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**PSSP/WPP Category 2/A**

# **Basic safety in BC Hydro facilities**



August 2024

## **Training and development Participant guide**

 **BC Hydro**  
Power smart

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Learning, Development and Trades Training

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This course was developed by BC Hydro Learning, Development and  
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## Your notes

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# Course introduction

Welcome to the **Basic Safety in BC Hydro Facilities** course. This course was developed by BC Hydro Learning, Development and Trades Training.

Approximate time required to complete this training is **2 to 2 ½ hours**.

## Audience

All workers who require authorization to PSSP category 2 or WPP category A so they can access the BC Hydro Power System facilities.

## Course goal

This course is the System Component training that is required for authorization to either:

- Power System Safety Protection (PSSP) Category 2
- Worker Protection Practices (WPP) Category A

The desired outcome of this course is that you will fully understand both the hazards you may encounter at BC Hydro facilities and the safety precautions you must take to avoid injury.

## Course objectives

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

- Recognize the common hazards in BC Hydro facilities.
- Identify your responsibilities for ensuring your own safety and the safety of others.
- Use the Limits of Approach table to find how far away you must stay from high-voltage electrical equipment.
- Identify the key safety and security measures you must follow when entering a BC Hydro facility.
- List your responsibilities with respect to work-related incidents.

## Course topics

- Introduction to Safety
- Working Safely around Live Electrical Equipment
- Accessing Facilities
- Preparing to Work Safely

## Completion requirements

At the end of the course you will complete an assessment to demonstrate your understanding of the information taught in this course.

### Your notes

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# Introduction to safety

**Purpose:** The purpose of this lesson is to familiarize you with the dangers at BC Hydro power system facilities and the measures that are in place at BC Hydro to ensure every worker's safety.

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

- Define key terms related to safety.
- Discuss key workplace hazards and the injuries they may cause.
- Explain the key regulations that govern safety at BC Hydro.
- Outline the responsibilities for safety at BC Hydro.
- Explain the purpose of Local/Functional Component training.
- Identify other safety resources at BC Hydro.

**Topics:** This lesson covers the following topics:

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

## Life Saving Rules

Life Saving Rules were developed by BC Hydro's Safety Taskforce to highlight an overarching value: Have the courage to intervene if you see an unsafe act or condition or you observe someone unfit for work.



1. Maintain your Limits of Approach



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



3. Test for hazardous energy



4. Ensure that Worker Protection Grounding/Bonding is applied



5. Protect yourself from falling when working at height



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



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



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



9. Adjust your driving to the weather and road conditions



## What is safety?

Like any industrial workplace, BC Hydro's power system facilities are potentially dangerous places to work. Whatever we are doing in these facilities, we must be aware of the dangers that are present and the ways we can avoid being injured. We must work safely.

Before we look at some of the specific types of dangers, let's define our terms clearly, so we are all talking about the same thing.

In this course, when we talk about power system facilities, we mean BC Hydro workplaces that include electrical and mechanical equipment used in the generation, transmission, and distribution of electricity. This includes generating stations, substations, and transmission and distribution lines.

**Note:** While this course focuses on fenced facilities, most of the principles and safety rules also apply to work outside the stations, on BC Hydro's transmission and distribution lines.

**Safety** means freedom from the risk of injury or disease. If you are safe, you are not in danger of being hurt in any way.

A **hazard** is a substance, force, or condition that may expose a person to a risk of injury or disease.

**Risk** is the probability that an incident with serious consequences will occur ( $\text{Risk} = \text{Probability} \times \text{Consequence}$ ). The higher the probability and the more severe the consequences, the higher the risk.

A **safe workplace** is a place where all hazards are eliminated or controlled so as to minimize the risk of injury or death.

Throughout BC Hydro, the ongoing goal is to integrate safety into everything we do and to strive for zero accidents or injuries. As part of this strategic intent, we believe in the principle that training to work safely is a corporate responsibility. This course, Basic Safety in BC Hydro Facilities, is one tool in this ongoing goal.

## Workplace hazards

There are many types of workplace hazards at BC Hydro's facilities. These include, but are not limited to:

- Electrical hazards
- Mechanical hazards
- High-pressure hazards
- Fire hazards
- Chemical hazards

### Electrical hazards

There is a very good reason that BC Hydro's power system facilities are fenced and power lines are elevated to prevent access. These worksites are full of high-voltage electrical equipment. These include:

- High-voltage transmission and distribution lines
- High-voltage switches
- Transformers
- Electrical distribution panels
- Circuit breakers
- Generators



While electricity is a very useful form of energy, it can also be dangerous. Most of us know that we have to be careful with electricity in our homes. If you touch a frayed power cord, you can get quite a jolt.

Our household electrical circuits operate at 120 and 240 volts. At that level of power, you have to actually come into contact with a conductor (such as a bare wire carrying current) to be hurt. On the power system, the voltages can be anywhere from 24 to 500,000 volts. High voltages (over 750V) can actually pass through the air from one conductor to another or ground, in a phenomenon called arcing.

In most cases, you will not get close enough to a high-voltage conductor to touch it because before you touch it, the electricity will arc through the air and contact you.

### **Types of electrical injuries**

Electrical currents can cause the following injuries:

- Broken bones and lacerations
- Severe burns
- Blindness, kidney damage, and heart damage
- Death resulting from electrocution

These injuries can happen in a variety of ways:

- Direct contact with an electrical conductor.
- Arcing of electricity from a nearby electrical conductor.
- A short or fault causing electricity to flow through the ground.
- Falls from height as a result of the muscle contractions or startling that can occur from electric shock.

## Mechanical hazards

Although most people are well aware of the electrical hazards associated with working on the power system, mechanical hazards are also a big concern. Many of the tasks performed on the power system expose workers to the possibility of injury. Some of the mechanical equipment that may cause injuries includes:

- Trucks, aerial lifts, and other work vehicles
- Overhead cranes and elevated objects
- Hydroelectric and thermal generators and their associated equipment
- Ladders, elevated work platforms, and scaffolds
- Chainsaws, drills, and other power tools

### Types of mechanical injuries

Many types of injuries can result from mechanical equipment including:

- Fractures
- Lacerations, contusions, and abrasions
- Concussion
- Paralysis
- Death

These injuries can happen in a variety of ways:

- Getting hit or crushed by a vehicle, a piece of equipment, or a falling object.
- Having your clothing or a body part snagged and dragged into operating machinery.





## High-pressure hazards

Many systems in BC Hydro facilities are powered by pressurized liquids and gasses. These include:

- Hydro-electric generators, which are powered by high-pressure water.
- Thermal generators, which are powered by pressurized steam.
- Generating unit governors, which are powered by high-pressure hydraulic oil.
- Pneumatic tools and equipment, which are powered by high-pressure air.
- High-voltage circuit breakers, which contain pressurized gasses.

### Types of high-pressure injuries

Injuries from high-pressure include:

- Injection injuries, where material is blown into your body
- Broken bones
- Lacerations, contusions, abrasions, and burns
- Death

These injuries can occur when a hose or pipe breaks and releases high-pressure liquid or gas in an uncontrolled manner.



## Fire hazards

The following are potential fire hazards at BC Hydro worksites:

- Energized electrical equipment
- Overheated grounding rods
- Oil-filled transformers
- Flammable liquids, including fuel
- Chemicals
- Welding and other hot work
- Batteries
- Oily rags

Much of the smaller equipment found in the power system does not have enough fuel to sustain a fire and typically involves an initial arc, flash or explosion. Oil filled transformers and batteries are the exception. Transformers can easily hold 7500 litres or more of combustible oil. Batteries may also burn or explode if exposed to a spark or overheating.

### Types of fire injuries

Injuries from fire include:

- Thermal and contact burns
- Lung damage
- Blindness
- Death

These injuries can happen in a variety of ways:

- Smoke inhalation
- Toxic gas inhalation
- Explosion

- Splattering of hot liquids



## Chemical hazards

Many types of chemical hazards exist at BC Hydro worksites. These include:

- Toxic fumes
- Sulphur hexafluoride (SF<sub>6</sub>) gas
- CO<sub>2</sub> or deluge systems
- Batteries and battery rooms
- Treated wood poles

Chemical hazards exist at just about every worksite, even offices. You must be aware of the types of chemicals common to your worksite.

## Types of chemical injuries

Injuries from chemicals include:

- Burns to the skin and eyes
- Lung damage
- Damage to the internal organs
- Death

These injuries occur in a variety of ways:

- Direct contact through misuse or spillage
- Inhalation
- Ingestion



## Safety rules and regulations

Work at BC Hydro is governed by two primary sets of safety rules and regulations:

- WorkSafeBC Occupational Health and Safety Regulation
- BC Hydro Safety Practice Regulations (SPR)

It is every worker's responsibility to understand and apply the rules and regulations that apply to the work they are doing. Failing to comply with these regulations is a serious offence.

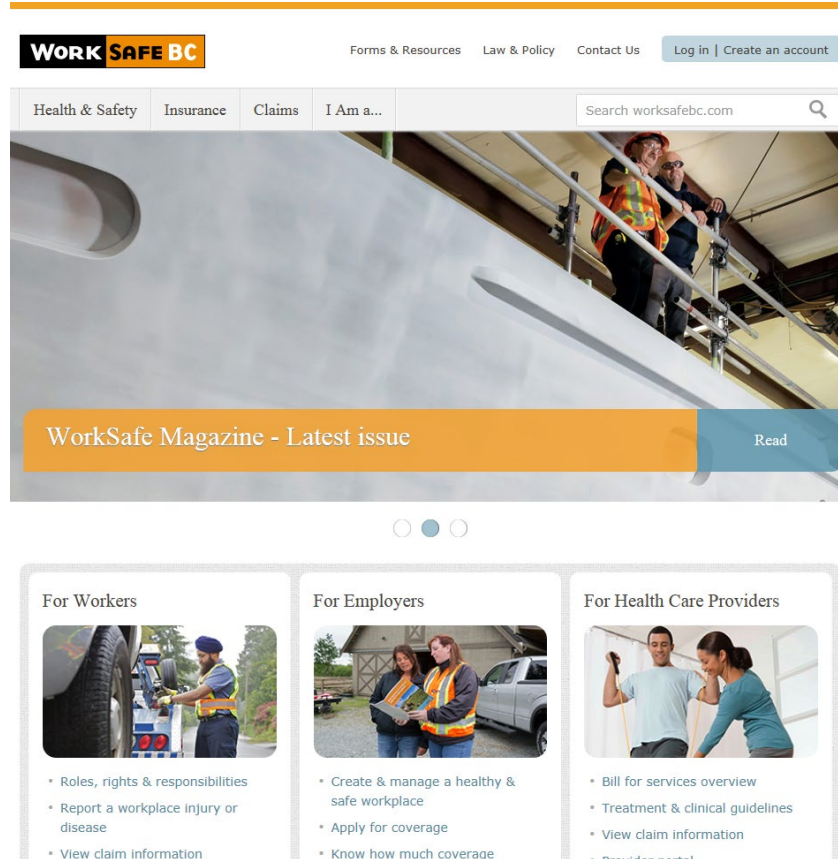
### WorkSafeBC regulations

The WorkSafeBC Occupational Health and Safety Regulation is provincial legislation that governs safety at all worksites in BC. Every employer and worker in BC is legally responsible for following this legislation, and there are serious penalties for any infractions.

All of BC Hydro's safety rules, processes, and procedures comply with the WorkSafeBC Regulation.

You can get a paper copy of the WorkSafeBC Regulation, or you can consult it on-line at <http://www.worksafebc.com>.





**OSH Regulation on the WorkSafeBC Website**

**Safety practice regulations**

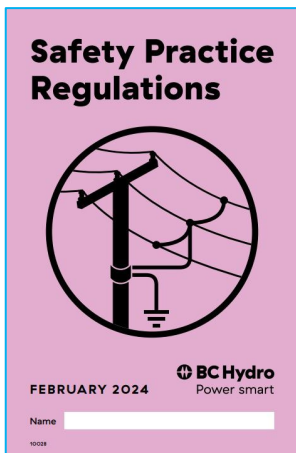
The Safety Practice Regulations (SPR) are the rules and instructions that govern all work done by or for BC Hydro and all access to BC Hydro’s power system. The SPR has been developed and revised through years of experience in operating the BC Hydro system.

The rules in the SPR are defined by the Safety Practices Committee, which includes management and union workers. Between new editions, the committee distributes new rules, revisions, and interpretations through Bulletins and FYIs. Your supervisor is responsible for informing you of these changes.

It is your responsibility to read, understand, and follow the rules that apply to your worksite and the types of work you do. If you do not understand any of the rules or requirements, speak to your manager or union representative to get an explanation. All on site workers are required to be in possession of a copy of the SPR.

The SPR is divided into eight sections:

- 100 General Safety Rules
- 200 Incidents and First Aid



- 300 Personal Protective Equipment and Tools
- 400 Work Near, or On, Energized Conductors and Equipment
- 500 Isolation, Grounding, and Blocking – General
- 600 Isolation and Tag-Out
- 700 Isolation and Lock-Out
- 800 Minimum Crew Complement, Supervision, and Safety Watcher Requirements

Sections 100 to 300 and the first half of section 400 apply to everyone who works in a power system facility. These are the rules and regulations that we will focus on in this course.

The second half of section 400 and sections 500 to 700 apply only to those who work directly on power system equipment.

Everyone must follow section 800 to establish the minimum crew complement to safely complete the assigned work.

## Safety responsibilities

BC Hydro is committed to providing a work environment that maintains the highest level of safety possible. Achieving our goal of zero injuries requires everyone who works at BC Hydro facilities to share the responsibility for safety. BC Hydro supervisors, contractors, and all workers must integrate safety into everything they do.

### Responsibility of supervisors

Supervisors (including managers, crew and work leaders, or any other employee who oversees, instructs, directs, or controls others in the conduct of work) are responsible for:

- Ensuring that workers have the tools, resources and information to work safely.
- Enforcing safe work procedures, rules, standards, and regulations and correcting all unsafe conditions, equipment, and activities.
- Ensuring all work is planned and designed to remove hazards or have effective barriers in place to minimize safety risks.
- Being open and responsive to safety issues that are raised by employees or that arise from the work being overseen, and providing timely follow up to those issues.
- Assigning only qualified and authorized workers to all jobs.
- Ensuring that the workers understand what they are allowed to do and what they are not allowed to do with respect to their authorization.

The managers' responsibilities are specified in Safety Practice Regulations rule 104 and the corporate policy statement.



## Responsibility of workers

All workers are responsible for:

- Ensuring their own safety and the safety of their co-workers, contractors, and the public to the extent of their knowledge and control.
- Working safely and knowing and following all applicable safety rules and work procedures.
- Intervening when they see unsafe work or conditions and immediately correcting, or reporting to their manager or supervisor, unsafe conditions, equipment and activities.
- Refusing work if they believe it is unsafe for them or others.
- Performing only those work activities that they are trained and authorized to perform.
- Using appropriate personal protective equipment (PPE) and devices as required.

The workers' responsibilities are specified in Safety Practice Regulations rule 105 and the corporate policy statement.



## Responsibility of contractors

All contractors and their employees who work on the BC Hydro power system are responsible for ensuring that their workers:

- Have the appropriate training and authorization for the work they are contracted to do.
- Follow all safety regulations and procedures for each job they undertake.



## Safety training

BC Hydro uses two systems of training and authorizing workers for different levels of responsibility:

- Power System Safety Protection (PSSP) is used in Transmission and Distribution facilities.
- Work Protection Practices (WPP) is used in generation and non-integrated (NIA) facilities.

Workers require authorization under PSSP or WPP to access facilities or work on power system equipment. The category of authorization (and the training) you require depends on your job responsibilities.

For PSSP, the authorizations are as follows:

Category	Authorization
1	1A: Customer below 60 kV without customer infeeds 1B: Customer with 60 kV and above, or customer connections below 60 kV with customer infeeds
2	Access the power system
3	Work on the power system Receive Protection Extensions
4	Certified Utility Arborist
5	Receive Safety Protection Guarantees and Live Line Permits Apply Self Protection
6	Perform PIC Duties: Issue Safety Protection Guarantees Issue Live Line Permits and Assurance of No Reclose Permits

For WPP, the authorizations are as follows:

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



This course, *Basic Safety in BC Hydro Facilities*, is **System Component** training for PSSP Category 2 and WPP Category A.

It covers general safety rules and procedures that apply in all BC Hydro facilities and is a prerequisite for getting authorized to access and/or work around the power system or in any power system facility.

To be authorized for work at a BC Hydro facility, you will need to complete:

For transmission & distribution areas using PSSP	For generation & NIA facilities using WPP
<ul style="list-style-type: none"> <li>• System Component training</li> </ul>	<ul style="list-style-type: none"> <li>• System Component training</li> </ul>
<ul style="list-style-type: none"> <li>• Functional Component training</li> </ul>	<ul style="list-style-type: none"> <li>• Local Component training</li> </ul>
<ul style="list-style-type: none"> <li>• Local Information training</li> </ul>	

**Functional Component** training outlines additional requirements that are generic to the BC Hydro system and pertain to distribution, station, transmission and non-integrated areas using PSSP.

**Local Component/Local Information** training covers site-specific safety requirements and procedures, including information about:

- Specific hazards at the site
- Security systems
- Communications systems
- Key contacts
- Fire, first aid, rescue, and evacuation procedures

**Note:** Entry into indoor substations requires specific Functional Component training, Local Information and authorization by the local site Manager.

When you have completed this course, the site Manager or Supervisor responsible for the work or activity taking place will provide you with Local Component training or Functional Component & Local Information training at every site where you will work.

On successful completion of the Local Component or Functional Component & Local Information training for a facility, the site Manager or Supervisor will authorize you to work in that facility.

**System Component Category 2/A authorization does not permit you to work directly on power system equipment.**

Your authorization to access a facility is only valid when the facility is operating under normal conditions. Upon entering a facility, you must familiarize yourself with the emergency procedures and in an emergency situation you must leave the facility as dictated by the evacuation

procedure. You must not re-enter or support first responders unless you have been trained and authorized to do so.

**Note:** Anyone who is not authorized to access a facility must be under the direct and continuous supervision of a person who is authorized.

## Training for work on power system equipment

If you will be working as an electrician, power line technician, CPC Technologist, engineer, mechanic, apprentice, utility arborist, or Driver-Helper, you will be required to take additional safety courses, such as Working on the Power System, and receive further authorization to work on power system equipment. The courses and authorizations you need depend on:

- The type of work you perform.
- The level of responsibility you have for the safety of other workers.

Your manager or supervisor will advise you of the courses and Local Component or Functional Component & Local Information training that are required for the job you will be doing.



## Other safety resources

Besides the rule books and safety-related training, there are a variety of other safety resources available to you. These include:

- Occupational Safety and Health (OSH) Standards
- Rules and Procedures
- Occupational Safety and Health (OSH) Specialist
- Trades Training Instructors (TTIs)
- Safety Advocates (SA's)

### OSH standards

OSH Standards are documents that expand upon the rules provided in the SPR. The OSH Standards explain in great detail the health and safety rules and requirements that are related to specific topics. Examples include:

- Job Planning
- Chainsaws and Portable Power Tools
- Confined Space Entry and Work
- Respiratory Protection
- Fire Extinguisher Maintenance
- Fall Protection
- Working Safely in Wildlife Habitat

All of the OSH Standards are listed in appendix F in the SPR, and are available from SafeHub or on the Safety Extranet.

### Rules and procedures

Rules and procedures are developed for safely performing hazardous tasks.

Examples include:

- Asbestos Management
- Work Methods
- Worker Protection Grounding
- Isolation for Mechanical Apparatus
- Confined Space Entry

Rules and procedures are available from SafeHub or on the Safety Extranet.

## Occupational safety and health specialists

Occupational Safety and Health (OSH) Specialists are the front-line health and safety resource persons at BC Hydro. They provide advice, information, and training for BC Hydro employees, contractors, customers, and the general public on issues of workplace safety and health. They monitor safety programs, processes, and worksites to ensure that work practices and conditions provide the highest degree of employee and public safety.

Contact information for your local OSH Specialist can be obtained from your manager.

## Trades training instructors

Trades Training Instructors (TTIs) are experienced power system workers who have been given the responsibility of supervising, instructing, and demonstrating safe and efficient work methods and procedures in the classroom and in the field. They actively participate in the ongoing work of BC Hydro while using these opportunities to teach and mentor other workers.

## Safety advocates

Safety Advocates (SAs) are experienced electrical journeypersons with technical background and expertise that enables them to:

- Be viewed as an expert on how to safely and efficiently complete the work.
- Influence management.
- Be a leader who demonstrates courage to act and intervene when required.
- Provide interpretation and clarification on the application of approved work procedures, safety rules and standards.
- Be a leader who can work alongside crews to evaluate, observe and provide feedback on Safety Leadership, Work Methods and Job Planning.

## Your notes

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# Working near but safely apart from live electrical equipment

**Purpose:** The purpose of this lesson is to familiarize you with the safety concerns associated with working near electricity.

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

- Describe the effects of electricity.
- Define the Limits of Approach.
- Explain step and touch hazards.
- Discuss station ground grids.
- Explain safety issues specific to trucks, cranes and aerial lifts.

**Topics:** This lesson covers the following topics:

- Electricity and the human body
- Limits of Approach
- Step and touch potential
- Station ground grids
- Trucks, cranes, and excavators

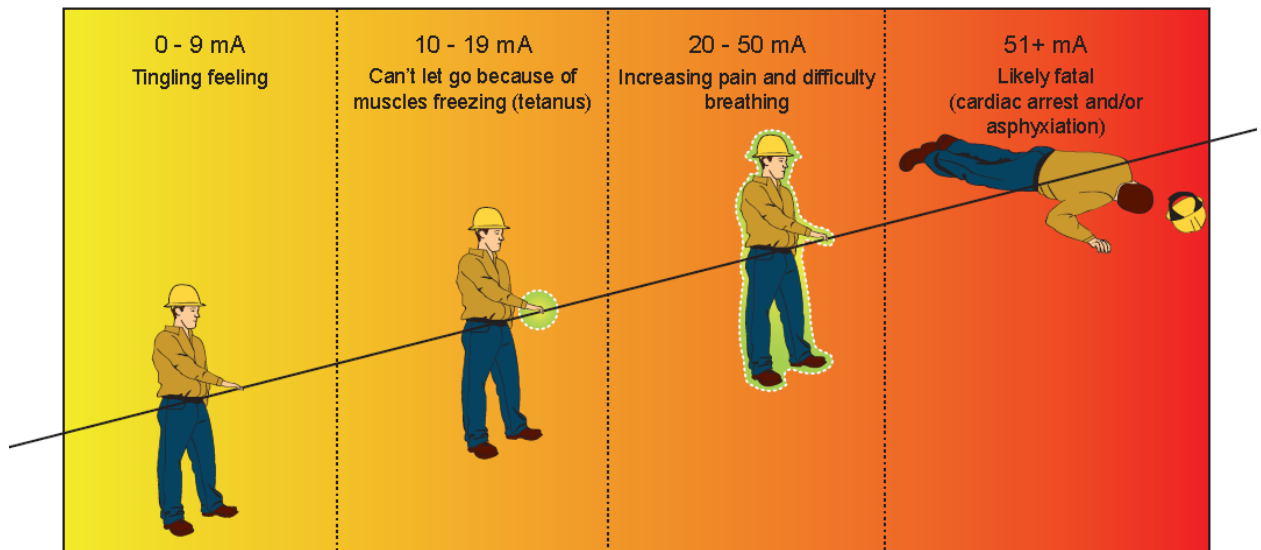
## Electricity and the human body

Electricity is present in every BC Hydro power system facility. The effects of electrical current can be minor or fatal. It is essential that you understand electricity, its effects on the human body, and the ways of limiting the hazards associated with it.

Electrical current in the human body has a variety of effects:

- Heat is produced because of resistance in the body resulting in burns.
- The nervous system is affected which prevents reflex and voluntary control of muscles.
- Muscles may freeze making it impossible to let go of whatever is delivering the current.
- Muscle spasms may cause bone fractures.
- The diaphragm (which controls breathing) may be affected, resulting in possible death by asphyxiation.
- The heart may freeze and be unable to beat properly resulting in possible death from cardiac arrest.

The following diagram shows the effects of AC current (in milliamps) on the body:



Some additional things to be aware of:

- The higher the voltage, the more current passes through your body. Anything over 50 volts can be fatal.
- Wet skin is a better conductor of electricity than dry skin, so you are more likely to be badly injured in humid or wet weather.
- If the current passes through the chest or head, there is a much higher possibility of death.

**Remember:** You need very little voltage or current to get badly hurt. Prevention is the only strategy.

## First aid requirements

During work, if you experience any sort of electrical shock, no matter how minor:

- Seek immediate medical attention.
- Report the incident to your manager.



## Limits of Approach

The best way to avoid the dangers of electricity is to stay away from electrical equipment. However, as mentioned in lesson 1, high voltage electricity can pass through the air from one conductor to another, or to ground, a phenomenon called *arcing*.

To help all workers understand how far they must stay from electrical equipment to avoid the danger of arcing, BC Hydro has developed the Limits of Approach. Limits of Approach is the closest distance an Authorized Worker is permitted to approach exposed, energized conductors or equipment.

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

Even after you have completed this course and Local Component or Functional Component & Local Information training, you will be considered an “Unqualified Worker” with respect to the Limits of Approach:

- If you are working without the supervision of a Qualified Electrical Worker you must use the distances in the *Unqualified Worker* column (for example, you must stay at least 3m/10 feet away from equipment that carries up to 75,000 volts.)
- If a Qualified Electrical Worker is supervising you, you can use the distances specified in the *Uninsulated equipment or Unqualified Worker and their equipment when continuously directed by Qualified Electrical Worker* column (for example, you can work as close as 1.5m/5 feet from equipment energized at 75,000 volts.)

**Note:** It is imperative for your own safety that you never get closer to energized equipment than the distances outlined in this table. Your life depends on it. If you do not know the voltage of a piece of equipment, ask a Qualified Electrical Worker.



Maintain your limits of approach.

**Table 401**  
Limits of Approach (LOA)

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

### Worker positioning and reasonably likely movement

Workers need to position themselves so that none of their movements will ever violate Limits of Approach.

**Worker positioning:** how you position yourself, including your tools and equipment, to do your work.

The working position selected must account for all of your reasonably likely movements, and still permit you to work at the applicable Limits of Approach distance.

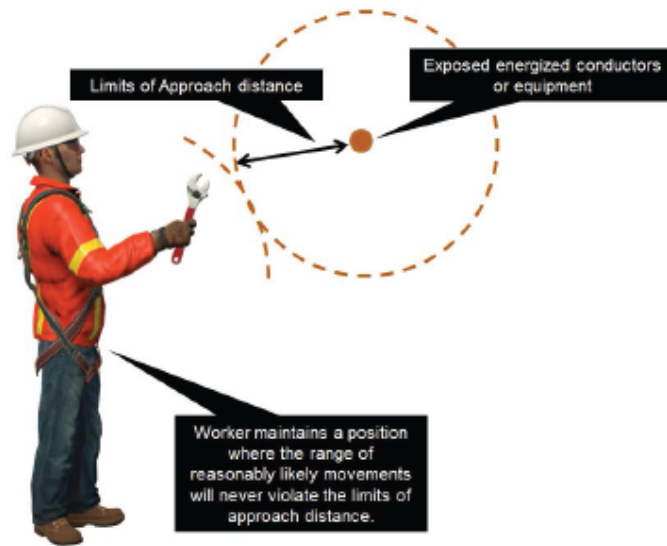
**Reasonably likely movement:** the range of motion you go through as you work.

If you were to do a specific task 100 times, the range of reasonably likely movement would encompass all of the likely movements you would make completing that task those 100 times.

These movements might include reaching for your hard hat on a hot day to wipe your forehead, reaching for a tool or someone passing you a tool, and using tools and equipment to do your work.

Your reasonably likely movement and therefore your worker positioning is different based on your height, arm length, your working style and the particular tools and equipment you are using.





Examples of conductive tools and equipment to consider when thinking about your reasonably likely movement include:

- Stepladders or scaffolding
- Metal measuring tapes
- Metal landscaping tools
- Vehicles and equipment that you are operating

For example, while your body may be 3 metres from a transformer, the end of a ladder you are carrying could easily be within one metre of the electrical source. Electrical current could then arc to the ladder, which would conduct it to your body causing severe electrical shock. Therefore, you must include the length of the ladder when you are calculating your Limits of Approach.

Similarly, if you are operating a crane, no part of the vehicle, the boom, the cable, or the load can come closer to any energized equipment than the Unqualified Worker distance specified in the Limits of Approach table. If you are continuously directed by a Qualified Electrical Worker, then the Uninsulated Equipment distances specified in the Limits of Approach table can be used.

Never use any type of tool or measuring tape to measure how far you are from an electrical conductor. By extending a measuring tape in the direction of the electrical source, you would be putting yourself in grave danger of arcing and electrical shock. Only laser measuring tools should be used for LOA measurements. If you are unsure of the distance, or how to measure the distance, consult a Qualified Electrical Worker on the job. BC Hydro also offers training course SAFE 404 for Unqualified Workers to become familiar with LOA measurements.

**Note:** SPR 304.2 states: “metal rules, metal measuring tapes, or wire-reinforced fabric tape shall not be used in areas where electrical energy could make their use hazardous”.

For further information on the use of tools in the vicinity of high-voltage electrical equipment, see SPR 304.2, 308, 401, and 515.

**Whatever you're doing, you must position yourself so you never violate your Limits of Approach.**



## Step and touch hazards

When you are working around electrical equipment, there is always the possibility that an electrical fault will put you in danger of electrocution. This section explains the danger, as well as the precautions you must take to avoid injury.

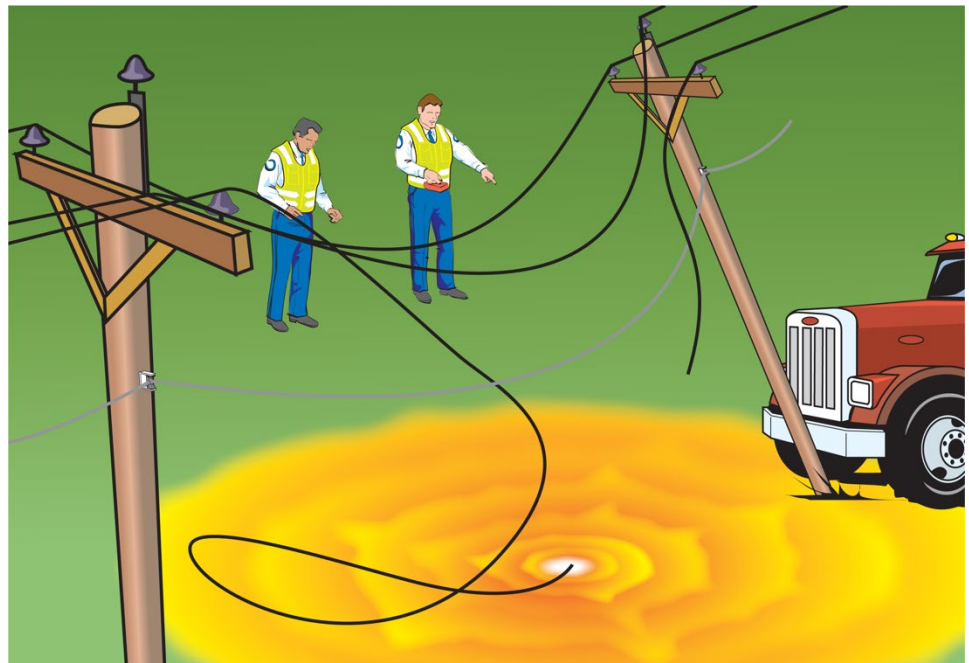
### The ripple effect

If a tree or an uninsulated boom on a truck makes contact with a high voltage power line, or if a broken power line falls to the ground, electricity flows to the ground and spreads out in every direction. Because the earth does not conduct electricity very well, the voltage diminishes very quickly as it moves out from the point of contact. Within approximately 10 meters (33 feet), distribution voltages are reduced to zero. For higher voltages, the distance is greater.

This phenomenon is known as the ripple effect because it resembles the ripples that occur when you drop a stone in a pool of water.

The ripple effect poses a hazard to anyone within 10 metres of the point of contact for the following reasons:

- Electric current passes through any conductor that connects a point of high voltage with a point of lower voltage.
- The human body is a much better conductor than the earth, so if one part of the body is touching a higher voltage than another part of the body, current will flow through the body.



**The ripple effect**

## Step potential

**Step potential** is the difference in voltage between two points that are one step (about one meter) apart, either towards or away from the point of electrical contact. This difference can be thousands of volts.

If you take that step between a high voltage and a lower one, a very high current passes through your body, more than enough to kill you. If you stand perfectly still with your feet together, there will be no potential difference. You will be like a bird sitting on a wire, with both feet at the same electrical potential.

### Leaving an energized area

If the ground becomes energized, you can avoid shock by keeping your feet close together and taking short, shuffle-like steps. Never allow the heel of one foot to move beyond the toe of the other foot until you are clear of the energized area.



**Step potential**

## Touch potential

**Touch potential** is the difference in voltage between your hands and feet when you touch something energized while standing on the ground.

Generally, the energized object is at a very high voltage compared to the ground within a metre of its base. When you touch the energized object, you form a path through which current can travel to ground.

If you are in a vehicle that has made contact with an energized line and you climb out of it, you could suffer from the same result. If your hand is on the door when your foot touches the ground, current will pass through you to the earth.

### To avoid touch potential:

- Never touch the conductor that is transmitting current to the earth.
- Never attempt to touch a person who is experiencing an electrical contact or you will become part of the circuit.
- If possible, remain in a vehicle that has touched an energized wire or equipment until help arrives.
- Avoid leaning against utility poles or other electrical equipment in case a fault causes it to be energized.



**Touch potential**



## Station grounding grids

All BC Hydro Generating and Substations have a copper grounding grid that is buried horizontally about 0.6 metres (2 feet) below the earth's surface. In Generating Stations, this grid is incorporated into the concrete of the station to protect it from damage and corrosion. The frames of all electrical equipment and all metal structures in the station are connected to the grounding grid. Grounding points are provided so workers can connect their worker protection grounds and large work vehicles to the station grid.

The purpose of a ground grid is to minimize the ripple effect in work areas. If a current goes to the ground because of a fault or short:

- Points on the ground or floor within step distances rise to near the same voltage, so the step hazard is minimized.
- Metal structures are near the same voltage as points on the floor or ground within touch distance, so the touch hazard is minimized.

**Note:** While step and touch hazards are minimized in power system stations, there are still many electrical hazards. You must still maintain the Limits of Approach and take all other precautions necessary to keep safe.



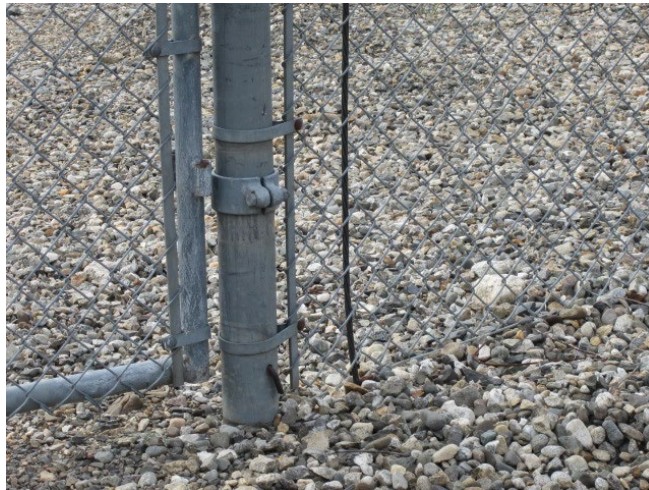
**Copper ground grid before being covered**

## Working at the station perimeter

The station ground grid extends one metre past the station fence, and the fence itself is connected to the grid. If there is a high-voltage fault within the station, the current will flow into the earth in a ripple effect around the edge of the station. Whenever you are working outside the station fence, you must therefore keep in mind the risk and take special precautions.

- Never lean a metal ladder against the fence from outside.
- Take special care when hoisting material over the fence in either direction.
- Never run an extension cord from a station power source to tools or equipment outside the fence, always use cordless tools or a portable generator for such work.
- Never run an extension cord from a power source outside the station fence into the station.

For further information about the precautions required when working near the station perimeter, see SPR 408 and the *Work Adjacent to Stations Work Procedure*.



## Trucks, cranes, and excavators

Whenever you are using a vehicle around electrical equipment, you must remember that the vehicle must be factored into your reasonably likely movement. Every part of the vehicle must be kept outside the distance specified in the Limits of Approach table.

This is especially critical for boom-equipped vehicles such as cranes, hoists, backhoes, and excavators. As SPR 401.2 states, the LOA distances specified apply to all parts of uninsulated boom-type equipment, including aerial lifts, booms, hoisting cables, and any part of a suspended load being raised.

When you are using such equipment in the vicinity of high-voltage electrical lines or equipment, you must observe the following safety precautions:

- Warn all workers to stay well clear of the vehicle.
- Have a safety watcher on the ground directing the vehicle operator, using either communications equipment or mutually understood, approved hand signals (SPR Appendix B).
- If you are working within a power system facility, connect the vehicle to the station ground grid to avoid step and touch hazards.
- If you are working outside a facility, the operator shall not be standing on the ground (if the operator has to stand beside the vehicle, he or she must stand on a ground mat connected to the vehicle frame).

For further information about operating vehicles in the vicinity of energized electrical equipment, see SPR 401 and 411.





# Accessing facilities

**Purpose:** The purpose of this lesson is to familiarize you with the general safety considerations associated with working in a BC Hydro power system facility.

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

- Describe the types of, and need for, Personal Protective Equipment.
- Outline the factors to consider when accessing a BC Hydro worksite.
- Discuss how to ensure safety in hazardous areas.
- Outline general fire prevention practices.
- Outline the concerns around working with chemicals.
- Explain the First Aid and Rescue Response requirements at BC Hydro.
- Outline BC Hydro requirements for reporting incidents.

**Topics:** This lesson covers the following topics:

- Personal Protective Equipment
- Entering and leaving power system facilities
- Cyber asset security
- Hazardous areas
- Fire prevention
- Working with chemicals
- In case of incident

# Personal Protective Equipment

**Basic Personal Protective Equipment (PPE)** provides you with protection against multiple hazards encountered in the workplace. Basic Personal Protective Equipment includes:

- Head protection
- Foot protection
- High visibility clothing
- Eye protection
- Hearing protection
- Hand protection

A Personal Protective Equipment (PPE) zone is a restricted work area that requires the use of basic PPE. PPE zones shall be clearly established and communicated through signage and/or controlled access.

BC Hydro provides PPE to its employees as required. PPE must be worn or readily accessible in designated PPE zones. You will be informed of the PPE requirements for your worksite during your Local Component/Local Information training.

For detailed information on personal protective equipment refer to PPE Program Overview.

## Head protection

Hard hats are designed to protect your head from falling objects. Hard hats worn at BC Hydro worksites must:

- Meet ANSI or CSA standards
- Be classified for electrical use, known as class “E”
- Be equipped with chinstraps

Be sure to adjust the straps and headband to ensure that your hard hat will not fall off during head movement or severe weather conditions. If your hard hat falls off your head, it becomes a safety hazard to you and others.



**Note:** Chin straps on hard hats must be fastened when there is a possibility the hat could be dislodged or when working at a height of 3m (10 feet) or higher.

## Foot protection

Safety footwear provides physical support and protection for the feet. Safety footwear must be CSA approved. The type of safety footwear you use depends on your trade or function.

**Note:** Running shoes, sandals, or any other type of light footwear are not acceptable on BC Hydro's worksites.



## High visibility clothing

High-visibility clothing has a brightly coloured background (usually yellow or orange) and strips of fluorescent or reflective material. Such clothes ensure that the worker wearing them is plainly visible to vehicle operators both in daylight and at night.

According to WorkSafeBC's Occupational Health and Safety Regulation, Part 8.24, an approved high-visibility vest, jacket, or coverall must be worn in the following conditions:

- When the worker is directing traffic.
- When the worker is exposed to the hazards of vehicles traveling at speeds in excess of 30 km/h (20 mph).
- When the worker's duties on a worksite cause them to be exposed to mobile equipment.



## Eye protection

Eye protection is meant to protect your eyes from a variety of hazards. Eye protection includes both safety glasses and face shields. Polycarbonate lenses are recommended and side shields must be used. Workers who wear contact lenses must tell the first aid attendant and site manager. Where complete facial protection is needed, a face shield should be worn. Eye protection must still be worn under the shield.



## Hearing protection

Hearing protection can be either ear plugs or ear muffs. All workers must wear hearing protection in all posted noise hazard areas. In most of these areas a supply of ear plugs or ear muffs will be available for your use.



## Hand protection

General purpose work gloves made from leather material are well suited for PPE use because they can provide hand protection against abrasions and punctures.

For protection against cuts work gloves made from cut resistant material should be worn.

## Hazard-Specific Personal Protective Equipment (HS-PPE)

Depending on the type of work you are performing, you may be required to use HS-PPE to protect against hazards specific to your job task. Some of these types of HS-PPE include:

- Respiratory protection
- Rubber gloves for electrical work
- Cut-resistant gloves
- Flame-resistant clothing
- Fall-protection equipment

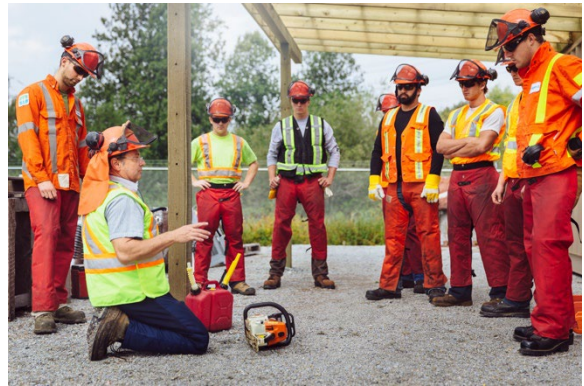
The need for these will be discussed during planning for the specific job.

## Other Personal Protective Equipment

### Clothing

All workers must wear protective clothing appropriate to their worksite and job tasks. Protective clothing should be worn to guard against abrasions, chemicals, heat, contaminants, and inclement weather. Protective clothing includes:

- Gloves
- Aprons
- Coveralls
- Rainwear
- Pants for use with chain saws



Anyone working near high voltage, high temperatures, flames, molten metal or sparks must wear flame-resistant clothing appropriate to the risk.

Anyone working around rotating machinery or tools must not wear loose-fitting clothing or jewellery that might become entangled in the machinery, resulting in bodily harm.

Anyone working in close proximity to electrical equipment must not wear jewellery or metallic adornments of any kind, since these will increase the risk of arcing and severe burning.

## Entering and leaving power system facilities

When you're authorized to work at a specific site, you'll be provided with keys, security access codes and levels — as shown on your access card — and specific instructions for entering the facility. Authorization to work at a site can include your manager's authorization, safety authorization and sometimes a security authorization.

### Gates, keys and access levels

All of BC Hydro's power system facilities are surrounded by fences with lockable gates. This security prevents unauthorized people from entering the site and tampering with power system equipment or, more importantly, from being injured or killed by coming into contact with power system equipment.

- Your BC Hydro ID access card should be visible while onsite.
- Lost ID access cards and keys must be reported to the Security Command Centre (SCC) at 1-877-311-8611.
- Access is issued for a specific role or for a specific period of time.
- Close and lock the gate/door after you enter.
- Don't give access without verifying authorization.
- Keys must not be duplicated.
- For the tethered keys for restricted areas at some stations, be sure to scramble the tumblers to secure the pin code and raise the cover to protect the tumblers before you enter the area.
- Return all keys to the issuing office when your job is complete or you change roles.

### Driving in and parking

Some of the larger facilities have clearly marked driveways and parking lots. If that is the case, be sure to stay on the road and park in a designated parking space. Other sites, such as switch yards and substations, may not have a driveway or parking lot.

- Plan your route into the site to avoid hazards.
- Don't block gates, doors or other vehicles.
- Respect all warning signs, barriers, guards and safety ropes.
- Leave vehicle keys with security or in the vehicle.
- Leave the keys with security, the control room, or somewhere else





safe where they can be accessed if needed when leaving the vehicle overnight.

- Return all keys when your job is complete.

## Building security

If a building at the site has an entry alarm system, you must learn and follow the correct procedure for using it prior to going to the facility. This information is covered during Local Component training.

## Recording your entry

When you are working at hazardous locations such as power system facilities, it is very important that someone knows you are there. In case of an accident or emergency, supervisors and emergency workers need to be able to identify everyone on the site so they can carry out rescue operations quickly and efficiently. The procedure for recording your entry depends on whether the station is attended or unattended.

When entering an attended station, you must report to the person in charge of the station, the office administrator, or the site representative. Specific sign-in requirements for each attended station are covered in Local Component training.

An unattended station is a facility where there's normally no staff on duty. When entering such a facility, you must record your visit in the station or visitor logbook. This entry must include:

- Your first and last name
- The time and date of the visit
- The purpose of the visit

In many cases, if you are the first crew member to arrive at an unattended station, you're also required to report your arrival to the BC Hydro Control Centre or a private security company. Such requirements are covered in Local Component/Local Information training.



## While working at the facility

When propping open a restricted door for operational reasons, the access point must continue to be controlled by:

- Remaining within visual range of the open restricted door.
- Being close enough to intercept a person before they get to the door.



- Confirming that anyone who does try to enter is authorized to be in the restricted area before letting them through the door.
- Reporting suspicious activities or people to Security Command Centre at 1-877-311-8611.

**Note:** access authorization can only be verified in SureSite. To verify authorization, contact your site admin, your BC Hydro manager or a team member, or you can check SureSite. You can find SureSite by searching for it from the HydroWeb home page.

## Leaving the facility

When leaving a facility, you must do the following:

- Secure behind you by physically checking all restricted access points, including doors, cabinets, and equipment kiosks.
- If you find an access point that cannot be secured, contact the facility manager first (if you and the facility manager cannot secure the access point, then contact the Security Command Centre at 1-877-311-8611).
- For an attended facility, advise the person in charge of the station, the office administrator, or the site representative of your departure and sign out as required by the station.
- For an unattended facility, record the time of your departure in the logbook (where it's required, contact the BC Hydro Control Centre or private security company to advise them of your departure).
- Take care to avoid any hazards when driving your vehicle to the gate (if possible, use the same route that you used on the way in).
- Close the gates and lock them behind you.

## Cyber asset security

Some of the electronic devices that control or monitor the power electric system are *cyber assets*.

Like your phone or computer, these assets can be hacked. If hackers gain access to these, they can do a lot of damage and could even make our entire system go dark. Warning signs are posted on hazardous equipment and in hazardous areas to alert you to the dangers and the precautions that you must take.

BC Hydro's electrical system is part of a connected power grid. To ensure the reliability of the grid, all North American utilities are required to follow NERC standards (the North American Electric Reliability Corporation).

The Critical Infrastructure Protection (CIP) subset of NERC standards protects cyber assets that could impact reliability.

If we — employees or contractors — do something we're not supposed to do under NERC, BC Hydro could be given severe financial penalties.

**Cyber assets** are programmable electronic devices that support the operation of the power system.

One type of cyber asset is a relay. It trips a circuit breaker when a fault is detected. This directly affects energy flow and can put people in the dark. We use these devices to keep people safe (e.g. when lightning strikes), but hackers can use them for criminal purposes.

### What can happen when cyber assets aren't protected

*Case study: Cyber attacks on the power system in the Ukraine*

In December 2015, the Ukrainian power grid experienced a cyber attack. This is considered to be the first known successful cyber attack on a power grid. Hackers were able to successfully compromise information systems and temporarily disrupt electricity supply to end consumers.

30 substations were tripped offline.

About 230,000 people were left without electricity for one to six hours.

Another attack occurred June 2017. In this incident, computers went offline due to the attack but the company was able to continue operation without them.

During the attack, the radiation monitoring system at the Chernobyl nuclear power plant went offline.

**Cyber attacks on power system assets are a serious concern and potentially very dangerous. We all need to do our part to prevent them.**

## Your role in protecting cyber assets

Even if you don't touch a cyber asset – like a router, relay or an HMI, which looks like a touchscreen, you still have a role to play.

At a station, **do not** connect any personal or corporate devices to station equipment unless it is part of an authorized work procedure or emergency recovery effort. Examples of this are:

- **Do not** use a station asset's USB port to charge your phone.
- **Do not** connect any device in the station to a Virtual Private Network (VPN), hotspot, or other wireless connection that enables remote interactive access.

**Note:** Even a powered down device can cause a violation.

- **Do** act to keep BC Hydro cyber assets safe.
- **Do** report potential cyber security incidents or threats to the IT help desk at 604-528-1444.
- **Only** use BC Hydro approved tools like memory sticks in any of the station's equipment.

## Hazardous areas

Within a power system facility, there are a number of methods used to alert you to, and protect you from, specific hazards:

- Warning signs are posted on hazardous equipment and in hazardous areas to alert you to the dangers and the precautions that you must take.
- Barriers, guards, and safety ropes or chains are used to restrict access to hazardous areas. In some facilities, a flashing light may be used to indicate that high voltage testing is in progress.
- Moving parts of machinery are protected by guards that must be kept in place at all times when the equipment is operating.
- Locks and warning tags are placed on equipment switches and valves to prevent them from being operated in such a way that would harm other workers.

For your own health and safety, you must always pay attention to and respect these safety measures. Never move or remove any of these critical safety items.





## “Do not touch” rule

All of the equipment in power system facilities is potentially dangerous to you and your fellow workers. Operating switches, valves, or controls of any type could put you, other workers, the public, and the power system itself at grave risk. Never touch locks or tags.

There is only one way to avoid this danger: Never touch any equipment that you are not trained and specifically authorized to work on.



## Fire prevention

Fire is always a danger in industrial workplaces, and power system facilities are no exception. Every facility has fire protection equipment and a detailed safety plan for responding to fires when they occur.

It is your responsibility to understand the site safety plan for the facilities in which you work. This will be covered in Local Component/Local Information training or explained to you by your manager.

### To help prevent fires, you must observe the following rules:

- Smoke only in designated areas.
- Do not block fire doors.
- Use fire hoses and protection equipment only for emergency purposes.
- Do not block access to fire protection equipment.
- Clean up and dispose of flammable and combustible waste according to the appropriate procedures.
- Do not store unnecessary flammable and combustible material.
- If you are performing hot work such as welding, plan the work carefully to reduce or eliminate the risk of starting a fire.
- Always be aware of specific fire hazards, such as those presented by batteries, and take the precautions necessary to avoid a fire.

### If you discover a fire:

- Immediately notify other building occupants, as specified in the safety plan for your facility, and call for firefighting assistance.
- If you have been trained and can do so safely, attempt to extinguish the fire using available fire protection equipment.
- Report the fire to the facility manager or their representative as soon as possible.
- Specific fire response procedures will be provided in Local Component/Local Information training. For further information on fire prevention, see SPR 113, 114, 115, 116 and 410.



## Working with chemicals

Chemicals include solids, liquids, and gases, and can be found in every worksite including offices. It is essential that you take every precaution when working in an area that contains chemicals. Do not touch any substances or containers without direction to do so by someone familiar with the proper handling, storage, use, and first aid requirements.

Chemicals can affect us in a variety of ways from inhalation, ingestion, and splashing, to explosions. They cause various injuries, some minor, others fatal. If you are uncertain, avoid it.

### Workplace Hazardous Materials Information System (WHMIS)

WHMIS legislation requires you to be knowledgeable about the hazardous materials at your worksite. Those required to work with or around hazardous material will be required to take further training. Examples of hazardous materials include:

- Compressed gas
- Flammable and combustible material
- Oxidizing material
- Toxic material
- Irritant material
- Corrosive material
- Self-reacting substances and mixtures
- Organic peroxides
- Bio-hazardous infectious material

See OSH Standard 301.

**Note:** Anyone working around hazardous materials must know the location of the safety data sheets (SDS) for these substances. These sheets include information on the composition, toxicology, transportation of, and PPE requirements for each substance.

### Spill response

All spills must be reported to a knowledgeable worker, who will follow the spill response guidelines to address the spill. Do not attempt to clean a spill of unknown material or chemicals. Unknown chemical spills are to be directed to a special response team that will complete the cleanup.

See OSH Standard 302.



## Transportation of dangerous goods

The Transportation of Dangerous Goods (TDG) is highly regulated and controlled by both the federal and provincial governments. Workers having TDG related duties must be trained to the level of competence that allows them to lawfully carry out their duties (e.g. preparing, offering, carrying, or receiving shipments of dangerous goods). If you will be required to carry out work associated with TDG you must receive further training.

See OSH Standard 404.

## In case of incident

At BC Hydro, we don't talk about accidents, because we believe that all adverse events can be prevented through the application of appropriate procedures and constant vigilance on the part of every worker. Instead, we call adverse events *incidents*.

Incidents include emergencies, injuries or damage involving workers or equipment, near misses that might otherwise result in an incident, and unusual circumstances on the job. Workers who are involved in or witness such an event have specific responsibilities for aiding or rescuing injured workers, making the area safe, and reporting the incident.

## First aid and rescue

BC Hydro's OSH Standards require immediate access to first aid services and equipment at all worksites during the regular work hours. The first aid stations are clearly marked and contact information for first aid attendants and emergency services are clearly posted.

It is every worker's responsibility to report every injury and get first aid treatment immediately no matter how minor it may appear. Because some injuries may be more serious than they appear, it is critical that you get treatment as soon as the injury occurs.

If someone else is injured, it is your responsibility to assist them as long as doing so does not endanger you. If you are trained in rescue or first aid procedures, you should initiate rescue or perform first aid as appropriate to the level of certification you hold.

If you are required to use equipment or work in locations where special rescue procedures may be required (elevated structures, aerial lifts, confined spaces) you will be trained in the appropriate procedures.

See SPR 201 and 203 and OSH Standard 502.

## Reporting incidents

All incidents must be reported to the supervisor no later than the end of a shift. BC Hydro employees must report the following incidents using the BC Hydro Incident Management System:

- Those requiring first aid treatment or medical attention.
- Lost time incidents requiring medical treatment.
- Those in which there is no treatment but there is a possibility of future disability.
- Motor vehicle incidents.
- “Near-miss” incidents in which there is no injury, but potential for injury was high and/or there are lessons that could prevent future incidents.

Motor vehicle incidents must be reported to the appropriate external authorities, as required by the Motor Vehicle Act.

The workers’ first responsibility is to make sure the scene of the incident is safe for both workers and the public. If the scene of an incident is critical to an investigation, workers must preserve the scene and any equipment connected with the incident. If the conditions surrounding the scene are likely to change, photographs should be taken as soon as possible to show the circumstances of the incident.

It is essential that as much information as possible is gathered from incidents. This information:

- Allows BC Hydro to make improvements to worksites and procedures.
- Helps prevent the same types of incidents from occurring in the future.

See SPR 202.



# Preparing to work safely

**Purpose:** The purpose of this lesson is to review the types of planning and preparation that contribute to safe work.

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

- Explain personal preparation.
- Explain the components of pre job planning.
- Explain the Worker Check Procedure.
- Discuss the role and purpose of the Safety Watcher.

**Topics:** This lesson covers the following topics:

- Personal preparation
- Tailboard meetings
- Worker Check Procedure
- Safety watcher
- Safety precautions for power facilities

## Personal preparation

Safety at work is much more than simply obeying the rules. Safety requires a personal commitment and constant vigilance on the part of every worker.

As SPR 101.5 says: “all workers are expected to take intelligent and reasonable care to protect themselves, other workers, and the public against any injury that might result from their work.”

In order to take such care for your own and others’ safety, you must prepare yourself mentally and physically.

### Self-awareness

Self-awareness is being aware that you are ultimately responsible for your own safety and the safety of your co-workers and the general public.

You should not work if you are ill, feeling the after-effects of medication or alcohol, or in some other way incapable of performing your job duties safely. It is, in fact, your duty to inform your supervisor of anything that might impair your ability to work safely.

No matter how routine the job or the environment, always look beyond the familiar, and remind yourself of any potential work area hazards. You must not be complacent even if you are doing a task or job that you have done many times before.

Never indulge in horseplay or scuffling while you are at a job site. Doing so may cause injury to you, another person, or the power system.

**Remember:** Note: If you believe that carrying out any work may pose a risk to anyone’s health or safety, you have the right and the responsibility to refuse to do that work.

### Positive work habits

Careless work habits increase the risk of injury to yourself and your coworkers. Positive mental and physical work habits contribute to your safety:

Mental Habits	Physical Habits
Understand procedures fully	Follow procedures exactly
Keep your mind on the task	Keep your eyes on the task
Consider potential hazards	Wear appropriate PPE
Plan the work	Keep the work area tidy
Follow the work plan	Move carefully and deliberately
Take the time to do the job right	Use tools only for their intended purpose

## Using the right tools

Personal preparation includes reporting to the worksite with the tools and equipment required to perform your duties.

- Be sure you have the personal protective equipment (PPE) that is appropriate for the work environment and the job you are doing.
- Be sure you have all of the necessary tools and equipment before starting the job.
- Never try to adapt tools to a task that they are not suited for.
- Always inspect your tools and equipment before using them.
- Replace any tool that is worn or not working correctly.

See SPR rules 304 to 309 for further information on the care and use of tools.





## Tailboard meetings

Tailboards are meetings held before work commences and whenever there is a significant change in the work plan to ensure that all workers understand the hazards, risks, and procedures associated with the job. SPR 106 requires that documented tailboards be held for all hazardous work involving one or more workers.

Tailboards are a very important part of your own preparation for the job. It is essential that you pay careful attention to all arrangements and discussions.



Tailboard meetings include discussions on:

- All the known hazards and the multiple independent barriers to be put in place
- The scope and sequence of the planned work procedures
- The location and boundaries of the work, and the placement of barriers to establish safety zones as required
- Rules and regulations applicable to the work being performed
- Required Personal Protective Equipment
- The role and responsibilities of each worker on the job
- Emergency plans, first aid, rescue plans, emergency response contacts and locations

**Note:** If you do not understand any of the information or if you are concerned about any of the plans, be sure to speak out. Your safety and the safety of your fellow workers depend on it.



See SPR 106 and OSH Standard 122 for more information on Tailboard meetings.

## Worker Check Procedure

The Worker Check Procedure applies to situations where a worker is working alone in a hazardous situation or traveling in a remote area where they might not be able to get assistance if they need it.

If a hazardous situation is identified prior to a job, Worker Check Procedures are required. If a hazardous or potentially hazardous situation arises during the course of the work, the worker must initiate a Worker Check to cover the rest of that work.

### Using the Worker Check Procedure

Before starting the job, the worker must notify a Worker Check Authority (WCA). Worker Check Authorities must be capable of performing the required tasks and can include but are not limited to:

- Office Staff
- Control Centres
- Restoration Centres
- Headquarters
- Other workers
- Managers or crew leaders
- Spouses or family members

When a worker checks in at the start of the job, they report the location, the nature of the job, and the expected time to complete the work. The next step is determining time intervals for the worker to call in, and how they will communicate with the WCA. The intervals for call-ins should be set up as appropriate for the hazards and circumstances of the work. They must occur upon arrival and departure from the worksite at a minimum.

If a worker fails to call the WCA at the agreed time, the WCA attempts to contact the worker. If the WCA is unable to contact the worker, they begin a rescue response.

See SPR 801 and OSH Standard 801 for more information on the Worker Check Procedure.

## Safety watcher

A safety watcher is a qualified worker who is familiar with the hazards of the worksite where the work is taking place. If the worker in charge of a particular worksite considers the work or location to be hazardous, they can appoint a safety watcher. The safety watcher is then required to leave their other duties and give their full attention to ensuring site safety.

The worker in charge is responsible for notifying all other workers at the site that there is now a safety watcher and who that person is. The safety watcher has the authority to immediately stop any work that they consider to be hazardous.

Safety watchers are used in a variety of situations such as:

- When work is being performed on or at the side of a busy road
- When it is necessary to stop pedestrian traffic from entering the worksite
- If vehicles or equipment must back up into traffic or navigate in areas that are confined
- When work is being performed near high voltage equipment or in confined spaces



When you are working alone and there is something in the working environment that you believe you will be unable to observe and still perform your work tasks safely, you can request a safety watcher.

The need for a safety watcher is generally discussed at the Tailboard meeting, but the requirement for one may arise at any time. It is a worker's right to request a safety watcher at any time if they believe one is required for them to work safely.

See SPR 805.

### Safety watchers for Limits of Approach

Safety watchers may also be used when work is being performed and/or tools and equipment are being operated near energized equipment. These safety watchers must meet the requirements in OSH 201 sections 4.1.1, 4.1.2 and 4.1.3—they must:

- Be an authorized Qualified Electrical Worker; **and**
- Have a trade qualification of either: Power Line Technician, Cable Splicer, Electrician or Winder.

## Safety precautions for power system facilities

In summary, your safety depends on the following key rules:

- Always wear appropriate personal protective equipment.
- Recognize and respect all warning signs, safety barriers, and machinery guards.
- Observe the Limits of Approach around high-voltage electrical equipment.
- Do not touch switches, valves, or control panels unless you are specifically authorized to do so.
- Do not tamper with locks or tags applied to protect workers.
- Prepare yourself mentally and physically for every job you do.
- Ask for assistance if you think your work is hazardous.

**Never perform work beyond your category of authorization.**

# Appendices

## Common abbreviations

Abbreviation	Term
DIST	District
GS	Generating Station
NIA	Non-Integrated Areas
PIC	Person in Charge
PSSP	Power System Safety Protection
SPR	Safety Practice Regulation
SPG	Safety Protection Guarantee
TRANS	Transmission
WPP	Work Protection Practices