical Journeyman; and,
- Coordinating tasks involving two or more qualified electrical journeymen.

Safe crew complement principle #1:

There shall be enough qualified workers on site to safely perform the assigned work. This means that there are enough qualified workers to physically do work in the work zone e.g. two qualified PLTs in a bucket for live line work; work on CT circuit requires a qualified CPC Technologist and qualified Electrician. Assigned work includes both Planned and Trouble responses. **QUALIFIED:** BC Hydro Safety Practice Regulations: Accepted as satisfactory in reference to experience, training, education, personal competency, physical ability, and familiarity with rules, procedures, equipment, and dangers involved in the work and/or operation.

Safe crew complement principle #2:

Workers shall only be assigned to, and carry out work they are qualified and authorized to perform. This means for example that only authorized (PSSP Cat 5) Journeyman PLT's are assigned to do work on exposed, energized conductors or equipment and are not relying on someone else on the crew to be competent. Apprentices are not deemed to be a qualified worker for the purpose of crew complement.

Safe crew complement principle #3:

Viable rescue will be in place for all high hazard work. Consistent with WorkSafeBC Regulation, viable rescue is defined as the safe extraction of the injured worker from immediate hazards, the administration of first aid, and the transport to a suitable medical facility without incurring a delay that would diminish the injured workers chance for recovery. Safe extraction requires the rescuer to be qualified such that they are able to evaluate on-site hazards to prevent others (and themselves) from becoming additional victims. Prompt transport to a suitable medical facility:

- Either on site or sufficiently close so as to be able to perform a timely rescue (as per WorkSafeBC Regulations); e.g. the rescuer must be:
- A qualified electrical journeyman, apprentice PLT or pre-apprentice B PLT for pole top rescue,
- A qualified electrical journeyman, apprentice, pre-apprentice B PLT, Line Truck Operator or NIA employees for bucket rescue.

Viable rescue requires one worker who is outside the immediate work zone, and is qualified and competent to perform the rescue.

Note: This doesn't always mean that crew members will be added; i.e. a cable crew where the surface crew member can perform this function while performing other support duties on site, but outside the immediate work zone.

Safety protection guarantee:

An assurance that conductors, electrical equipment, or mechanical equipment on the Distribution and Transmission power system are isolated and will remain isolated. The three types of Safety Protection Guarantee are Clearances (including Protection Extensions), Test and Work Permits, and Self-Protections.

Safety watcher:

A member of the crew who is solely committed to the task of a safety watcher for the duration of the work which requires this role to be performed.

Secured:

An isolating device is said to be secured when it is held in position by an approved lock or tag.

Supervisor:

A worker who instructs, directs, or controls workers in the safe performance of their duties, regardless of title or classification (for example, subforeman/woman, chief operator/area dispatcher, supervisor, or manager).

Switching:

Any function that causes a change of state to Level I or V power system equipment.

Verification:

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

Viable rescue:

Consistent with WorkSafeBC Regulation, high hazard work requires a risk assessment to determine extent and complexity of rescue and evacuation procedures required. Unless otherwise noted in the SPR the following applies:

- Viable rescue requires the second worker on site be qualified in and equipped to perform the applicable rescue method, including the ability to assess workplace hazards that could pose a risk to rescuers.

- This worker can attend to various duties at the work site provided they stay out of potential immediate harm presented by work area hazards and they remain on site and in direct communication with the other worker(s).

Note: For work listed in SPR801, a worker check with a rescue requirement may act as a rescue plan under conditions described in **SafeHub Work Requirement—Worker Check Requirements of Work Approved Under SPR 801**.

Visual check:

A confirmation by an authorized worker that the correct isolating device has been switched to the required position and is properly secured.

Work Protection Practices (WPP):

The rules and procedures that govern how equipment is isolated from potentially hazardous sources of energy and made safe to work on in, all generating stations, NIA substations, and their associated facilities.

Work zone:

Being out of the work zone is being at a location where the “rescue worker” would not have their

health and welfare adversely affected by the uncontrolled release of energy originating from within the work zone.

WPP LOCKOUT DEFINITIONS

The terms and definitions in this section of the Glossary apply specifically to the lockout procedures where WPP is applied as described in Section 700.

Dissipating:

Reducing hazardous energy to a level that is required by regulation or is otherwise safe for humans, including measures such as releasing pneumatic, gas, or hydraulic pressure; releasing spring energy; and applying Worker Protection Grounding/Bonding or Blocking.

Group locks:

A set of similarly-keyed locks applied for worker protection, the key for which is placed in a key box.

Group lockout:

A form of work protection in which two workers independently lock out all isolating devices, the keys to those locks are placed in a key box, and each worker working under that Group Lockout applies their personal lock to the key box to ensure the equipment remains in a protected state.

Host:

A worker authorized to place a personal lock, where WPP is applied, who maintains direct and continuous supervision of a visitor accessing protected equipment.

Isolation schematic:

A diagram that schematically displays all isolating devices associated with a generating unit. Isolation schematics are used as an aid for determining the isolation, grounding, and blocking required for work safety.

Personal lock:

A lock, or set of similarly-keyed locks, applied for worker protection, the key for which is retained by the worker.

Personal lockout:

A form of work protection in which each worker places a personal lock on each device to ensure the equipment remains in a protected state.

Protected:

Equipment is said to be in a protected state when all sources of hazardous energy applicable to the work to be done have been isolated, grounded and/or blocked, and locked out.

Switching reference:

A previously prepared and checked Switching Order or an approved list of switching steps.

Test coordinator:

The worker who is responsible for the coordination and overall safety of test activities under a Group Lockout.

Test leader:

The worker who is responsible for overseeing a specific test procedure under a Group Lockout, to ensure sources of test energy do not create a hazard to other workers, to take charge of barriers and signs, and to inform the test coordinator when the test is completed.

Visitor:

A person who requires access to protected equipment and is not authorized to place personal locks at a facility without the direction of a Host.

Visitor lock:

A personal lock placed by a visitor.

Work leader:

A person, regardless of title or classification, who is authorized to perform one or more of the following roles during a Group Lockout:

- Advise the PIC of job isolation requirements and any changes to these requirements
- Ensure isolation is appropriate for the work to be done
- Hold documented tailboards
- Arrange for a Test Coordinator
- Ensure workers and equipment are clear at the end of the job and returns the Lockout Sheet to the PIC.

Acronyms

| | |
|-------------|--------------------------------|
| AC | Alternating current |
| CAT | Category |
| CSA | Canadian Standards Association |
| CT | Current transformer |
| DC | Direct current |
| EHV | Extra high voltage |
| FVO | Fraser Valley Office |
| FYI | For your information |
| GLO | Group lockout |
| GOI | Guarantee of isolation |
| LOA | Limits of Approach |
| MO1 | Machine Operator 1 |
| NIA | Non-integrated areas |
| OSH | Occupational Safety and Health |
| PIC | Person in charge |
| PLO | Personal lockout |
| PLT | Power line technician |
| PSSP | Power System Safety Protection |
| SF6 | Sulphur hexafluoride |

| | |
|----------------|------------------------------|
| SIO | Southern Interior Office |
| SOO | System operating order |
| SPC | Safety Practices Committee |
| SPG | Safety Practice Guarantee |
| SPR | Safety Practices Regulations |
| T&W | Test and work |
| TTI | Trades training instructor |
| UD | Underground distribution |
| VT | Voltage transformer |
| WLL | Working load limit |
| WPP | Work protection practices |

Notes:

Safety Practice Regulations revision record

The following are significant revisions since the book was last issued and have been highlighted in grey. This does not include minor non significant revisions, grammatical or punctuation changes.

| | |
|-----|--|
| 111 | Fire prevention |
| 113 | Fires |
| 118 | Helicopter, fixed wing and drone work |
| 122 | Distracted work |
| 303 | Personal protective equipment |
| 415 | Equipment for work on energized conductors |
| 416 | Conditions for work on energized conductors or equipment |
| 417 | Work on energized conductors and equipment—general |
| 418 | Live line tool work |

| | |
|-----|---|
| 424 | Live line permit |
| 426 | Arc flash requirements for work on energized distribution conductors or equipment |
| 427 | Barriers or distinctive identification |
| 504 | Equipment to be treated as energized |
| 509 | Switching devices identified on the operating one-line diagram |
| 519 | Worker Protection Grounding/Bonding for rescue to protect life |
| 520 | Worker Protection Grounding/Bonding for inaccessible isolation points |
| 613 | Tags—general |
| 701 | General policy |
| 710 | Preparing personal lockout—equipment not on the one-line diagram |

| | |
|----------------------------------|---|
| 722..... | Hazardous testing under group lockout |
| 727..... | Isolating devices that are not lockable—applies to non-integrated area (NIA) only |
| 801..... | One worker—work that can be performed and conditions |
| 805..... | Safety watcher—work requiring a dedicated safety watcher |
| Glossary—Common definitions..... | Viable rescue |
| Tag out—forms and tags..... | Danger Do Not Operate Tag for NIA Isolating Devices that are not lockable |
| Index..... | Removed |

Table 403
Limits of Approach (LOA)

| Nominal Voltage (kV) | Actual Voltage Range Phase to Phase | Restricted Work | |
|----------------------|-------------------------------------|-----------------|-----|
| | | m | ft |
| 138 | 75kV to 150kV | 1.10 | 3.5 |
| 230 | 150kV to 250kV | 1.40 | 4.5 |
| 287 | 250kV to 325kV | 1.70 | 5.5 |
| 345 | 325kV to 425kV | 2.10 | 7 |
| 500 | 425kV to 550kV | 2.70 | 9 |

Table 401

Limits of Approach (LOA)

| Nominal Voltage (kV) | Actual Voltage Range Phase to Phase | Qualified Electrical Worker | | Uninsulated equipment or Unqualified Worker and their equipment when continuously directed by Qualified Electrical Worker | | Unqualified Worker | |
|----------------------|-------------------------------------|-----------------------------|-----|---|----|--------------------|----|
| | | m | ft | m | ft | m | ft |
| .751 to 35 | 751V to 40kV | 0.75 | 2.5 | 1.20 | 4 | 3.00 | 10 |
| 60 | 40kV to 75kV | 0.90 | 3 | 1.50 | 5 | 3.00 | 10 |
| 138 | 75kV to 150kV | 1.50 | 5 | 2.40 | 8 | 4.50 | 15 |
| 230 | 150kV to 250kV | 2.10 | 7 | 3.00 | 10 | 4.50 | 15 |
| 287 | 250kV to 325kV | 2.60 | 8.5 | 3.70 | 12 | 6.00 | 20 |
| 345 | 325kV to 425kV | 3.00 | 10 | 4.30 | 14 | 6.00 | 20 |
| 500 | 425kV to 550kV | 3.70 | 12 | 4.90 | 16 | 6.00 | 20 |