May 2016

Power System Safety Protection

System Operating Order 1T–12

Name:

BC Hydro
Power smart

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Power System Safety Protection

System Operating Order 1T–12

May 2016

PSSP Review Committee

Power System Safety Protection
System Operating Order 1T–12

Revisions Record

All revisions are indicated by shaded boxes and do not include grammatical or punctuation changes.

The following are significant revisions since the book was last issued in October 2011:

- 1T–12L updated LOA for category 2 of worker authorization categories describing Unqualified Worker Limits of Approach
- 1T–12M updated LOA for exceptions to authorization categories describing Unqualified Worker Limits of Approach
- 1T–12 all subsections to remove references to the use of PSSP in NIA Generating stations and substations.
- 1T–12A 4.0 clarification of prime contractor, PIC accountabilities and Worker responsibilities. Removal of section 5.0, Remove “supplementary instructions” wording from section 6.0 and Appendix 1.
- 1T–12B 2.0 power system equipment can include equipment being decommissioned, remove station lighting and emergency lighting from power system.
- 1T–12E 1.0 aligning language with the SPR, 2.0

clarify delegation of Operating Responsibility for water conveyance and defined stations.

- 1T–12F 3.3 to allow the use of highlighters for marking up one–lines used as Mimic displays.
- 1T–12G removal of appendix 1 describing the outline of the operating order.
- 1T–12I 5.O re–word the section to provide addtional clarity.
- 1T–12J 6.O removed as tailboard requirements are stated in the SPR, 7.O aligned language with SPR 5O9.2, 5O9.3 and stated the qualifications to check a switching order, 9.O records to be kept for 2 years.
- Complete revision of 1T–12K and added appendix.
- Complete revision of 1T–12L to align with training materials.
- Complete revision of 1T–12M to align with 1T–26.
- Field tagging requirements moved from 1T–12F section 3.O to 1T–12J section 8.2
- 1T–12L Module 3; Clarification of Cat 3 Authorization

- 1T–12M Section 4.3; Exceptions To Authorization
- 1T–12L Rule 3; Clarification of CAT 2 Authorization
- 1T–12M Rule 3; Gap in Section 4.6 Authorizations During Emergency Operations
- Updated appendix 2—PSSP Trainer certification and recertification
- 1T–12N added
- 1T–12J Section 8.O; Tagging Clarifications
- 1T–12K; Audit Clarifications

Table of Contents

Operating Order 1T–12 is divided into the following parts:

Operating Order 1T–12L is further divided as follows:

1A Customer Isolation for Connections Less Than 60 kV Without Customer In–Feeds

1B Isolation for Customers With Connections 60 kV and Above or for Connections With Customer In–Feeds

2 Training for Access to the Power System

3 Training to Work on the Power System and to Receive Protection Extensions

4 Training for Certified Utility Arborists

5 Training to Receive SPGs, Live Line Permits and Take Self Protection

6 Training for Persons In Charge

Additional copies of the PSSP Operating Orders can be obtained from Stationery (form number 10058). For any questions regarding these orders, please contact a PSSP Representative or Authorizing Manager. For a current list of these people go to the PSSP web page.

The headings within the various parts of SOO 1T–12 are as follows:

Contents

POWER SYSTEM SAFETY PROTECTION
SYSTEM OPERATING ORDER

1T–12A—Summary

1.0 General

The 1T–12 series of operating orders specify requirements for consistent application of safety protection on BC Hydro's transmission and distribution power system.

1.1 Acronyms

The following acronyms will be used throughout the 1T–12 series of operating orders. Other acronyms that are used infrequently will be explained as they occur.

- DOO—Distribution Operating Order
- DCCF—District Central Control Facility
- OHSR—Occupational Health and Safety Regulation of WorkSafeBC
- OSH—Occupational Safety and Health Standard
- PIC—Person In Charge
- PSSP—Power System Safety Protection
- RTO—Real Time Operations
- SOO—System Operating Order

- SPR—Safety Practice Regulations
- WPP—Work Protection Practices
- GOI – Guarantee of Isolation
- SPG – Safety Protection Guarantee
- PA – Plant Alteration
- LOA – Limits of Approach
- NIA – Non–Integrated Area

2.0 Power System Safety Protection

The power system, for purposes of PSSP, does not include integrated and non–integrated generation. Work at integrated and non–integrated generating stations is covered by WPP. The interface between PSSP and WPP is covered by SOO 1J–18.

The power system is defined in SOO 1T–12B.

PSSP is defined as the constraints required to be applied to the power system to provide worker protection from power system hazards during prescribed work.

See Appendix 1 of this Operating Order for definitions of terms used in the 1T–12 series Operating Orders.

3.0 Relationship Between SPR and PSSP

The SPR is the book of rules and instructions which govern work done on the power system. PSSP is the System Operating Order which defines how applicable sections of the SPRs are to be applied consistently throughout the power system. PSSP will not contradict the SPR.

4.0 Safety Responsibilities

- BC Hydro is accountable for the safe control and operation of the BC Hydro owned power system, as defined in operating orders and other relevant documents. This accountability is fulfilled in part through the application of PSSP, independent of any delegation of Prime Contractor that might be in effect at work sites.
- The PSSP PIC will have exclusive authority to establish the conditions for, and to issue, safety protection guarantees for the power system or part of it. For PIC responsibilities refer to 1T–12I 2.1.
- The PSSP PIC has Operational Responsibility. In parallel, the Field Worker maintains responsibility for their own safety. For PIC and Field Worker responsibilities refer to the

applicable SOOs, 1T–13, 1T–10 and the SPR.

5.0 WorkSafeBC Occupational Health and Safety Regulation

PSSP procedures must conform to OHSR, Part 19.

The personal lockout requirements in OSH 204, and OHSR Part 10 apply to all areas not included in the power system, such as workshops, offices, laboratories, vehicle service garages and stores.

For all integrated and non–integrated generation areas, WPP rules apply.

6.0 PSSP Review Committee

(See Appendix 2)

Revisions to SOO 1T–12 will be drafted by the PSSP Review Committee. This is a committee of delegates from across BC Hydro. All revisions will be approved and published by the PSSP Review Committee.

7.0 Main Elements of Power System Safety Protection

PSSP consists of 12 main elements. Each main element is described briefly below.

7.1 Power System Definition (See SOO 1T–12B)

Equipment included on BC Hydro's power system as it relates to PSSP will be defined by system operating orders, distribution operating orders, station one–line diagrams and circuit one–line diagrams.

7.2 Equipment Identification (See SOO 1T–12C)

Each piece of major equipment on the power system will be uniquely identified by a numeric or alpha–numeric designation affixed to the equipment.

This identification is required to ensure that the equipment is accurately described in communications and documentation.

7.3 Power System Locking (See SOO 1T–12D)

System locks will be applied to lockable devices to support safety protection. System locks are also applied for normal operation to reduce exposure to unauthorized access.

7.4 Central Control (See SOO 1T–12E)

Central control will be established to ensure uniform control throughout the power system. BC Hydro has delegated the control of the

Transmission, Generation and Distribution facilities as specified in SOO 1T–12E, 1J–11 and DOO 1D–19. Included in the hierarchy is the centralized control of the BC Hydro power system and defined stations. Operation of level V equipment on the distribution system is delegated directly to authorized site workers.

7.5 PSSP Mimic Displays (See SOO 1T–12F)

Central control facilities will have their assigned portion of the power system displayed on one or more PSSP mimic displays.

The PSSP mimic display will be a symbolic representation of the power system, used to indicate the operating positions of equipment and of field tagging.

7.6 Communications Systems (See SOO 1T–12G)

Effective communications systems will be installed and properly maintained to facilitate central control operations.

Communication facilities are essential to the safe and efficient operation of a centrally controlled system. Each person responsible for a work activity must have an adequate means of

communicating directly with central control to the extent required for the planned work.

7.7 Operating Authority (see SOO 1T–12H)

Operating Authority is defined as the right to control an assigned portion of the power system to establish the conditions required for and to issue SPGs, Live Line Permits and Assurance of No Reclose Permits.

The assignment of Operating Authority to a PIC must be rigorously implemented. It includes strict adherence to boundaries between designated Operating Authorities (see applicable SPR rules), and the assignment of responsibilities to maintain consistent and effective control of all elements of the power system.

7.8 Isolation for Safety Protection (See SOO 1T–12I)

The responsibility for isolation and other constraints required for safety protection will be clearly established.

The PIC is responsible and accountable for determining the isolation required and the sequence of switching, locking and tagging necessary to isolate major equipment. The

worker receiving an SPG is responsible for checking the isolation using a combination of field checks and references to operating diagrams and drawings. Testing will be required to verify the equipment is de–energized before grounding and blocking.

7.9 Operating Procedures (See SOO 1T–12J)

Procedures required for power system operation include a comprehensive system of operating orders. The documentation includes log books, switching order forms, operating one–line diagrams, Distribution operating drawings, and permit record books.

7.10 Audits (See SOO 1T–12K)

Audits will be conducted to ensure that PSSP procedures are properly followed.

7.11 Training (See SOO 1T–12L)

Personnel required to have access, switch or to work on the power system, must be trained in PSSP and relevant sections of the SPR as specified in this operating order.

7.12 Authorization (See SOO 1T–12M)

All personnel required to access, switch or to work on the power system must be authorized.

7.13 Functional Component Training (See SOO 1T–12N)

Functional Component training covers additional requirements for work in or on the respective systems.

Appendix 1: Definitions of Terms Used in 1T–12 Series Operating Orders

Some terms used in SOO 1T–12 may be found in the SPR, others are defined below.

1. **Directly Associated**

   This phrase distinguishes equipment that has direct operational functions from equipment that is used solely for repair and maintenance. Equipment which is used for both direct operation, and repair and maintenance, will be classified as power system equipment and is therefore Directly Associated. PSSP procedures, as opposed to personal lockout, will apply.

2. Equipment Levels

There are five levels of power system equipment established to define Operating Responsibility. See SOO 1J–11.

- **Level I—IV Equipment** is all power system equipment which is either shown or listed on station operating one–line diagrams and transmission equipment which is under the direct Operating Responsibility of a central control facility. Self Protection may not be taken on level I to IV equipment. See SOO 1T–12E.

  High voltage distribution equipment including all field reclosers where looped or multiple feeds exist and where customers have customer in–feeds are included in this group. When the level IV equipment is within boundaries of a level V isolation point, Self Protection may be used when the SPG is established at the level V device.

  All field reclosers are level IV regardless of whether they are used in a loop or a lateral feed. Isolation disconnects on reclosers are to be considered as level V if they are in the level V zone. Recloser bypass disconnects

around the recloser do not constitute a loop. For isolation purposes, these disconnects are to be tagged with self protection and treated as a single isolation point.

- **Level V Equipment**, as defined below, may be isolated using Self Protection.

  Transmission
  Power system equipment associated with any transmission lines or cables but not directly connected to the conductors, (e.g. cable pumping plants).

  Stations
  Power system equipment not shown or listed on the station operating one–line diagrams, or if shown, specifically identified as Level V equipment(e.g. DC supplies, VT secondaries, station service).

  Distribution
  Power system distribution equipment of any voltage outside stations, where looped or multiple feeds do not exist. A single isolation point must establish positive safety protection of a line or cable. An example is a distribution lateral.

3. Device Locking

The isolating device is configured such that system locks can be placed to secure the device in the required state (e.g. open, closed).

4. Official Log

This is the log which is used by the PIC to record system operation, SPGs, Live Line Permits and Assurance of No Reclose Permits that are issued on the portion of the power system for which the PIC has Operating Authority. The PIC must sign the official log.

5. Operating One–Line Diagrams

These are electrical schematic diagrams that represent all station and transmission Level I through Level IV high voltage equipment. Operating one–line diagrams will be approved by the manager responsible for the equipment as defined in 1T–25. Approved electronic versions of these diagrams are acceptable for use by the PIC for PSSP purposes.

6. Operating Orders

These are formal written instructions which govern the operation of the power system and are numbered in accordance with SOO 1T–01.

7. Plant Alteration (PA)

This is a document that tracks changes to the transmission and distribution system. PA procedures are described in SOO 1T–99 and DOO 1D–01.

8. System Locks

These are high quality security locks with replaceable cores keyed for one or more master key level. They are used for locking power system facilities for public safety, to prevent unauthorized entry, and for PSSP.

Appendix 2: Terms of Reference— PSSP Review Committee

1. The purpose of the PSSP Review Committee is to assist in ensuring the effectiveness of PSSP procedures set out in SOO 1T–12. The Review Committee will meet as required to:

   - Provide interpretation of SOO 1T–12.
   - Review the operating order to ensure it properly defines the requirements and application of PSSP procedures and is consistent with the SPR.
   - Communicate revisions to holders of the PSSP operating orders.
   - Review the training requirements and the delivery of training materials and programs for persons required to access or work on the power system.
   - Conduct a review of the PSSP operating orders at a minimum of every four years as set out in SOO 1T–12K.

2. PSSP Trainer certification and recertification:

   - The Power System Safety Protection Committee ("the PSSP Committee") shall be responsible for PSSP Trainer certification and

recertification. Review each PSSP Trainer; prior to any PSSP authorizations that are expiring.

- The existing Trainer certification will be reviewed by the PSSP Committee; 2 months prior to expiring.
- Arrange for classroom training audits for each PSSP Trainer;
- PSSP Trainer report to be reviewed monthly by the PSSPC.

3. The PSSP Review Committee shall be comprised of management and professionals representing the following work disciplines: RTO, Transmission, Distribution, Stations, Construction, Work Methods and Safety. PSSP Review Committee members shall be appointed by Senior Management from within their respective work disciplines.

   The PSSP Review Committee is sponsored by the Chief Safety Officer.

   All persons appointed to the PSSP Review Committee shall be conversant with the requirements of PSSP and have a commitment to ensure that PSSP continues to provide procedures for authorized employees to safely carry out

prescribed work on the power system.

4. The Chair shall immediately advise Senior Management of any PSSP issues that could be contentious or could cause significant impact.
5. The PSSP Review Committee approves all assigned PSSP Representatives.
6. The PSSP Review Committee is the subject matter expert and governance body accountable for maintaining SOO 1T–12.
7. The PSSP Review Committee will review and endorse all changes being made to SOO 1T–12.
8. PSSP will be published in print at strategic intervals, but will be maintained electronically (on the PSSP website) in the interim periods, with any revisions clearly identified in the document and changes communicated through a bulletin notification.

Appendix 3: Terms of Reference—PSSP Representatives

1. The PSSP Representatives will be assigned by Senior Management. The responsibilities of each PSSP Representative are to:
   - Liaise between PSSP users and the PSSP Review Committee.
   - Review proposed PSSP operating order revisions and comment for those they represent.
   - Propose changes to PSSP Operating Orders to reflect current operating requirements in their area.
   - Explain or resolve PSSP issues in their area and refer to the PSSP Review Committee for inclusion into the FAQ.
   - Support PSSP training or review sessions when PSSP Operating Orders are revised.
   - Support random classroom training audits.
2. Identification of PSSP representation for an area can be determined by referring to the PSSP Representatives list on the PSSP web page.

1T–12B—Power System Definition

1.0 General

This order defines the boundaries and system components of the centrally controlled power system, owned by BC Hydro, as they apply to PSSP. The power system is composed of the integrated and non–integrated systems as defined in sections 2, 3 and 4 of this operating order.

Equipment included on the power system, for PSSP purposes, will be defined by system operating orders, distribution operating orders, station one–line diagrams and circuit one–line diagrams.

Power system boundaries are those defined structures, switches or geographic locations on the interconnections with generating stations, other utilities, transmission voltage customers, primary customers, the points of delivery to Level V customers and BC Hydro's personal lockout areas. (See SOO–1T 12H).

SPR, PSSP, system and distribution operating orders apply to all power system equipment within the boundaries specified in this operating order.

2.0 Power System Components

The power system is comprised of all high voltage circuits, switching stations, transformers, reactive equipment, distribution circuits and equipment used in the transmission and distribution of electrical energy. It can include equipment being constructed or decommissioned for these items. (For the purposes of PSSP, integrated generation is not included in the definition of power system, however; non–integrated generation and substation equipment are included, solely for the purpose of issuing SPGs within the WPP side of the boundary as per SOO 1J–18).

All workshop machines and equipment, stores, offices, laboratories and vehicle services garages including those which are located in stations and other complexes are not part of the power system and will be isolated, when required, following OSH 204 lockout procedures.

The power system is comprised of directly associated equipment and systems such as:

Station Equipment

- Transformers;
- HVDC rectifiers and inverters;
- Reactive power equipment;
- Circuit breakers;
- Buses;
- Voltage regulators;
- Disconnect switches;
- Grounding switches;
- Current transformers;
- Voltage transformers;
- Surge arresters;
- Auxiliary motors, fans, and pumps;
- Pressurized air systems; and,
- Protective, metering and communication systems including the network of microwave stations and radio repeaters.

Transmission and Distribution

- Transmission lines;
- High voltage cables;
- Distribution feeders;
- Reactors;

- Capacitors;
- Voltage regulators;
- Reclosers;
- Isolating switches;
- Sectionalizing switches;
- Separable insulated connectors;
- Power line towers and structures;
- Pot–heads;
- Surge arresters;
- Oil pumping plant for cable sections;
- Wave traps; and,
- Protective, metering and communications systems.

Station Service

- AC and DC circuits (associated with Power System Equipment), switches and fuses at BC Hydro transmission and distribution stations;
- Rectifiers and inverters;
- Motors, compressors, fans and pumps;
- Protective and communications systems;
- Emergency generators; and,
- Batteries.

3.0 The Integrated Power System Boundaries

The following are the interconnections between the PSSP power system and other utilities, IPPs, transmission voltage customers, BC Hydro generation and BC Hydro Non–integrated Area. The boundaries must be described in detail in system and distribution operating orders.

- Bonneville Power Authority (BPA);
- AltaLink;
- FortisBC;
- BC Hydro—Generation;
- BC Hydro—NIA;
- Other Utilities and Independent Power Producers (IPPs); and,
- Transmission voltage customers.

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1T–12C—Equipment Identification

1.0 General

All stations, control centres, distribution and transmission circuits must have unique numeric or alpha–numeric designations.

Power system equipment that is identified on an SPG, must have a unique numeric or alpha–numeric designation.

The naming of Level V devices as defined in SOO 1T–12A Appendix 1 is optional. The PIC may use any Level V device as an isolation point as long as it can be uniquely described. Uniquely described does not mean it should have a numeric or alpha–numeric designation; for example "secondary side of xxx 12CVT3", is acceptable where xxx is a name of the station.

2.0 Facility Identification Convention

Each station and control centre must be assigned a unique abbreviation consisting of three letters or two letters and a number. These abbreviations are for use by operating personnel on mimic displays, operating one–line diagrams, Operating Drawings for Distribution, in logs, SPGs and records.

3.0 Station Equipment

All level I through IV equipment in stations must have a unique alpha–numeric designation. The designation may include the station abbreviation. The specific designation will be marked on a designation sign mounted on the equipment or structure. It is used to ensure accuracy of communications in logs and records, on mimic displays, operating diagrams and SPGs.

4.0 Transmission Circuits

All high voltage circuits must have unique alpha–numeric designations.

5.0 Distribution Circuits

5.1 OVERHEAD DISTRIBUTION CIRCUITS

All overhead level IV distribution switches, cutouts and fused disconnects identified on SPGs must be assigned a unique numeric or alpha–numeric designation. Each designation must appear on the field device and on the mimic display. The designation decals for overhead distribution switches, cut–outs, and fused disconnects must be located such that they clearly relate to the associated devices. New switches must be assigned numbers as part of the Plant Alteration procedure.

5.2 UNDERGROUND DISTRIBUTION CIRCUITS

Distribution circuit switches and separable insulated connectors that may be used as isolation points for SPGs must be assigned specific designations. The destination or assigned number of the cable connected to the switch or attached to the separable connector can be used as the designation. The switch or separable insulated connector location combined with the destination or assigned cable number must provide unique identification.

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1T–12D—Power System Locking

1.0 General

System locking is one of the main elements required to provide power system safety protection. Power system locking facilities, other than those required for PSSP, are described in SOO 1T–46.

Any device with a locking facility already in place must be locked with a system lock when that device is used to establish PSSP.

2.0 Power System Locking

All locks used to establish PSSP must be system locks. System locks will be high quality security locks with replaceable cores keyed for one or more master key level.

Power system equipment must be secured from unauthorized access for work under PSSP. Access points must be locked with system locks when not attended. Kiosk locks are approved as power system locks for access to underground distribution equipment only.

Any isolating or blocking device added to the power system for the duration of the work under PSSP, if subject to unauthorized access or false operation, will also be provided with a locking facility and be locked with a system lock.

A device equipped with a locking facility must be used in preference to a non–locking device, provided the required isolation is maintained and system operation is not restricted.

3.0 Keying for Power System Locking

Only authorized personnel can be issued keys for system locks.

The Manager responsible for issuing keys for Power System locking must maintain records of keys issued. They will also be responsible for obtaining and recording the return of the key when persons are no longer authorized in the issuers' area. (see Appendix 1)

Appendix 1: Sample Key Record Forms

Form 1 Key Register Form

Key #.	Name	Issue Date	Return Date
1			
2			
3			
4			
5			

Form 2 Key Control Form

Key Number _____ Issue to: _____

_____ _____
Printed Name Receiver's signature

_____ _____
Telephone Number Department Name & Address

Date of Issue: _____Issued by: _____

_____ _____
Printed Name Issuer's signature

Temporary Issue: Indicate possible return date

Returned to:

_____ _____
Printed Name Issuer's signature

Date Returned:

_____

DUPLICATION OF MASTER KEYS IS AN OFFENCE

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System Operating Order

1T–12E—Central Control

1.0 General

The BC Hydro power system must be centrally controlled to ensure proper and consistent operation.

The BC Hydro 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 1J–11 and 1T–11A.

The central control facility consists of a control room, communications equipment, mimic displays, logs, tags, operating orders, instructions, documentation and records.

For the NIA power systems see section 4 of this operating order.

2.0 Operating Responsibility

The BC Hydro Control Centres; Fraser Valley Office (FVO) located in Langley and Southern

Interior Office (SIO) located in Vernon are known collectively as the BC Hydro Control Centre. The BC Hydro Generation and Transmission Coordinators have the ultimate Operating Responsibility to monitor, control, and direct the operation of the power system including integrated BC Hydro generation facilities. The Generation and Transmission Coordinators do not have Operating Authority for any equipment on the power system.

The Grid, Plant and Load Desk operators at the BC Hydro Control Centre have Operating Authority for all equipment on the power system. Operating Responsibility for control of portions of the power system (e.g. some generation and water conveyance facilities) is delegated to other control facilities as described in SOO 1J–11 and 1T–11A.

Workers are responsible for assessing system risk and safely executing operating activities on the system.

3.0 Defined Stations

Defined stations are:

- Shrum GS (GMS);
- Burrard Thermal GS (BSY);

- Revelstoke GS (REV);
- Mica GS (MCA); and,
- Fort Nelson (FNG).

4.0 Non Integrated Area (NIA)

Operating Authority and Responsibility for the NIA distribution system has been delegated to the NIA organization within Field Operations.

The NIA power system is controlled through the delegation of Operating Authority and Responsibility in a hierarchical arrangement that includes the District Central Control Facilities (DCCF) (MAS, SPT and ASK) and unattended Stations.

5.0 Temporary Central Control Facilities

During major work programs or declared emergencies, Operating Authority and Operating Responsibility of a station or a portion of the system can be transferred to a local PIC. The local PIC will establish a temporary local control facility on the appropriate scale complete with, but not limited to, a log, mimic display, tags and safety documentation.

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1T–12F—PSSP Mimic Display

1.0 General

Each central control facility must have a PSSP mimic display which accurately represents the configuration, major device designation, status and safety tagging of the assigned portion of the power system over which the control facility has Operating Authority.

Note: The mimic display for distribution facilities must include all portions of distribution circuits where high voltage loops or multiple feeds exist (level IV).

PSSP mimic displays will be used in operating the power system to indicate device status and for safety tagging of isolation points established for the purpose of issuing SPGs, Live Line Permits and Assurance of No Reclose Permits. Alteration of an indicated device status or tagging or de–tagging of the mimic display will only be performed by, or ordered by, the PIC.

2.0 PSSP Mimic Displays

A PSSP mimic display may consist of a combination of dynamic or static display boards, electronic displays (with a paper copy for backup), operating one–line diagrams, or approved distribution operating drawings. For example, the PSSP mimic display could consist of a mimic display board on a wall used as the main display, supplemented by operating one–line diagrams in a folder.

Note: Some display boards at substations/ headquarters are for informational purposes only and are not PSSP mimic displays. The official PSSP mimic display must be under the control of the Operating Authority and stamped “Mimic Display”.

2.1 MIMIC DISPLAY UPDATING

The PSSP mimic display must be updated before power system modifications are accepted for service. The PIC will make suitable temporary changes to the mimic display if it is impractical to make permanent mimic display changes at the time the power system modifications are accepted for service.

2.2 ELECTRONIC MIMIC DISPLAYS

At central control facilities with computer based controls, the PIC may use a system of electronic displays for generating stations, transmission lines, substations, distribution systems, etc.

The subset of electronic displays specifically intended to be used by the PIC for PSSP mimic display purposes must satisfy the following requirements:

- SOO 1T–34A describes the formal procedure that is used to ensure that all PSSP electronic mimic displays are approved. 1T–34A describes the revision process to be used whenever changes are made in the field. Approved paper operating diagrams will provide back–up for the electronic displays and may be used for 'mark–ups' as per paragraphs 3.3, 3.4 and 3.5 of this operating order.
- Major devices will have their full alpha–numeric designation on the PSSP electronic mimic display. Where it is required to enhance clarity, minor associated devices may have their alpha–numeric designations abbreviated as long as there is no possible confusion of identity. For example, 25D1CB54 and 25D2CB54 could be shown as D1 and D2 provided 25CB54 has its full designation.

3.0 Mimic Display Tagging

Isolating devices tagged in the field as directed by the PIC for SPGs must also be tagged on the mimic display.

The mimic display is tagged after the switching is completed and before the SPG is issued. Tagging is part of the switching process not the SPG process. Exceptions to this are permitted in cases where a distribution central control PIC is remote from the mimic display.

In such cases, outstanding mimic display tagging must be kept to a minimum, and the outstanding changes to system configuration must be recorded in the official log. The mimic display will then be updated from the official log and so recorded by the PIC before the end of the shift.

Live Line Permits and Assurance of No Reclose Permits will be recorded in the PIC's log prior to issue and the mimic display will be updated as soon as practicable.

Each device must remain tagged on the mimic display until the SPG is cancelled and the associated field tags are removed.

Where multiple SPGs are issued with common isolation points, each guarantee will have its own

set of tags on the mimic display, as specified in SPR 604.2c.

On the three phase Power System(s), station devices such as disconnects with individual phase motors operators must be shown on the mimic display as one device even though they consist of three individual single phase components. The alpha–numeric designation of such a device on the mimic display and operating one–line diagrams must be followed by a "(3)" to indicate the three components. For PSSP tagging purposes the mimic display will be tagged with only one tag. Switching orders and SPG forms must identify three tags in the field by indicating (3) following the device designation i.e. 5D21(3).

3.1 MIMIC DISPLAY BOARD TAGGING

PSSP mimic display boards must be tagged as described in SPR 613.1. Only approved tags as defined in the SPR may be used.

3.2 ELECTRONIC MIMIC DISPLAY TAGGING

Electronic mimic displays will be tagged by means of a "tag field" on the display which will indicate the presence and number of tags associated with each device. Each station will

have an electronic safety tag list which will include the device, tag type, date, time and detailed reference to the SPG. A back up paper copy will be printed once per shift if adequate electronic backup is not available.

For information on control system interlocks associated with safety tags see 1T–34B.

3.3 TAGGING OF OPERATING ONE–LINE DIAGRAMS USED AS MIMIC DISPLAYS

When operating one–line diagrams are used as a PSSP Mimic display they will be marked up using colour coded lines or by using mimic display tags to show the tagging of isolating devices. The mimic display will be updated to show the current state of the assigned portion of the power system.

When colour coded lines are being used, isolation points will be enclosed by lines drawn on the diagram using a coloured pen or highlighter of appropriate transparent colouring. Red or orange colour coding will be used for Clearance zones and blue for Test and Work zones. The isolation zone will be identified on the diagram by means of a dated notation referenced to the SPG.

Any operating one–line diagram used as part of the mimic display will show tags in effect for the portion of the station displayed on the diagram. De–tagging will be done by stroking out the dated notations or removing the mimic display tags. The diagrams will be replaced as necessary and all tagging still in effect will be transferred to the replacement diagram.

If the PIC is required to tag level V isolating points which are not shown on the operating one–line diagrams, information can be transferred from station mechanical or electrical drawings as a sketch or as a listing of the equipment and then tagged on the operating one–line diagram.

Operating one–line diagrams that form part of the PIC's mimic display will be clearly stamped with the words "MIMIC DISPLAY".

3.4 TAGGING OF DISTRIBUTION OPERATING DRAWINGS USED AS MIMIC DISPLAYS

Distribution devices not shown on a distribution mimic display will be tagged on the distribution operating drawings. Distribution operating drawings which are used as the mimic display will have tags applied as outlined in 3.3 of this operating order.

Distribution operating drawings that form part of the PIC's mimic display will be clearly stamped with the words "MIMIC DISPLAY".

3.5 TAGGING ON COMBINATION DISPLAYS

When the mimic display consists of a combination of displays and the isolation points for an SPG are represented on more than one display, a caution tag marked "PSSP" with a note referencing one display to the other must be attached to each display.

4.0 Temporary Distribution Control Facilities

At temporary distribution control facilities, mimic displays such as a combination of a display board and Distribution operating drawings will be used.

Each distribution mimic display will include, as a minimum, a display board consisting of distribution operating drawings which show the three phase portions of distribution circuits where looped or multiple feeds exist. The diagrams must be securely mounted on a board and suitable for tagging.

5.0 Non-Integrated Distribution Systems

A combination PSSP mimic display such as a display board, distribution operating drawings will be used at the central control facility for each non-integrated distribution system.

Power System Safety Protection
System Operating Order

1T–12G — Communications Systems

1.0 General

Communications systems will be provided as required for the central control of the power system. The communications network consists of radio, telephone, direct wire, power line carrier, microwave, satellite systems and mobile dispatch computer systems. Communications equipment will be properly maintained and expanded as required to facilitate safe operation of the power system.

Communications facilities are essential for the safety of personnel working on the power system. The person responsible for a work activity will be provided with an appropriate means of communication with the PIC for PSSP. In unique situations where this is not possible, special procedures will be established in writing and will be understood by all workers assigned to the task. Provision will be made to ensure contact with the central control facility in emergencies.

2.0 Documentation and Training

Each central control facility will ensure that documentation is available to describe the communications facilities in use in their operation. Step–by–step operating procedures will be provided.

Field Operations will ensure that system operating orders and PSSP local information summaries are available to describe emergency communications procedures.

All members of work crews and all persons required to operate communications equipment as part of their normal work or emergency procedures must be fully trained.

3.0 Radio System

BC Hydro RTO is required to provide operating orders that meet the needs of all headquarters. These orders will include detailed operating procedures for normal and emergency communications between base stations, mobiles, and the central control operator. For further information see SOO 7T–66 to 7T–70.

3.1 IDENTIFICATION DURING RADIO COMMUNICATION FOR PSSP

For PSSP related activities all parties must be identified by both first and last name.

Power System Safety Protection
System Operating Order

1T–12H—Operating Authority

1.0 General

Operating Authority will be assigned for all power system equipment. PICs will be responsible for switching and safety isolation procedures. PICs will maintain rigorous control over those portions of the power system for which they have Operating Authority.

SPGs, Live Line Permits, Guarantees of No Reclose and Assurance of No Reclose Permits can be issued only by the PIC responsible for that area. Self Protection may be taken on level V equipment by an authorized worker.

The role of PIC can only be assigned to workers who have been authorized to Category 6.

Note: Operating Authority is assigned to a PIC. A PIC is not a specific individual, i.e.; a PIC is whoever is signed into the official log. SOO 1J–11 specifies Operating Responsibility and Operating Authority.

2.0 Operating Authority Assignment and Boundaries

Boundaries between the power system and BC Hydro Generation and NIA Operating Authority areas and between different Transmission and Distribution Operating Authority areas will be defined in system operating orders.

Power system boundaries are described in SOO 1T–12B.

A dotted line on operating one–line diagrams will be used to show the Operating Authority boundary between power system equipment and:

- transmission voltage customer–owned equipment;
- independent power producers;
- customers with customer in–feed;
- BCH Generation; and,
- Non–Integrated Stations.

Operating Authority boundaries between control centres will be indicated on the mimic display.

The boundary with level V customers will be at the point of delivery.

2.1 CONTROL CENTRES

Control Centres are assigned Operating Authority for defined portions of the power system.

In a control centre where more than one PIC is required, the Operating Authority will be retained by the control centre and each PIC will operate under that authority as outlined in SOO 1T–11A.

2.2 EMERGENCY SITUATIONS

Emergency situations requiring independent action to protect life are covered in the Safety Practice Regulations, (see SPR 5O9.1).

System Operating Orders describe the system emergency response plan and procedures. Emergency procedures at a headquarters or station level are further described in operating orders and emergency response manuals produced by Field Operations and Generation.

3.0 Transfer of Operating Authority

The transfer of Operating Authority procedure may be used by two PICs to move the operating boundary such that the required lines or electrical and mechanical apparatus are all within one area

of control following the transfer. Once Operating Authority has been transferred any further transfers (except for returns) are not allowed. SOO 1T–11 defines the procedure for transfer of Operating Authority within a single control centre.

3.1 PROCEDURE FOR TRANSFER

The PIC will first verify that the person to receive Operating Authority is authorized to Category 6.

The PICs will define the boundaries and confirm the status of the equipment for which Operating Authority is to be transferred.

The receiving PIC must have accurate operating drawings and any required operating information for the equipment transferred. The PIC who has transferred Operating Authority and the PIC who has received Operating Authority will record the transfer in their official logs and on Safety Protection Forms.

3.2 GENERATING STATION EQUIPMENT

The boundary between PSSP and WPP will be clearly defined on the generating station one–line diagrams. At generating stations WPP is in effect for all work in the WPP area. For integrated generating facilities Operating Authority for WPP rests with the site. For non–integrated generating facilities Operating Authority rests with the DCCF.

3.3 SUBSTATION EQUIPMENT

One procedure for transferring Operating Authority at substations is to transfer Operating Authority "up to and including" the boundary devices. It is acceptable practice at capacitor stations for the control centre to transfer Operating Authority to the station for a prolonged period during maintenance. Local PICs then sign on and off for their shifts in the official log.

A second procedure for transferring Operating Authority at substations is by the use of a Guarantee of Isolation (GOI) when the issuing PIC needs to retain control of the boundary devices. SPR defines the procedure to be used when

issuing or receiving a GOI.

3.4 DISTRIBUTION EQUIPMENT— INTEGRATED SYSTEMS

Operating Authority for defined distribution systems will not normally be transferred to field personnel unless requested by a Regional Manager during an emergency.

3.5 DISTRIBUTION EQUIPMENT— NON-INTEGRATED SYSTEMS

The official log for a non-integrated system will be located at the generating station.

Operating Authority for the distribution system will be permanently assigned to the DCCF PIC. Operating Authority is assigned to the PIC, not a specific individual.

Authorized Workers performing PIC duties during non-regular working hours must be aware they cannot become the PIC without signing on in the official log. See 3D-NIA-08.

4.0 Safety Protection on Boundary Equipment

The isolation of power system boundary equipment, level I through IV, requires isolation from all hazardous sources of in–feed. The PIC must confirm isolation in the adjacent area of control.

Isolation from both the power system and from the personal lockout area is required on boundary equipment where customer in–feeds exist.

If there is no customer in–feed from one side of the boundary, isolation is required only from the side with the in–feed. This will be the case in the vast majority of boundaries with our customers.

Permanent customer owned standby power supply generators that are equipped with CSA approved transfer switches or CSA approved key interlock switches designed to ensure that the generators cannot feed into the power system are not considered to be customer in–feeds. The isolation procedures for customers with in–feeds must be described in jointly signed operating orders.

Note: **Worker Protection Grounding/Bonding procedures are always required.**

Grounding/bonding procedures provide

protection from the hazard of accidental energization from all power sources, including unauthorized power supplies.

4.1 LIVE LINE PERMITS AND ASSURANCE OF NO RECLOSE PERMITS ON BOUNDARY LINES OR EQUIPMENT

Prior to issuing a Live Line Permit or Assurance of No Reclose Permit (ANRP) that depends in whole or in part on no reclosing in an adjacent area of control; the local PIC must first obtain, from that adjacent area of control, a Guarantee of No Reclose (GNR). The GNR information must be logged in both areas of control and must be tagged on the mimic display in the issuing area of control. The receiving PIC may place a GNR tag on their mimic display if tagging provision is available.

A GNR is not required from customers and Independent Power Producers who operate their generation in synchronism with the power system provided jointly signed operating orders describe the operating restrictions and/or control design that will ensure the customer will not attempt to energize the power system.

4.2 BOUNDARY IDENTIFICATION AND ISOLATION PROCEDURES

4.2.1 Boundaries Within the Power System

Within the power system, the local PIC may establish an isolation point in an adjacent area of control by either:

- Use of a Guarantee of Isolation (GOI) from the adjacent PIC for any required isolation points in the adjacent area of control. The mimic display must be tagged in the issuing area of control and may be tagged on the receiving PIC's system if the tagging provision is available. The local PIC can then issue an SPG using isolation points within the local area of control and GOIs for any isolation outside the local area of control. This is the preferred method for isolating inter–area transmission lines and large construction projects.

- Moving the boundary with agreement of the PIC in the adjacent area of control by transfer of Operating Authority such that the required isolation points following the transfer are all within the local area of control. The local PIC can then issue SPGs using isolation points entirely within the local area of control.

4.2.2 Boundaries Between the Power System and Other Power Systems

A GOI between the power system and others will be enforced by the established Guarantee of Isolation, or equivalent procedures for each power system.

4.2.3 Boundaries Between the Power System and Personal Lockout Areas

All boundaries between the power system and personal lockout areas within stations shall be identified. The identification shall, as a minimum consist of appropriate signs at the actual boundaries or isolation points. In the case of stand alone personal lockout equipment surrounded by power system equipment, identification will be directly on the stand alone personal lockout

equipment.

For equipment on a boundary of the power system and a personal lockout area, the two methods of providing isolation are:

- If a worker requires safety protection for work on boundary equipment in a personal lockout area, and no suitable isolation points are available in the personal lockout area, Self Protection can be applied to level V isolation points. (Personal lockout must be applied on any isolation device located within a personal lockout area).
- The power system boundary can be moved into the personal lockout area for the duration of the boundary equipment work by agreement between the PIC and the person responsible for the personal lockout area. The temporary boundary must be clearly identified. Isolation can then proceed entirely by PSSP.

4.2.4 Boundaries Between the Power System and Customers With Connections 60 kV and Above, and for Customers With Customer In–Feeds (Level I–IV)

Jointly signed operating orders are required for each boundary with a customer with connections 60 kV and above and for customers connected at less than 60 kV with customer in–feeds (defined as level I through IV).

The orders will define the boundary location, identify customer in–feeds and describe isolation procedures. Appendix 1 describes the required contents of the jointly signed operating orders and describes customer/boundary isolation.

For radial feeds to customers with no customer in–feeds on level I through IV boundaries (e.g. 60 kV radial feed), the PIC can issue SPGs using isolation on the power system only.

In situations where a BC Hydro PIC is not involved, for example the isolation of a metering kit from primary sources under the control of the customer, the worker will arrange directly with the customer's

authorized representative to open the required isolating devices. The isolating procedure must be specifically identified in the jointly signed operating order. The worker will apply personal locks to the customer's isolation devices.

In cases where the customer requires isolation from the power system, BC Hydro will apply GOI (Guarantee of Isolation) procedures for the customer's protection as defined in the jointly signed operating order. The customer may also apply their own isolation procedures on the BC Hydro isolation devices with the agreement of the PIC and provided the PSSP GOI procedures remain in place.

4.2.5 Boundaries Between the Power System and Customers With Connections Less than 60 kV and With No Customer In–Feeds (Level V)

Each level V boundary with a distribution customer is at the point of delivery to the customer. Customer Isolation (CI) can apply to these level V equipment boundaries. To be classified as level V there must be no customer in–feeds from the customer

equipment into the power system. CI procedures are described in SPR 609 and 610 and SOO 1T–12L Module 1A.

For equipment on a level V boundary between the power system and a customer, isolation from the customer's system is not required in order to establish safe work conditions for work on the power system.

In situations where a BC Hydro worker requires isolation from primary sources under the control of the customer (e.g. the isolation of a metering kit) the BC Hydro worker will arrange directly with the customer's authorized representative to open the required isolation devices. The worker will then apply personal locks to these devices. Local permission may be given to qualified persons to remove and reinstall low voltage revenue meters in order to establish the customer's meter base as the isolation point for work on customer's equipment. Neither authorization by jointly signed operating order nor customer isolation procedures is required for this isolation—personal lockout procedures apply.

Appendix 1: Required Content of Joint Operating Orders Describing Customer Boundary Isolation

This appendix describes the requirements for the jointly signed operating order between BC Hydro and customers with connections 60 kV and above and for customers connected at less than 60 kV with customer in–feeds (level I through IV).

1.0 Purpose of the Joint Order

- Description of the boundary line/equipment; and,
- Compliance with SOO 1T–12H 4.0 and 1T–12L Module 1B.

2.0 Responsibility

- Authorizing signatures;
- BC Hydro issues/revises/distributes;
- Customer to inform BC Hydro of any changes; and,
- Review every four years.

3.0 Authorized Personnel and Telephone Numbers

- List of key BC Hydro Control Centre and Field Operations personnel and phone numbers including the PIC; and,

- List of authorized customer personnel and phone numbers.

4.0 Boundary Description

- BC Hydro operating one-line diagram is required;
- Boundary to be shown by a dotted line;
- Agreement of designation, as defined in SOO 1T-12C, of first and second isolation points. (The second point is required when maintenance is to be done on the customers entrance disconnect.); and,
- Metering kit to be shown on the one-line diagram.

5.0 Scheduling Requirements

- Mutual agreement to outage date and times;
- Advance notification, minimum time requirements;
- Name of persons to be notified; and,
- Emergency outage procedures.

6.0 Outage Procedures

6.1 BC Hydro Work Requirements

6.1.1 NO CUSTOMER IN-FEEDS

- O Switch and isolate from BC Hydro system only; and,
- O No isolation required from the customer's system;

6.1.2 CUSTOMER IN-FEEDS

- O Switching sequence, BC Hydro and customer;
- O Application of GOI procedure;
- O PIC directs BC Hydro worker to check open, lock and tag GOI; and,
- O PIC issues an SPG.

6.2 For Customer Work

- O Switching sequence, BC Hydro and customer;
- O Application of GOI procedure (may include GOIs from other operating authorities);
- O PIC advises customer of isolation;
- O If required by the customer, the customer's approved worker may "over-lock" BC Hydro isolation points; and,

- Customer's normal safety protection procedures apply

6.3 For Combined Work

- Describe any special procedure;
- Application of GOI procedure;
- PIC issues an SPG to BC Hydro workers; and,
- Customer proceeds with their work as required.

7.0 Procedures for Returning Equipment to Service

- Notification of PIC and customer;
- Removal of isolation; and,
- Switching and re-energization procedure.

8.0 Procedure for Field Operations to Work on Customer's Metering Kits using WorkSafeBC personal lockout procedure

- Not done through BC Hydro PIC;
- BC Hydro worker gets customer to isolate using the customer's procedure; and,
- BC Hydro worker "over-locks" with personal locks.

Power System Safety Protection
System Operating Order

1T–12I—Isolation For Safety Protection

1.0 General

The BC Hydro power system is centrally controlled. The assignment of Operating Authority for the purposes of issuing Safety Protection is described in SOO 1T–12H.

The PIC will have the Operating Authority for an assigned portion of the power system. In a control centre where more than one PIC is required, the Operating Authority will be retained by the Control Centre and each PIC will operate under that authority as outlined in operating orders.

All persons issuing, receiving, or taking SPGs, Live Line Permits or Assurance of No Reclose Permits must be authorized. They must understand the limits of their authorization and ensure that proper procedures are followed.

2.0 Responsibilities

2.1 PERSON IN CHARGE (PIC)

The duties of the PIC are defined in SPR 502. These responsibilities include:

- Direct the operation and tagging of devices classified as level I through IV.
- Direct the isolation of any necessary level V devices, i.e. those level V devices listed on SPGs.
- Issue all Clearances, Test and Work Permits, Guarantees of Isolation, Guarantees of No Reclose, Live Line Permits and Assurance of No Reclose Permits as may be required for the safe undertaking of work on the assigned portion of the power system.
- Maintain the official log.
- Keep a record of all SPGs, Guarantees of Isolation, Guarantees of No Reclose, Live Line Permits and Assurance of No Reclose Permits issued.
- Hold a file of all cancelled permits.
- Maintain the mimic displays that represent the conditions on the portion of the power system for which the PIC has Operating Authority.

2.2 SPG RECEIVER

The normal procedures for SPGs are outlined in SPR 600. Additionally, a PIC may issue an SPG to him/herself.

Switching orders and SPGs must be checked for accuracy and completeness with respect to the work to be done, by a second person qualified and authorized to do so.

3.0 Safety Protection Guarantees

The detailed responsibilities and procedures for issuing, receiving and returning SPGs are described in SPR 600. SPR 600 also describe the procedures for tagging, Worker Protection Grounding/Bonding and mechanical blocking. The requirements for locking isolation devices are specified in SOO 1T-12D.

Following receipt of an SPG, the worker will verify the isolation (which may include level V devices). After receiving the SPG, but before going to work on the isolated equipment, the SPG holder will ensure that appropriate testing is performed to verify de-energized conditions immediately prior to applying grounds. The requirements and procedures for safety grounding/bonding are detailed in SPR 512, 513 and 514.

The worker may take Self Protection on additional level V equipment. (e.g. by opening dc supply switches, shutting off valves for gas, oil, water, and air supplies, discharging operating springs, as appropriate to the particular job being undertaken).

Before the SPG is returned and prior to the removal of working grounds, the Self Protection that was applied must be removed and the auxiliary devices returned to their normal in–service positions provided no other Self Protection tags are in place.

4.0 Self Protection

Self Protection may be applied by a person who is authorized to Category 5. Self Protection procedures are outlined in the SPR 607 and 608.

Confirmation that equipment is level V is mandatory before applying Self Protection. The identification of level V equipment will be done through direct observation, and/or by reference to accurate drawings, and/or through consultation with a reliable source who has access to accurate information. A reliable source is normally the PIC, the local BC Hydro manager or a PSSP Cat 5 authorized worker with local power system knowledge. Prior to operating

level V equipment, the worker must also assess system risk. If there is a significant risk to the power system, confirmation and approval from the PIC is required before the work proceeds; e.g. for work on Distribution laterals which feed station service for a control centre, generating station, or microwave site; or for blocking dc auxiliary supplies or air supplies to a circuit breaker, etc. If there is minimal risk the worker may proceed without contacting the PIC.

In stations, station service and emergency diesel supplies equipped with a mechanically interlocked transfer switch (e.g. automatic transfer switch) are not considered to be sources of hazardous in–feeds to the normal system supply. Such equipment suitable for isolation using Self Protection must be identified in an operating order.

Level V isolating devices in stations may have multiple Self Protections in effect at any one time. When it is required to limit the work to one SPG, a Test and Work must be issued by the PIC rather than a Self Protection taken by the worker.

5.0 Live Line Permits and Assurance of No Reclose Permits

When a Live Line Permit or Assurance of No Reclose Permit is required on a Distribution line section which can be re-energized by automatic reclosing devices located upstream in the line or at the station, automatic reclosing will be blocked.

Where there are known issues with recloser coordination, blocking of the first upstream reclosing device may not provide sufficient protection for a crew working under a Live Line Permit or Assurance of No Reclose Permit. In such cases, an operating order must be issued to specify action required to assure reclose blocking for the faults on that line section.

6.0 On-Site Operating Authority

An on-site Operating Authority may be established by permanent delegation or by temporary transfer of Operating Authority for all or part of the equipment in a station. The Operating Authority is transferred to the PIC, i.e.; the person signing in the log and accepting PIC responsibilities (Operating Authority is transferred to the PIC not a specific individual).

7.0 Vancouver Dual Radial System

The operation of the Vancouver Dual or Double Dual Radial Vaults is governed by special field tagging procedures, described in DOO 7D–DRV–01. The mimic display tagging must conform to 1T–12F, i.e. mimic tagging must reflect tagging in the field.

Power System Safety Protection
System Operating Order

1T–12J—Operating Procedures

1.O General

This order specifies the documentation, operating information, and procedures required for PSSP. Specific safety procedures will be in place to ensure that all work that is carried out on the power system is executed safely. These procedures will be uniformly applied and must be understood by all workers who work on the power system. These procedures are specified in the SPR and in operating orders. The purpose of this order is to specify detailed procedures not covered in the operating orders or in the SPR.

2.O Information and Documentation

Each PIC will have specific information and documentation applicable to the PIC's area of operation. The information will be kept current and readily available. Examples of the required documentation are:

- Operating One–Line Diagrams;
- Distribution Operating Drawings;
- Log Books;

- System and Distribution Operating Orders;
- SPGs; and,
- Switching Order Forms.

3.0 Procedures

3.1 STATION LOGS

Personal entry and exit to stations must be recorded in the station log book and, if required by operating orders, the PIC must be informed. Stations used as regular crew headquarters require log book entries only for station work. In addition, station logs will be used to record:

- Descriptions of station equipment status changes;
- Protective relay flags;
- SPGs, Assurance of No Reclose Permits and Live Line Permits received for work within the station perimeter;
- Each step of any switching sequence which consists of operating less than three devices, or the switching order form number for the consecutive operation of three or more devices;

- PIC activities including Safety Protection Guarantees issued when Operating Authority is transferred to a PIC located at the station; and,
- Isolation for Self Protection where the isolation remains in place past the end of the shift or involves three or more devices.

3.2 CENTRAL CONTROL LOGS

The central control facility must have an official log and it must record all operations for which it has Operating Authority. Switching order forms, SPG forms, event recorder print–outs and electronic database with adequate backup may be part of the official log.

3.3 SWITCHING ORDER FORMS

The requirement for the use of a switching order form is described in SPR 509.14 and 604.2d. Each substation must have a switching order book. All switching orders must be cross referenced in the station log and must remain on site.

3.4 OPERATING DRAWINGS

Central control facilities will have up–to–date mimic displays to operate their respective systems. Distribution operating drawings may

form part of the mimic display as outlined in SOO 1T–12F. Control Centres will have operating one–line diagrams for stations within their Operating Authority. Stations will have operating one–line diagrams located at the station. Any discrepancy between the operating drawings and the actual plant must be referred to the PIC and the responsible manager. No switching will be done and no SPGs will be issued until a resolution has been reached.

3.5 SAFETY PROTECTION GUARANTEE RECORDS

Each central control facility will have formalized procedures for documenting all SPGs that they issue and cancel. All persons who receive SPGs must have either the original of the SPG or have their own Safety Protection Record book for recording the particulars of SPGs issued to them.

3.6 LIVE LINE PERMIT AND ASSURANCE OF NO RECLOSE PERMIT RECORDS

Each central control facility will have formalized procedures for documenting all Live Line Permits and Assurance of No Reclose Permits that they issue and cancel.

All persons who receive a Live Line Permit or Assurance of No Reclose Permit must record the following information:

- equipment designation;
- time the permit is issued or cancelled; and,
- the PIC's name.

This information is to be recorded as notes on a tailboard form, and be retained for the duration of the permit.

3.7 OPERATING ORDERS

Central control facilities will have all operating orders applicable to their area including operating orders relating to safety and emergency procedures.

Stations will have, on site, any directly applicable operating orders. These orders will contain information on ts, safety equipment, station alarms, hazards and emergency procedures.

4.0 Additions and Removals for Stations and Transmission Lines

Information such as operating one–line diagrams and operating orders must be revised when a plant

is commissioned or decommissioned. Operating drawings which are required for Safety Protection must be marked up, dated and initialled by the System Control Manager as specified in 1T–25 or by the PIC.

4.1 ADDITIONS

Procedures for adding equipment to stations and transmission projects are detailed in SOO 1T–35. The procedures require the use of a commissioning notice to energize (CNE).

4.2 REMOVALS

When any equipment in stations is decommissioned the procedures in SOO 1T–35 shall be followed.

5.0 Additions and Removals for Distribution Systems (Outside Station Perimeters)

A Plant Alteration (PA) must be used where revisions involve three–phase main supplies, single and three–phase loops or multiple feeds. Distribution operating drawings must be revised as part of the alteration procedure. Operating orders will define PA procedures.

Revisions, including temporary revisions to the electrical configuration of a distribution network

such as those made necessary to repair storm damage, will be communicated to the PIC. The PIC will have the responsibility to make note of the revisions. If such revisions become permanent the appropriate documentation and revisions as noted above must be promptly completed.

6.0 Switching Procedures

All switching of electrical and mechanical apparatus on the power system will be governed by the procedures defined in the SPR and SOO 1T–12. For definition of these procedures refer to:

Safety Practice Regulations:

- Electrical Switching—Sections 500, 600
- Mechanical Blocking—Section 518
- Worker Protection Grounding/Bonding—Section 512, 513 and 514

PSSP:

- Operating Authority—1T–12H
- Isolation for Safety Protection—1T–12I

6.1 SWITCHING ORDER PROCEDURE

The PIC will specify the switching assignment and identify the operations and sequence of the operations.

The PIC shall ensure that the worker doing the switching is authorized and understands the switching sequence.

Each switching sequence 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. The qualifications to check a switching order are PSSP Category 6 authorization or PSSP Category 5 authorization plus authorization to switch isolating devices identified on the operating one–line diagram.

Before performing an operation specified in the switching order, the authorized person will follow the requirements of SPR section 5OO.

The mimic display will be updated by the PIC when the switching order is completed. The exception to this is specified in SOO 1T–12F 3.O.

Details to be entered in the station or control centre log sheet will include:

- the station identification;
- the switching order number;

- the purpose of the switching order; and,
- the date and time the switching order was issued and completed.

7.0 Tagging Procedure

All tagging of electrical and mechanical apparatus on the BC Hydro power system will be governed by the procedures defined in the SPR and SOO 1T–12.

7.1 MIMIC DISPLAY TAGGING

Tagging of mimic displays will be defined by SOO 1T–12F for the assigned portion of the power system over which the Control Facility has Operating Authority.

7.2 FIELD TAGGING

Field tags shall be attached or removed by a PIC or by authorized workers under the direction of the PIC. Self Protection, Customer Isolation, and Grounding / Blocking Protection tags may be attached or removed by the worker arranging the protection or on the instructions of that worker without direction from the PIC.

7.3 TAGGING ATTACHMENT

Tags must be securely attached to the electrical

and mechanical devices associated with each tag, and must be located to indicate clearly what the associated tag is enforcing or the protective conditions it supports. When it is highly impracticable to attach tags to the device, workers must make every effort to place the tag to clearly identify the device it supports.

Equipment Identification for tagging purposes will be as per 1T–12C.

When attaching a PSSP tag to a power system device that has a locking mechanism that is already in place and secured with a system lock, the tag must be placed within the lock.

Three single phase manually operated disconnect switches identified as one device are tagged in the field with one tag on the centre phase. URD separable insulated connectors, elbows, and cables that are used as isolation points for SPGs must have supporting tags attached to each phase. Tagging attachment locations of SPG isolation points on URD distribution cables or elbows shall be affixed to the feedthrough stand–off's.

For motor operated disconnects with individual phase motor operators, each motor operated single phase component will be individually

tagged in the field.

To secure VT secondaries, Tags must be secured in such a way that the tag is clearly visible to all workers, and it is clear that the tag is securing the VT isolation.

For the purposes of administering PSSP, temporary line / bus cut isolation points must be tagged when required to support a Safety Protection Guarantee. Permanent line / bus cuts are not to be tagged (Per 1T–09).

Non–conducting material is to be used for tag attachment to avoid a hazard to personnel, equipment or system security, non–metallic tie wraps, for example, may be used to secure the tags.

7.4 FIELD TAG REMOVAL

All tags are to be removed as soon as practicable after return of an SPG.

If an SPG tag is discovered unsupported by a mimic, the matter will be referred to the PIC, and then by the PIC to the PIC's manager. The manager or PIC will undertake a thorough investigation and then the PIC can authorize removal of the tag if appropriate. A written record of such investigation will be entered into

the Incident Management System.

If a Self Protection tag is left unsupported 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.

8.0 Record Keeping of PSSP Documentation

Completed records relating to SPGs will be retained for a minimum of 2 years from the date of the SPG return.

Power System Safety Protection
System Operating Order

1T–12K—Audits

1.0 General

Audits will be conducted to ensure that PSSP procedures are accurately written in SOO 1T–12 and that the operating order is properly followed.

2.0 Review of the PSSP Operating Orders

The PSSP Review Committee will conduct a review of the PSSP operating orders. This review is to ensure that the PSSP Operating Orders are up to date and that they reflect any revisions to the SPR produced since the last issue of SOO 1T–12. Each section of SOO 1T–12 will be reviewed at a minimum of every four years.

It is recognized that revisions to PSSP may be required from time to time to address practical operational requirements. Revisions or improvements may be proposed by employees and they should be referred to a PSSP Representative or to members of the PSSP Review Committee at the time they are identified. However, the existing practice as outlined in the current version of SOO 1T–12, will remain in effect until revisions are approved.

3.0 Safety Operation Audits

The PSSP Review Committee will sponsor a field audit of administrative and procedural aspects of PSSP use within each Region at least once every 4 years. Since the Control Centre is instrumental in the issuance of Safety Protection within the province, the Control Center will be included in the regional audit each year. The audit will assess how well field personnel know and administer the following:

- SPR section 500 and 600(including procedural sections in 400).
- SOO 1T–12 and other applicable operating orders.
- Application of LIFE SAVING RULES 1–4 as it applies to PSSP.
- PSSP Manager authorization process.

3.1 REQUIREMENTS

An audit team will consist of at least one PSSP Review Committee member and at least one worker, both well–versed in PSSP rules and procedures. Audit team members shall not be employed in the region being audited.

The audit shall follow the PSSP audit procedure

and use the documents referenced in Appendix 1 of this operating order.

3.2 RESPONSIBILITIES

The PSSP Review Committee chair is responsible for:

- Developing an annual PSSP audit schedule;
- Define any additional scope or objectives required of the audit;
- Forming and familiarizing audit teams with the audit process;
- Distributing a final report for each region audited; and,
- Reporting overall audit results to T&D Field and Grid Operations Leadership Team.

The Regional and Grid Operations Managers are responsible for:

- Recommending areas with high PSSP activity for auditing within the region;
- Providing the audit team with the required documentation;
- Making workers and contractors available for interviews;
- Responding to the audit recommendations and

developing a corrective action plan; and,

- Ensuring corrective action plans are prepared and completed in a timely fashion and sent to PSSP Review Committee Chair.

Refer to 1T–12K 3.0 Appendix 1 for a full definition of the PSSP audit procedure.

Appendix 1:

PSSP Audit Procedures

1.0 General

Due to the high diversity of PSSP user groups working on the system and the geographical challenges to site visits and worker interviews it is critical to the success of the audit that proper planning and scheduling be in place. A schedule will be developed to give the access required to the auditors while trying to limit the disruption of work.

2.0 Pre–audit Conference Calls

Four weeks prior to the commencement of the audit, a pre–audit conference call meeting with the PSSP Review Committee Chair, the Regional Manager, Transmission Services Manager, General Manager – Construction, General Manager – Construction Services and the Grid

Ops Manager, must be arranged to communicate the expectations, requirements and scope of the audit (e.g. briefly summarize the audit process and clearly communicate the audit scope). The managers will identify auditing areas and projects that have a high level of PSSP activity and meet the scope and objectives of the audit. Indicators for PSSP activity can be, but are not limited to, recent PSSP authorization lists, control centre logs, outage schedules, station logs, maintenance programs and capital projects on the power system.

The managers will assign representatives to work with the audit team and help to coordinate the interview scheduling, documentation, site visits and travel arrangements. The audit team will conference with the assigned representatives two weeks prior to the audit to review the schedule ensuring audit objectives and scope are being met.

3.0 Personnel to be interviewed

Worker interviews are critical to a successful audit. The personnel listed below will typically be required for interviews by PSSP auditors but may not be limited to depending on the scope of the audit. The regional and control centre

representatives will ensure personnel availability and schedule the interviews up to two weeks before the audit begins;

- Station Manager;
- Distribution Manager;
- Transmission Manager;
- PCM Vegetation Manager;
- PCM Contract Manager;
- Construction Manager;
- Construction Services Manager;
- 2 Workers recently authorized in PSSP within the last year See Note 4;
- 2 Category 2 workers;
- 2 Category 3 workers See Note 2;
- 2 Category 4 workers See Note 2;
- 4 Category 5 workers See Note 3;
- 2 Category 6 workers at the control centre and 2 Project Controllers active in the region; and,
- 2 Work leaders/planners See Note 4.

Note 2: Must have recently taken protection extensions with application of grounding blocking tags.

Note 3: 2 of the Category 5 workers must be authorized to switch.

Note 4: Can be comprised of Category 3, 4, or 5 workers interviewed.

4.0 Audit Interview worksheets

Audit interview worksheets have been developed for each of the following: managers, Category 2, 3, 4, 5 and 6 workers and work leaders. Worksheets have also been developed to record site observations and required documentation. The purpose of these worksheets is to provide the auditors consistent questioning to determine the correct application of PSSP/SPR's within the area. Each question will have a Yes or No answer followed by a general comment field. There will be significant emphasis on the comment criteria in the audit report while minimizing the subjectivity on scoring. The scoring should address quality of effort (e.g. documentation is in place, but the quality is very poor). The audit team will identify and provide rationale for those questions where a full score was not achieved. Auditors should assign scores as each question is addressed and maintain a running list of:

- Strengths;
- Areas for improvement;
- Non–conformances; and,
- Recommendations.

In parallel with the individual interview worksheets, a primary worksheet will be completed and used to compile the overall regional auditing results.

NOTE: Major non–conformances (interpreted as failure to comply with the requirements of WorkSafeBC OHSR Part 19.18 to 19.23, SPRs, OSH standards etc) must be identified for immediate corrective action.

5.0 Documentation

The auditors will determine the requirements and timing of the required documentation based on the interview schedule, site visits and work in progress. Audit documentation worksheets will be developed to record documentation compliance. The regional and control centre representatives will ensure the documentation is available to the auditors. Required documentation may include but is not limited to:

- PSSP report on recent authorized workers (within the last year) in the region;
- Live Line and ANRP log report for the region;
- SPGs including where applicable;
    - Associated switching orders/logs; and,
    - Associated outage requests.
- Tailboard documentation;
- Grounding plans;
- Protection extensions;
- Station logs;
- PSSP local information summaries;
- Safety meeting minutes;
- Key record forms;
- PIC/worker audio recordings as requested; and,
- Unique areas in Region (e.g. Dual Radial, spot network, large industrial customers, IPPs).

6.0 Site Visits

Site visits should be scheduled to coordinate with interviews and work in progress. Site observation is critical to determine correct application of PSSP tagging procedures and SPR work practices.

Audit documentation worksheets have been developed to record site visit observations and PSSP/ SPR compliance.

7.0 Audit Reporting and Corrective Actions

An audit report will be compiled by the audit team and consist of the final completed version of the Audit Primary Worksheet together with a summary sheet which identifies strengths and areas for improvement and makes any necessary recommendations. The audit team will meet with the PSSP Review Committee Chair to go over the results and sign off on the report as ready for distribution. The chair will forward the report to the Operations managers audited and clearly communicate that they will be responsible for all follow–up and corrective actions arising from the audit that are within their span of control. Corrective actions, if any, which are systemic in nature and fall outside the control of the Operations managers audited will be assigned to a manager with the required level of authority and span of control.

A Corrective Action Plan is to be forwarded to the PSSP Review Committee Chair within 10 days of receipt of the final audit report for record keeping and tracking purposes.

8.0 Records

Once the final report and Corrective Action Plan is received the PSSP review Committee Chair will post the report and corrective actions onto the **PSSP homepage** and into the SAP IMS system for record keeping and tracking.

1T–12L—Training

1.0 General

Personnel required to have access, switch, or to work on the power system, must be trained and authorized in PSSP and relevant sections of the SPR as specified in this operating order. Updates will be provided when changes are made to PSSP operating orders. PSSP training is in addition to other required skills, work procedures, or safety training. Exceptions to authorization are detailed in 1T–12M 4.3.

2.0 Training

PSSP authorization consists of a System Component, a Functional Component and local information training. The training level will be dependent on the category of PSSP authorization required for each worker.

2.1 SYSTEM COMPONENT

The System Component training requirements are detailed in Modules 1A, 1B, 2, 3, 4, 5, and 6 of this operating order. The PSSP Web-Based Training package includes a review

of PSSP operating orders, training modules and relevant sections of the SPR. It includes a series of standard tests to confirm the worker's comprehension of the PSSP material. For new PSSP authorizations in Categories 2 and 3, instructor–led training is preferred; however, the instruction provided by the self–paced Web–Based Training (WBT) is sufficient. New authorizations in Categories 4, 5 and 6 require instructor–led classroom training or its equivalent before writing the final exam(s).

2.2 FUNCTIONAL COMPONENT TRAINING

The Functional Component training will contain the appropriate safety and operating procedures for a specific function (Stations, Transmission, Distribution, NIA) , and Vancouver area indoor substations of the power system. The amount of Functional Component training will be appropriate to the job to be performed. It will include a review of necessary operating orders and hazards. The procedure is defined in 1T–12N.

2.3 LOCAL INFORMATION

The authorizing manager will ensure that each worker is provided with a summary sheet of local information or have access to it. See 1T–12N for content that shall be included in the local information.

3.0 PSSP Authorization Categories

There are seven categories of PSSP authorization which are based on hazards and complexity of the associated work.

The specific information and training required for the categories is contained in Modules 1A, 1B, 2, 3, 4, 5 and 6 appended to this order.

3.1 WORKER AUTHORIZATION CATEGORIES

- **Category 1A**

  Required information for authorized Category 5 workers implementing isolation procedures for Customers' systems below 60kV with no Customer in–feeds.

- **Category 1B**

  Required information for authorized Category

5 workers implementing isolation procedures for Customers' systems 60kV and above, and under 60kV with Customer in-feeds.

- **Category 2**

  Authorization is required to access substations on the BC Hydro power system. Authorization is required to access transmission and distribution worksites when workers and their equipment cannot maintain Unqualified Worker Limits of Approach.

- **Category 3 (Prerequisite Category 2)**

  Authorization limited to work on the power system that does not require an SPG except a Protection Extension; work on the power system under the direction of another crew member who has received an SPG, and for some types of work requiring an Assurance of No Reclose Permit.

- **Category 4 (Prerequisite Category 2 and 3)**

  Authorization limited to receiving an Assurance of No Reclose Permit for tree trimming work by qualified Certified Utility Arborists.

- **Category 5 (Prerequisite Category 2 and 3)**

  Authorization limited to receiving SPGs, Live Line Permits and authorized to isolate level V

equipment to take Self Protection.

Category 5 is a prerequisite for switching authorization.

- **Category 6 (minimum prerequisite Category 2, 3 and 5)**

  Authorization to receive Operating Authority, to perform PIC duties, and to issue SPGs, Live Line Permits and Assurance of No Reclose Permits.

4.0 Responsibilities

4.1 MANAGERS

It is the responsibility of the manager to ensure each worker required to access, switch, or work on the power system has received and understands the appropriate safety training, including PSSP System Component, Functional Component and Local Information, and is authorized. It is the manager's responsibility to ensure that PSSP procedures are followed, and to ensure that each authorized worker understands the limits of the authorization.

4.2 WORKERS

Each worker is responsible for understanding

PSSP System Component, Functional Component and Local Information training, and for not exceeding the limits of the PSSP Authorization granted.

4.3 CONTRACTORS

Contractors are responsible for ensuring their employees are trained and qualified for the work to be performed and they will maintain records of this training.

BC Hydro requires contractors to have their workers attend an approved training course.

PSSP training, authorization and restrictions of contractor employees will be reviewed, prior to commencing work, by the Contracts Manager.

Contract and Tender documents will specify requirements for contractors' PSSP training and authorization.

5.0 Methods of Training and Testing

The purpose of examinations is to ensure that the worker understands PSSP. The questions in the examinations will be based only on the instructed procedures and applicable regulations.

5.1 TRAINING MODULES

To ensure that all workers have the required PSSP training to perform their work safely on the BC Hydro power system, seven different training modules have been developed. The training modules and testing are arranged in a sequence that requires completion prior to authorization. The training requirements are:

PSSP Authorization	Minimum Training and Testing Required
Category 1A	Module 2, 3, 5
Category 1B	Module 2, 3, 5
Category 2	Module 2
Category 3	Module 2, 3
Category 4	Module 2, 3, 4
Category 5	Module 2, 3, 5
Category 6	Module 2, 3, 5, 6

It is mandatory that all appropriate PSSP training modules are completed before a worker can take the examinations and be authorized to work.

Note: Modules 1A, 1B and/or 4 may be required for some categories depending on work requirements.

5.2 PSSP TRAINING AND TESTING METHODS

Instructor–led Training is preferred and will be made available wherever possible. New authorizations in Categories 4, 5 and 6 requires Instructor–led Training before writing the final exam(s). Students will be provided with hard copies of the appropriate PSSP student guides for the System and Functional Component training modules. Instructors will ensure students have SPR and PSSP handbooks for use during the training. The worker's comprehension will be formally tested using paper based examinations. PSSP Web Based Training and testing provides a tutorial and a standard examination for the system component of each PSSP authorization category. The WBT package can be used for initial training and testing of workers prior to Cat 2 and 3 authorization and also for the two year reauthorization of all categories. An understanding of the SPR, related sections of operating orders, local instructions, and WorkSafeBC OHSR is also required.

Note: Implementing mandatory first time Instructor–led Training for CAT 2 and 3 is under review.

6.0 Maintenance of PSSP Training Modules

All PSSP training and testing modules will be produced and maintained by the PSSP Review Committee with appropriate input.

7.0 PSSP Trainer Requirements

7.1 PSSP TRAINER QUALIFICATIONS

- Must possess a strong working knowledge with a number of years of practical experience in areas where PSSP is applied.
- Must possess a thorough knowledge of PSSP and SPRs and how they apply to the work of the workers being taught.
- Must have developed professional instructional techniques and be skilled in the creation of an effective learning environment.

7.2 PSSP TRAINER CERTIFICATION

- Must have satisfactorily completed BC Hydro PSSP “Train the Trainer” course.
- Must have gone through a period of assisting a certified trainer with presenting PSSP Category 2,3,4,5 or 6 courses to worker groups.
- Must present a training course to a group of

workers under the guidance and evaluation of a certified trainer in that category.

- All internal BC Hydro PSSP trainer authorizations will be approved by Senior managers with functional responsibilities for Operations, Training or Work Methods.
- All external PSSP trainer authorizations will be approved by the Chair, PSSP Review Committee. Note for external PSSP trainer applicants: All former BC Hydro employees that held PSSP trainer authorization while employed by BC Hydro must request approval to be considered for external PSSP trainer authorization. Training authorization credentials are removed when leaving BC Hydro.

Power System Safety Protection
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1T-12L—Module 1A

Customer Isolation for Connections Less Than 60 Kv Without Customer In-Feeds

1.0 General

When customers with connections below 60 kV and without customer in-feeds require electrical isolation to work on their own equipment and this isolation cannot be obtained from devices that are controlled by the customer, the equipment must be isolated from the power system. This module will be required for those workers involved in the isolation of customers from the power system, as defined in this operating order.

2.0 Customer Isolation

The Customer Isolation procedure must be followed when isolating customers from the power system. This procedure will ensure that workers authorized by BC Hydro have isolated the electrical supply to the customer, and will not

reconnect the supply until requested to do so by the customer.

3.0 Procedure for Obtaining and Cancelling Customer Isolation

See SPR Section 609, 610 and SPR Appendix C for customer isolation procedures.

Note: Since the neutral conductor is still connected to the power system, it may not be at ground potential, and must not be relied on as the grounding point.

4.0 Emergencies

During emergencies, such as storms, it may be necessary for BC Hydro workers to isolate a customer's damaged electrical system. In these situations BC Hydro crews may disconnect a customer's damaged electrical system without contacting the customer. This procedure is for BC Hydro emergency isolation only. The customer is not permitted to proceed with any repairs to the equipment until all the procedures outlined in SOO 1T–12L Module 1A have been followed and a Customer Isolation has been properly arranged, unless the customer can isolate the equipment by devices controlled solely by the customer.

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System Operating Order

1T–12L—Module 1B

Isolation for Customers With Connections 60 Kv and Above or for Connections With Customer In–Feeds

1.0 General

This module describes the safety procedures for work on electrical equipment at the system boundaries between customers and BC Hydro, and applies to customers with connections 60 kV and above and to customers below 60 kV with customer in–feeds. This module will be required for those workers involved in isolation of customers from the power system, as defined in this operating order.

Line work requiring the reclosing to be blocked on either customer or BC Hydro owned boundary circuits may require the customer to be aware of Live Line Permit and/or Assurance of No Reclose

Permit procedures outlined in WorkSafeBC Occupational Health and Safety Regulation, Part 19 and BC Hydro Safety Practice Regulations (SPR).

2.0 Joint Operating Orders

Jointly signed operating orders are required for each electrical system boundary specified above. The operating order will identify the electrical boundary and describe the detailed isolation procedures to be applied to the boundary, both for work by the customer and BC Hydro.

The jointly signed operating order will include the names and telephone numbers of customer and BC Hydro representatives to be contacted to schedule boundary isolation work. Complete requirements are specified in BC Hydro SOO 1T–12H.

3.0 Isolation Procedures

3.1 WORK BY THE CUSTOMER

In cases where the customer requires isolation from the power system, the Person in Charge (PIC) will apply Guarantee of Isolation (GOI)

procedures on the appropriate BC Hydro owned substation or transmission line isolation devices, using system locks and tags.

The customer may also "over–lock" the BC Hydro devices with the agreement of the PIC provided the BC Hydro locks and tags remain in place.

3.2 WORK BY BC HYDRO WHICH INVOLVES A BC HYDRO PIC

For connections with customer in–feeds, the customer's representative will open the customer's isolating devices specifically identified in jointly signed operating orders and confirm with the PIC that the isolation has been established and will remain so. The PIC will arrange for an authorized worker to confirm that the isolating devices are open.

The PIC will then order the application of BC Hydro system locks and "Do Not Operate—GOI" tags.

For radial feeds to customers with no customer in–feeds (e.g. 60 kV radial feed) the PIC can issue SPGs on the BC Hydro system using isolation on the power system only.

3.3 WORK BY BC HYDRO NOT INVOLVING A BC HYDRO PIC

In situations where a PIC is not involved, for example the isolation of a metering kit from primary sources under the control of the customer, the BC Hydro worker will arrange directly with the customer's authorized representative to open the required isolating devices.

The BC Hydro worker will apply personal locks to the customer's isolation devices. This is not part of the power system and WorkSafeBC Part 10 applies.

Power System Safety Protection
System Operating Order

1T–12L—Module 2

Training for Access to The Power System

1.0 General

PSSP Category 2 System Component training is required for authorization limited to accessing the power system (e.g. entering stations, work sites, etc.).

All persons who need to access the power system must be authorized to do so, unless they are under direct and continuous supervision of an authorized worker.

The training in this module is designed for workers who do not require a detailed knowledge of power system safety procedures but who do need to know how to perform their work in a potentially hazardous environment.

The type of work for which this category of authorization is appropriate includes the following:

- Delivery of material;

- Delivery, pick–up, and servicing of vehicles;
- Landscaping, weed control;
- Internal and External Building Maintenance;
- Janitorial;
- Fire extinguisher servicing; and,
- Work in the vicinity of energized equipment but safely apart from it.

For further clarification on workers requiring Category 2 Authorization please contact the PSSP Review Committee.

Managers must ensure that their workers are trained in all safety rules required to perform the work.

This training module also includes non–PSSP information that personnel accessing the power system must know, such as emergency exits from buildings and location of fire extinguishers.

Note: Exceptions to authorization are detailed in 1T–12M 4.3.

2.0 Training Objectives

A thorough knowledge and understanding of the safety procedures in this training module is required before obtaining authorization.

The objectives of this module are, but will not be limited to, having the worker:

- Recognize common hazards in BC Hydro facilities.
- Identify their responsibilities for ensuring their own safety and the safety of others.
- Use the Limits of Approach table to find how far they must stay from high–voltage electrical equipment.
- Identify the key safety and security measures which must be followed when entering a BC Hydro facility.

3.0 Training Scope

To meet the objectives the course will follow, but not be limited to, the following lesson plan;

LESSON 1: INTRODUCTION TO SAFETY

- Life Saving Rules
- What is Safety?
- Workplace Hazards
- Safety Rules and Regulations
- Safety Responsibilities
- Safety Training
- Other Safety Resources

LESSON 2: WORKING NEAR BUT SAFELY APART FROM LIVE ELECTRICAL EQUIPMENT

- Electricity and the Human Body
- Limits of Approach
- Step and Touch Hazards
- Station Grounding Grids
- Trucks, Cranes, and Excavators

LESSON 3: ACCESSING FACILITIES

- Personal Protective Equipment
- Entering and Leaving Power System Facilities
- Hazardous Areas
- Fire Prevention
- Working with Chemicals

LESSON 4: PREPARING TO WORK SAFELY

- Personal Preparation
- Tailboard Meetings
- Worker Check Procedure
- Safety Watcher
- Safety Precautions for Power System Facilities

4.0 Functional Component Training

Once a worker has completed PSSP Category 2 System Component training, the worker will be required to complete the appropriate Functional Component Training. The Functional Component training will contain the appropriate safety and operating procedures for a specific function (Transmission, Distribution, Stations, NIA) of the power system. The delivery of Functional Component training will be appropriate to the job to be performed. It will include a review of necessary operating orders and hazards. There are four PSSP Functional Components that are generic to the BC Hydro system: the Distribution Component training, the Stations Training Component, the Non–Integrated Area training, and the Transmission Component Training.

5.0 Local Information

A worker must complete the appropriate Local information for Distribution, Stations, Non–Integrated Area, or Transmission training prior to beginning work.

Power System Safety Protection
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1T–12L—Module 3

Training For Work on the Power System and to Receive Protection Extensions

1.0 General

PSSP Category 3 System Component Training is required for:

- Work in proximity to the power system that does not require an SPG, LLP or ANRP.
- Work on the power system under the direction of a Category 5 crew member who holds an SPG, or;
- Live line work being performed under the direct and continuous supervision of a Category 5 crew member.
- Workers required to receive a Protection Extension.

Workers authorized to work on the power system must be familiar with all the hazards and procedures required for their work. This

may include training in step and touch potential hazards, safety watching procedures, Worker Protection Grounding/Bonding, mechanical blocking and Safety Protection Tagging. Workers must be fully trained in communications equipment operation for their work and for emergency procedures.

Some examples of the type of workers for which Category 3 authorization is appropriate are:

- Certified Utility Arborists receiving Protection Extensions (Category 4 also required)
- Workers installing pole stubs in hazardous locations;
- Eelectrical apprentices who work on the power system;
- Non–trade category workers such as driver/ helpers who work directly with electrical crews on the power system;
- Meter technicians; and,
- Contractors.

For further clarification on workers requiring Category 3 Authorization contact the PSSP Review Committee.

It is mandatory that each worker receiving a Protection Extension thoroughly understands

the safety procedures given by the Clearance holder. A worker receiving a Protection Extension must review the isolation, Worker Protection Grounding/Bonding and blocking with the Clearance Holder and apply “Do Not Operate — Grounding/Blocking Protection” tags where appropriate. Tampering with safety protection isolation, blocking, grounding, tagging is considered to be a serious safety infraction.

2.0 Requirements

A thorough knowledge and understanding of the content of this training module is required for a worker to obtain authorization to work on the power system, to receive an Assurance of No Reclose Permit for certain types of work, or to receive Protection Extensions. Successful completion of modules 2 and 3 is a requirement prior to Category 3 authorization.

Workers authorized to Category 3 must have ready access to the SPR before they can hold a Protection Extension.

3.0 Training Objectives

This course is separated into two parts; Part 1: Working on the Power System and Part 2:

Working under Power System Safety Protection (PSSP) Tag–Out.

Part 1: Working on the Power System provides basic training for all workers who require authorization to work on the power system under PSSP. It is a prerequisite for authorization to PSSP Category 3.

Part 2: Working under PSSP Tag–out, provides the worker with basic procedures and processes required for applying PSSP for work on the Transmission and Distribution systems.

The objectives of Module 3 training include but are not be limited to, having the worker:

- Explain the types of hazardous energy they will encounter in their work.
- Describe the methods used to control and eliminate hazardous energy associated with electrical and mechanical equipment.
- Describe the roles and responsibilities for establishing safe working conditions on the Power System.
- Understand the purpose of SPGs.
- Understand the importance of tags in the PSSP process.

- Identify the different types of SPGs.
- Explain the purpose of Protection Extensions.
- Describe the process for obtaining and returning a Protection Extension.
- Identify the different tags used in PSSP and explain their purposes.

4.0 Training Scope

To meet the objectives the course will include, but not be limited to, the following lesson plans;

PART 1: WORKING ON THE POWER SYSTEM

Lesson 1:

- Safety on the Power System
- Safety Protection at BC Hydro
- Hazardous Energy
- Avoiding Hazardous Energy

Lesson 2:

- Elements of Safety Protection
- Isolation of Equipment
- Worker Protection Grounding / Bonding
- Blocking

- Securing Protection: Locks and Tags
- Equipment to be Treated as Energized

Lesson 3:

- Safety Protection Roles and Responsibilities
- Responsibility for Operating the System
- Division of Authority for Work on the System
- The Person in Charge
- System Operation and Safety Aids
- PSSP Roles and Responsibilities
- WPP Roles and Responsibilities Job Planning and Communications
- Personal Safety Responsibilities

PART 2: WORK ON THE TRANSMISSION AND DISTRIBUTION SYSTEM

Lesson 1:

- Definitions
- PSSP Categories of Authorization
- The Category 3 Worker

Lesson 2:

- SPGs
- Introduction to SPGs
- PSSP Tags
- Clearances
- Test and Work Permits
- The Procedure for Clearances and Test & Work Permits
- Self Protection
- Working Under an SPG

LESSON 3:

- Protection Extensions
- About Protection Extensions
- Rules for Protection Extensions
- Obtaining a Protection Extension
- Returning a Protection Extension

5.0 Functional Component Training

Once a worker has completed PSSP Category 3 System Component training, the worker will be required to complete the appropriate Functional Component Training. The Functional Component training will contain the appropriate safety and

operating procedures for a specific function (Transmission, Distribution, Stations, NIA) of the power system. The delivery of Functional Component training will be appropriate to the job to be performed. It will include a review of necessary operating orders and hazards. There are four PSSP Functional Components that are generic to the BC Hydro system: the Distribution Component training, the Stations Training Component, the Non–Integrated Area training, and the Transmission Component Training .

6.0 Local Information

A worker must complete the appropriate Local Information for Distribution, Stations, Non–Integrated Area, or Transmission training prior to beginning work.

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1T–12L—MODULE 4

Training for Certified Utility Arborists

1.0 General

PSSP Category 4 System Component Training is required by Certified Utility Arborists engaged in vegetation management on or adjacent to the Power System and for these workers to receive Assurance of No Reclose Permits for that work.

Category 4 workers are responsible for working within their category of authorization, and are authorized to:

- Receive an Assurance of No Reclose Permit;
- Work under a PLT's Clearance with direct supervision;
- Receive Protection Extensions on existing Clearances; and,
- Work under a PLT's Self–Protection with direct supervision.

Certified Utility Arborists working for BC Hydro are bound by WorkSafeBC OHSR, Part 19.30–19.35, when the work involves trimming near energized conductors. They must be thoroughly familiar with, and understand these regulations.

2.0 Requirements

Certified Utility Arborists must complete this training module before they will be authorized for tree trimming and tree removal near power lines for BC Hydro. Only Utility Arborists who are certified and have received and understood this training will be authorized for this work by BC Hydro. The authorization process will include testing to determine level of understanding.

Successful completion of PSSP modules 2, 3 and 4 are a requirement prior to Category 4 authorization.

3.0 Training Objectives

The objectives of PSSP Category 4 System Component training are, but will not be limited to:

- Working within Limits of Approach as specified in WorkSafeBC OHSR Part 19.3
- Assurance of No Reclose Permits
- Application of Safety Protection for CUA's

4.0 Training Scope

To meet the objectives the course will follow, but not be limited to, the following lesson plans;

Lesson 1:

- Limits of Approach as specified in WorkSafeBC OHSR Part 19.3
- Differences between WorkSafeBC OHSR and SPR LOA Tables
- Application of SPR 405
- Crossing the Neutral Conductor
- When a PLT is Required

Lesson 2:

- Assurance of No Reclose Permit
- Circuit Identification
- Scheduling an ANRP
- Receiving and Returning an ANRP
- Blocking Reclosing/Tagging

Lesson 3:

- When Isolation is Required
- Working under a Clearance
- Working under Self Protection

- Taking a Protection Extension
- Grounding/Blocking Tagging

5.0 Functional Component Training

Once a worker has completed PSSP Category 4 System Component training, the worker will be required to complete the appropriate Functional Component Training. The Functional Component training will contain the appropriate safety and operating procedures for a specific function (Transmission, Distribution, Stations, NIA) of the power system. The delivery of Functional Component training will be appropriate to the job to be performed. It will include a review of necessary operating orders and hazards. There are four PSSP Functional Components that are generic to the BC Hydro system: the Distribution Component training, the Stations Training Component, the Non–Integrated Area training, and the Transmission Component Training.

6.0 Local Information

A worker must complete the appropriate Local Information for Distribution, Stations, Non–Integrated Area, or Transmission training prior to beginning work.

Power system safety protection
system operating order

1T–12L—Module 5

Training to Receive Safety Protection Guarantees, Live Line Permits and Take Self Protection

1.0 General

PSSP Category 5 System Component Training is required to obtain authorization to receive SPGs, Live Line Permits, Assurance of No Reclose Permits and to be authorized to operate level V equipment for the purpose of establishing Self Protection. Only workers who are authorized to Category 5 can be authorized to switch Level I – IV equipment.

A thorough knowledge of the applicable sections of the SPR and operating orders referenced in this training module is required. Workers must fully understand all aspects of their authorization and ensure that applicable procedures are followed.

Authorization to Category 5 provides a worker with authorization to operate level V equipment.

This allows the worker to fulfill the requirements of SPR 607 and 608 allowing a worker with Category 5 authorization to isolate level V equipment, such as a Distribution lateral, without direct contact with the PIC.

The Category 5 Worker holds a high level of responsibility for effecting safe work conditions on the power system including:

- Responsibility for each worker allowed to work on or to inspect the line or equipment to which the SPG applies.
- Identification of all hazardous energy sources when isolation is required.
- Making arrangements with the PIC to have the equipment removed from service and the switching performed.
- Verification of isolation.
- Applying grounding/bonding or blocking.
- Installing any necessary barriers or cover–up.
- Issuing Protection Extensions.
- Explaining the Safety Protection to all members of their crew, in a documented Tailboard meeting.

2.0 Requirements

A worker authorized to PSSP Category 5 is responsible for arranging the Safety Protection required to perform work and ultimately for the safety of all workers who depend on the Safety Protection established. To be considered a qualified PSSP Category 5 worker an individual must first demonstrate satisfactory performance in reference to:

- Experience;
- Knowledge;
- Training;
- Personal competency; and,
- Familiarity with rules, procedures, equipment, and hazards involved in the work and / or operation.

Successful completion of modules 2, 3, and 5 is a requirement for PSSP Category 5 authorization. Module 1A or 1B is required for Category 5 workers involved with isolating customers.

3.0 Training Objectives

The objectives of PSSP Category 5 training include but are not limited to, having workers be able to:

- Receive SPGs.
- Receive Live Line Permits.
- Issue Protection Extensions.
- Isolate level V equipment for Self Protection.

4.0 Training Scope

To meet the objectives the course will follow, but not be limited to, the following lesson plans:

Lesson 1: Regulations

- Safety Practice Regulations (SPR)
- Power System Safety Protection (PSSP) System Operating Order 1T–12
- Relationship between the SPR and PSSP
- WorkSafeBC Occupational Health and Safety Regulations
- Operating Orders

Lesson 2: Operating Authority and Operating Responsibility

- Equipment Levels

- Differentiating Between Levels
- Level I – IV
- Level V
- Equipment On and Off the Power System
- Equipment ON the Power System
- Equipment OFF the Power System
- Operating Responsibility
- Who has Operating Responsibility?
- What does a person with Operating Responsibility do?
- Operating Authority
- PIC (Person in Charge)
- Switching
- Who Performs Switching?
- Switching Authorization
- Switching Procedures
- System Risk
- Guarantee of Isolation
- Customer Boundaries

Lesson 3: Safety Protection Guarantees

- Types of SPGs
- SPG Form
- Clearances
- Clearances – Requesting, Issuing and Receiving
- Clearances – Returning a Clearance
- Protection Extensions
- Protection Extensions – Issuing and Returning
- Test and Work Permit
- Test and Work Permit – Requesting, Issuing and Receiving
- Test and Work Permit – Returning a Test & Work Permit
- Self Protection
- Self Protection – Isolating, Tagging and Removal
- Communication
- Worker Protection Grounding and Blocking for SPGs
- Tagging Requirements

Lesson 4: Assurance of No Reclose and Live Line Permits

- Assurance of No Reclose Permits (ANRPs)
- Requesting and Taking Permits
- Returning Permits
- Live Line Permits (LLPs)
- Requesting and Taking Permits
- Returning Permits

5.0 Functional Component Training

Once a worker has completed PSSP Category 5 System Component training, the worker will be required to complete the appropriate Functional Component Training. The Functional Component training will contain the appropriate safety and operating procedures for a specific function (Transmission, Distribution, Stations, NIA) of the power system. The delivery of Functional Component training will be appropriate to the job to be performed. It will include a review of necessary operating orders and hazards. There are four PSSP Functional Components that are generic to the BC Hydro system: the Distribution

Component training, the Stations Training Component, the Non–Integrated Area training, and the Transmission Component Training.

6.0 Local Information

A worker must complete the appropriate Local Information for Distribution, Stations, Non–Integrated Area, or Transmission training prior to beginning work.

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System Operating Order

1T–12L—Module 6

Training For Persons In Charge

1.0 General

PSSP Category 6 System Component Training is required for authorization to perform PIC Duties. These duties include receiving Operating Authority and directing the switching required to establish isolation for Safety Protection and issuing SPGs, Live Line Permits and Assurance of No Reclose permits.

BC Hydro's tag–out system for Safety Protection (PSSP) is structured around a hierarchical, centrally controlled arrangement of Operating Authority. Operating Authority is defined as the right to control an assigned portion of the power system to establish the conditions required for and to issue SPGs, Live Line Permits and Assurance of No Reclose Permits. Only workers trained and authorized to PSSP Category 6, Persons in Charge (PIC), can be assigned Operating Authority. The

assignment of Operating Authority to the PIC is rigorously implemented.

The PSSP PIC must:

- Ensure that the status of the power system or assigned part of the power system is accurately represented on a mimic display.
- Direct the operation and tagging of level I to IV equipment.
- Maintain a log of switching details, SPGs and operational events.
- Authorize the commencement of any work on the power system or assigned part of it.

2.0 Requirements

Workers authorized to Category 6 are responsible for establishing the conditions necessary for, and the issuance of, SPGs required to perform work on the power system. To be considered qualified, a worker must first demonstrate satisfactory performance in reference to:

- Experience;
- Knowledge;
- Training;

- Personal competency; and,
- Familiarity with rules, procedures, equipment, and hazards involved in the work and / or operation.

Successful completion of modules 2, 3 , 5 and 6 is a requirement for Category 6 authorization. Modules 1A and 1B are required for PICs involved with isolating customers. Module 4 is not required but recommended for PICs issuing Assurances of Non Reclose to Certified Utility Arborists.

3.0 Training objectives

Operating Authority can be assigned to PICs in BC Hydro for the following areas:

- Real Time Operations (RTO) Operators at BC Hydro's Control Centres for the Integrated Transmission and Distribution system.
- Non–Integrated Area Operators are PICs for PSSP equipment.
- Manned Generating Station Operators are PICs for PSSP equipment (GMS and PCN).

- Project Controllers are PICs for Construction projects.
- Temporary PICs can be assigned Operating Authority for large projects and in system emergencies.

Note: The PSSP Category 6 training objectives are under review.

4.0 Training Scope

To meet the objectives the course will follow, but not be limited to, the following lesson plans;

Note: The Lesson Plans for PSSP Category 6 training are under review.

5.0 Functional Component Training

Note: The Functional Component training for PSSP Category 6 training is under review.

6.0 Local Information

Note: The Local Information training requirements for PSSP Category 6 training are under review.

Power System Safety Protection
System Operating Order

1T–12M—Authorization

1.0 General

All employees and contractors working on, or accessing, the BC Hydro power system are required to have Power System Safety Protection System Component training, in accordance with 1T–12L rule 3.1 and as applicable to the location of the worksites, Distribution Component (DBC), Stations Component (STC), Non–Integrated Area (NIA) and/or Transmission Component (TXC), plus Local Information training. In addition, they must be authorized in the PSSP Manager database by a BC Hydro Authorizing Manager.

This order details the principles, processes and procedures for Authorizing Managers.

The list of Authorizing Managers can be found on the PSSP Website.

Lists of Authorizing Managers and authorized workers can also be accessed via:

- PSSP web page **(http://w3f5/pssp/index.shtml)**
- PSSP Manager

(http://fvobchwebsvc1/pssp_mgr/)

PSSP training requirements in SOO 1T–12L cover the overall training requirements for safety protection on the BC Hydro system. There are also four PSSP Functional Components that outline the additional requirements that are generic to the BC Hydro system: the Distribution Component training (DBC), the Stations Component training (STC), the Non–Integrated Area training (DGC), and the Transmission Component training (TXC).

The Local Information training identified in 1T–12N covers the additional requirements that are specific to a geographic area, headquarters or station where the work is to be undertaken. Before a worker can begin work on a specific portion of the power system, the worker requires the following:

- System Component Training and authorization CAT 2, 3, 4, 5 or 6;
- Functional Component Training and Authorization (DBC, STC, TXC, DGC as applicable); and,
- Local Information applicable to where work is to be performed, received, reviewed and recorded.

PSSP authorization may be granted for any period of time, up to a maximum of two years, from the System Component training date. PSSP authorization expires based on the earliest expiration of the System or Functional Component authorization required to perform the work.

2.0 Authorization

2.1 PSSP AUTHORIZING MANAGERS

All PSSP Authorizing Managers must be approved by an M3 or higher, or by the Chair of the PSSP Review Committee.

Authorizing Managers are required to be authorized to the same category that they provide to workers.

There are two categories of Authorizing Managers: Senior Managers and First Line Managers.

2.2 SENIOR AUTHORIZING MANAGERS:

- May authorize themselves in PSSP.
- Authorize First Line Managers.

2.3 FIRST LINE AUTHORIZING MANAGERS:

- May authorize their direct reports and/or other workers.
- Cannot authorize themselves.
- Cannot authorize other First Line Managers.

3.0 Responsibilities

1.1 AUTHORIZING MANAGERS

Authorizing managers who are assigned responsibility for PSSP authorization are listed in Appendix 1 of this order.

Authorizing managers are those responsible for providing authorization to workers and visitors who need to access and/or work on the power system.

3.2 DIRECT LINE MANAGERS

Direct line managers have workers reporting to them. For PSSP authorizing purposes, contract managers are considered direct line managers. If direct line managers are not authorized managers themselves, they must arrange with an authorizing manager to authorize their

workers or contractors for System and Functional Component.

Direct line managers must ensure that all PSSP training is provided for their workers and that they are authorized in PSSP Manager. Direct line managers are responsible for their workers, training and authorization and they will be required to address any “areas for improvement” before the authorizing manager will approve entry of the worker’s completion of System and Functional Component training into PSSP Manager.

The direct line manager must regularly review the status of their workers to ensure their authorization is current and appropriate.

3.3 WORKERS

It is each worker’s responsibility to understand and not exceed the limits of his or her PSSP authorization, including:

- Category of authorization;
- Functional Component authorization area;
- Switching authorization; and,
- Authorization expiry dates.

3.4 APPRENTICES

Electrical Worker apprentices may only be authorized up to Category 3.

4.0 Authorization Procedures

4.1 AUTHORIZATION PROCEDURES

The PSSP Manager database is not automatically updated when a worker successfully completes the written or Web–Based exams. An Authorizing Manager must approve all completed exams. If there are any incorrect answers (areas of improvement), an Authorizing Manager (or their delegated authorized trainer) must review the exam with the worker before authorizing the worker. It is the Authorizing Manager's option to authorize the worker's System Component training completion (on line), or select "review only" and require the worker to take the exam again.

Upon completion of classroom or Functional Component training, the trainer or the Authorizing Manager will complete a PSSP Station, Distribution, Non–Integrated Area, and/or Transmission Component training form and complete Local Information training. The manager will arrange for the training and

authorization record to be entered into the PSSP Manager database.

PSSP requirements before commencing work on a specific portion of the Power System are: System Component Training and Functional Component Training and Local Information Training and Manager Authorization.

Authorization must be renewed prior to the expiration of the System Component by completing both System and Functional Component training.

4.2 BIENNIAL REVIEW AND REAUTHORIZATION

Authorized workers must review the System and Functional Component of the appropriate PSSP categories every two years. The review will be followed by testing as per SOO 1T–12L to renew the worker's authorization. The worker will also be given an update of the Local Information training and summary sheet. The authorizing manager will ensure the details of the reauthorization are entered in PSSP Manager.

4.3 EXCEPTIONS TO AUTHORIZATION

PSSP authorization is required for all workers who require Safety Protection from power system hazards during prescribed work. The authorizing manager will provide judgment in the assessment of hazards requiring PSSP training and authorization. For additional clarification refer to the PSSP Review Committee Chair.

Persons who access or work on the power system for 1 work day or less need not be authorized provided they are under the direct and continuous supervision of a person having appropriate PSSP authorization. This typically depends on the hazards, risk and complexity of the work and is intended for out–of–the–ordinary circumstances where one–time access is required. In the event that direct and continuous supervision cannot be maintained the unauthorized worker must receive PSSP training and authorization.

If, after confirmation by the authorizing manager, that the workers will remain outside of Unqualified Worker Limits of Approach and that the power system does not pose a hazard to the workers, then PSSP training or authorization of the workers will not be required.

However, appropriate WorkSafeBC related safety instruction is required during the pre–job and tailboard discussions, as well as completion of the BC Hydro online electrical awareness training by all workers.

Examples of this type of work include:

- Hydroseeding beside a BC Hydro facility;
- Application of herbicide in a right–of–way;
- Security inspections outside of a BC Hydro facility;
- Environmental assessment in a right–of–way; and,
- Right–of–way Road maintenance.

4.4 PSSP SYSTEM RESTRICTIONS

PSSP Manager allows for recording of system and functional restrictions. For the purpose of PSSP, the following restrictions apply:

- A = Not allowed to enter any substations.
- B = Not allowed to enter indoor substations.
- C = Restricted to being a Project Controller (PIC) of a Construction project only.
- D = Restricted to taking Live Line Permits only.

- E = Restricted to establishing Self–Protection only.
- F = Restricted to working on secondary (overhead and under–ground) only.
- G = Establish Caution Tags in their name for work location only.
- H = Only allowed to enter substation yards (Note: must stay clear of all energized equipment (i.e. for deliveries, vehicle maintenance, etc.).
- I = Restricted to work on Transmission right–of–way only.
- J= Not allowed to receive protection extensions.
- K= PLTs allowed to operate feeder automatic reclosing control.
- L = Street lighting only.

Restrictions may also be applied at the System or Functional Component as deemed necessary by the Authorizing Manager. System Component restrictions are entered into the "Remark" field. Functional Component restrictions are entered into the "Local Restrictions" field.

4.5 SWITCHING AUTHORIZATION

PSSP Manager is used to record workers who are authorized to switch power system equipment under the PIC's direction. This is accomplished by completing the "Authorized to Switch" field in PSSP Manager.

4.6 AUTHORIZATION FOR WORK ON THE POWER SYSTEM DURING EMERGENCIES

When a system emergency is declared by the Executive Vice President of Operations and/or the Senior Vice President of Safety the following may apply.

All access to the Power System will be as stated in System Operating Order (S.O.O.) 1T–12 Power System Safety Protection with the following exceptions:

1. Qualified Electrical Workers from other jurisdictions working under the direct and continuous supervision of a Qualified and Authorized PSSP worker holding a SPG may work on de–energized equipment following approved BC Hydro Procedures. The qualified Electrical worker in charge shall ensure the non PSSP workers are made aware of all hazards and

local information relevant to the work they are performing.

2. After obtaining agreement from the IBEW, managers with PSSP Cat 5, who are qualified Electrical workers, may receive Live Line Permits, SPGs, and issue Protections Extensions.

3. After obtaining agreement from the IBEW, managers with PSSP Cat 5 and Swiching Authorization, who are qualified Electrical workers, may direct switching in order to support the declared emergency response.

4.7 AUTHORIZATION TO ADDITIONAL AREAS

Before a worker can be authorized to work in another area or headquarters on the power system the authorizing manager or delegate must:

- Confirm the worker's PSSP authorization by reference to PSSP Manager.
- Provide appropriate local information training.
- Update PSSP Manager.

4.8 TEMPORARY SYSTEM AND FUNCTIONAL COMPONENT EXTENSION

System and Functional Component Extensions may be provided for a period of up to 30 days. This extension period is to allow these individuals sufficient time to complete their work or allow for renewal of their System and Functional Component training. No extension beyond the 30 days is allowed.

1T–12N—Functional Component and Local information Training

1.0 General

Functional Component training (Section 4.0) covers additional requirements for work in or on the respective systems as follows (refer to OO 1T–12L Section 2.2 and Appendix 1):

- Stations Component (STC)
- Transmission Component (TXC)
- Distribution Component (DBC)
- Non–Integrated Area (DGC)
- BC Hydro Control Centre Operator (CCO)
- Vancouver area indoor Stations (VAS)

Web based training is available for STC, DBC and TXC. DGC, CCO and VAS training are provided by the local manager. Local Information training (Section 5.0) provides the specific knowledge required for the geographic area or headquarters where the station, transmission line, distribution

line, diesel generating station, or Vancouver Area Indoor Substation work is to be undertaken (refer to Appendix 2).

2.0 Responsabilities

2.1 WORKERS

Employees and contractors are responsible to take the functional component training and exam. Additionally they are responsible to review the local information.

3.0 Functional Component Training

3.1 STATIONS TRAINING COMPONENT

The Stations Training Component requirements are consistent throughout the entire Province, and shall be conducted in accordance with the applicable forms in Appendices 1 and 2.

Local Station Managers are responsible for issuing keys for access to the Stations in a given Region.

Note: Access to substations may require additional NERC CIP training and authorization. Speak to your BC Hydro Authorizing manager or BC Hydro contract Representative for further details.

If an authorized worker is required to work in another Region, with a different Station Locking

system, they must advise the Manager for the Station they plan to work at and be issued the appropriate keys to gain access.

The Stations Training Component is considered generic but does not include Vancouver Area indoor substations (VAS). To enter or work in these unique substations requires specific training which will be provided by the local Stations Manager. These indoor substations include: Cathedral Square (CSQ), Dal Grauer (DGR), George Dickie (GDK), Mount Pleasant (MPT) and Murrin (MUR). After training is provided to access these stations, Appendix 1 must be completed and PSSP Manager must be updated to indicate the completion of this additional training.

3.2 TRANSMISSION, DISTRIBUTION, AND DIESEL GENERATION COMPONENTS

Transmission Component, Distribution Component, and/or Diesel Generation Component training shall be conducted in accordance with the applicable forms in Appendices 1 and 2 through web based training, or an authorized PSSP Trainer as identified in PSSP Manager.

3.3 BC HYDRO CONTROL CENTRE OPERATIONS COMPONENT

BC Hydro Control Centre Operations Component shall be conducted as part of the TDSO control room operator training in accordance with the TDSO Training Program.

Upon completion of this training, the Authorizing BC Hydro Manager will arrange to update the authorization record in the CROW Database

4.0 Local Information Training

The Local Information may differ between geographic areas and headquarters, but must follow the template in Appendix 2.

The BC Hydro Authorizing Manager, or their delegate, is responsible to ensure all workers who work in their area or headquarters have reviewed and understand this information.

The amount of training will be appropriate to the job to be performed (refer to 1T–12L, Section 2.2). A record of the review shall be recorded on PSSP Manager. It must be explained to the worker that the Local Information allows them to work only in that specific geographic area, substation, headquarters, or diesel generating area.

The BC Hydro Authorizing Manager is responsible for keeping information on their Local Information sheet up to date, and for providing any updates to the Fraser Valley Office (FVO) for posting on the BC Hydro Site Information System (SIS).

The Local Information requirements are applied consistently throughout the entire Province. Local Information training includes ensuring the worker is aware of the applicable System Operating Orders (SOOs) and where to locate them (refer to Appendix 3). SOOs referenced in Appendix 3 can be accessed on SIS **(http://w3ecm/sis/index.html)**.

When the Local Information training is completed by a worker, the BC Hydro Authorizing Manager will provide the completed Appendix 1 for that worker to the local PSSP administrative assistant for entry into PSSP Manager. A copy of the completed Appendix 1 should be kept on file for audit purposes.

- APPENDIX 1 – TRAINING COMPONENT FORM can be accessed on PSSP web page **http://w3f5/pssp/documentation.shtml**.
- APPENDIX 2 – LOCAL INFORMATION FORM can be accessed on PSSP web page **http://w3f5/pssp/documentation.shtml.**

- APPENDIX 3 – LIST OF SYSTEM OPERATING ORDERS REQUIRED BY COMPONENT can be accessed on PSSP web page h**ttp://w3f5/pssp/documentation.shtml.**

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