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#### G19.1-1 Electrical Safety Act repealed

Retired on February 1, 2011

This guideline is not required after the OHS Regulation amendment of February 1, 2011 (refer to *OHS Regulation* section 19.1).

#### G19.1-2 Electrical qualifications

Issued June 29, 2005; Editorial Revision to include February 1, 2011 regulatory amendment; Editorial Revision November 21, 2017

Section 19.1 of the *OHS Regulation* ("*Regulation*") states:

> *"electrical worker"* means a person who meets the requirements of the Electrical Safety Regulation for installing, altering or maintaining electrical equipment;

**Purpose**
This guideline defines a "qualified electrical worker" and a "qualified worker" under Part 19 of the *Regulation*.

**Definitions**

**"Qualified electrical worker"**
A "qualified electrical worker" must meet all the requirements of the *Safety Standards Act* and the *Electrical Safety Regulation*, including a certificate of qualifications.

For the purposes of Part 19 of the *Regulation*, based upon section 4 of the *Electrical Safety Regulation*, an individual must not perform regulated work in respect of electrical equipment unless the individual meets at least one of the following criteria:

(a) holds appropriate industry training credentials in respect of electrical work

(b) has successfully completed electrical training recognized by a provincial safety manager under *the Safety Standards Act*

(c) is employed by an organization that utilizes electrical training programs that are approved by a provincial safety manager under the *Safety Standards Act* and the individual

(i) has successfully completed the relevant training, and

(ii) does not perform regulated work for any person other than the individual's employer who provided the training

(d) is the manufacturer's technical representative, or

(e) is supervised by an individual who

(i) is specifically authorized under the *Safety Standards Act* to perform that type of electrical work, and

(ii) supervises the individual on site and provides guidance and assistance to the individual as the electrical work is performed

For more information on qualifications for electrical workers, please contact the British Columbia Safety Authority, now operating as Technical Safety BC at Suite 200, 505 – 6th Street, New Westminster, BC V3L 0E1, telephone toll free: 1-866-566-SAFE (7233).

**"Qualified workers" and "qualified persons"**
Part 19 of the *Regulation* also refers to "qualified workers" and "qualified persons;" such a reference does not specifically relate to the worker's electrical qualifications. Section 1.1 of the *Regulation* states:

> *"qualified"* means being knowledgeable of the work, the hazards involved and the means to control the hazards, by reason of education, training, experience or a combination thereof;

The determination of whether a worker is "qualified" depends upon the particular circumstances of the work to be performed and that worker's knowledge, skills, and abilities. An evaluation must be performed by the employer to determine whether the worker has sufficient knowledge, skills, and ability to safely perform that particular type of work. If the *Regulation* reference is to a "qualified worker" and not to "qualified electrical worker" then the worker does not necessarily need to be a "qualified electrical worker," as defined in the previous portions of this guideline.

A WorkSafeBC prevention officer, while performing an inspection, may assess whether an individual meets the requirements of a "qualified electrical worker," or a "qualified worker," as required by the *Regulation*.

#### G19.1-3 Certified utility arborist

Issued consequential to February 1, 2013 Regulatory Amendment

**Regulatory excerpt**
Section 19.1 of the *OHS Regulation* ("*Regulation*") defines "certified utility arborist" as follows:

> "certified utility arborist" means a person who has completed a course of instruction, has a minimum of 1,200 hours of practical experience and is certified by an authority acceptable to the Board;

**Purpose of this guideline**
The purpose of this guideline is to describe the authority acceptable to WorkSafeBC for certification of certified utility arborists.

**Background**
Where tree pruning operations are conducted near energized conductors, certified utility arborists are permitted to work close to those conductors, up to the limits in Table 19-3 of the *Regulation*. In addition, the certified utility arborist is permitted to be in an aerial device passing between

energized conductors in accordance with section 19.34.1 of the *Regulation*. Given the nature of the hazards encountered in these tasks, it is crucial that the certified utility arborist be provided with specific training that provides a comprehensive understanding of how to manage those hazards. For this reason, the *Regulation* defined a certified utility arborist as a person who has instruction, and experience, and who has been certified by an authority acceptable to WorkSafeBC.

**Certification acceptable to WorkSafeBC**
The definition of certified utility arborist states that the certified utility arborist has completed a course of instruction and has a minimum of 1,200 hours of practical experience. In addition, the certified utility arborist must be certified by an authority acceptable to WorkSafeBC.

A certified utility arborist must have completed the relevant Industry Training Authority ("ITA") approved training program. That program involves classroom training, delivered through public post-secondary institutions, private training institutions, and secondary schools that have been approved by the ITA. The program also involves a minimum number of hours of work experience.

**Other certificates**
WorkSafeBC recognizes that other training courses may be developed that may meet the requirements for acceptance under section 19.1. WorkSafeBC will review any proposed courses for acceptance to ensure they meet a standard acceptable to WorkSafeBC. Any new courses WorkSafeBC identifies as acceptable under section 19.1 will be added to this guideline for the information of workplace parties and WorkSafeBC prevention officers.

Persons wishing to have WorkSafeBC consider an alternative course for acceptance under section 19.1 may submit that course to WorkSafeBC for review and evaluation. Please contact the Certification Services Department at WorkSafeBC for further information.

#### G19.4 Obstructions on poles

Issued September 21, 2012

**Regulatory excerpt**
Section 19.4 of the *OHS Regulation* ("*Regulation*") states:

> (1) Mailboxes, signs, clotheslines, or other obstructions are prohibited on or close to poles on which workers are required to work.
>
> (2) Tags authorized by the owner which are placed on a pole for identification purposes must be less than 1.7 m (5.5 ft) above grade, on the side of the pole which a climbing worker will face.

**Purpose of guideline**
The purpose of this guideline is to clarify the application of section 19.4 of the *Regulation* to utility poles.

**Interpretation**
This section of the *Regulation* is intended to keep wooden utility poles clear of obstructions to ensure a safe climbing area for workers. It does not apply to poles which are not climbed by workers. The owner of a pole may also have restrictions and requirements and should be contacted before placing any object on or close to a pole.

#### G19.8(1)Testing equipment - Standards acceptable to WorkSafeBC

Issued June 29, 2005; Revised April 19, 2013; Revised October 30, 2018

**Regulatory excerpt**

Section 19.8(1) of the *OHS Regulation* ("*Regulation*") states:

> Electrical testing equipment may be used if it meets the requirements of
>
> (a) *CSA Standard C22.2 No. 160-M1985 (Reaffirmed 1992), Voltage and Polarity Testers*, or
>
> (b) *CSA Standard CAN/CSA-C22.2 No. 231 Series-M89, CSA Safety Requirements for Electrical and Electronic Measuring and Test Equipment*.
>
> (c) Repealed. [B.C. Reg. 312/2003, effective October, 29, 2003.]

Section 4.4(2) of the *Regulation* states:

> When this Regulation requires a person to comply with
>
> (a) a publication, code or standard of the Board or another agency, the person may, as an alternative, comply with another publication, code or standard acceptable to the Board, or
>
> (b) practices, procedures or rules of the Board or another agency, the person may, as an alternative, comply with another practice, procedure or rule acceptable to the Board.

**Purpose of guideline**
This guideline lists acceptable alternative standards for electrical testing equipment.

**Acceptable standards**
In addition to the standards specified in section 19.8(1), electrical testing equipment may also be used if it meets one of the following standards that are acceptable to WorkSafeBC, where applicable:

| Standard | Standard Title |
|---|---|
| *CAN/ULC-D61243-1-2010* | *Live Working - Voltage Detectors - Part 1: Capacitive Type to Be Used for Voltages Exceeding 1 kV a.c.* |
| *CAN/ULC-D61243-2-2009* | *Live Working - Voltage Detectors - Part 2: Resistive Type to Be Used for Voltages of 1 kV to 36 kV a.c. [Amended March 2000]* |
| *CAN/ULC-D61243-3-2010* | *Live Working - Voltage Detectors - Part 3: Two-Pole Low-Voltage Type* |
| *CAN/CSA-C22.2 No. 61010-1 â€“ 2012 (Reaffirmed 2017)* | *Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use* |
| *CSA C22.2 No. 160-15* | *Voltage and Polarity Testers* |
| *CSA/CAN-C22.2 No.231.0-M89 (Reaffirmed 2001)* | *Safety Requirements for Electrical and Electronic Measuring and Test Equipment* |

#### G19.9 Insulated aerial device

Issued August 1999; Editorial Revision April 2005; Retired February 1, 2013

This guideline has been retired as it contained outdated or redundant material.

#### G19.9(2) Insulated elevating work platform

Issued December 19, 2013

**Regulatory excerpt**
Section 19.9(2) of the *OHS Regulation* ("*Regulation*") states:

> (2) The employer must ensure that, at least once every 12 months,
>
> (a) an insulated elevating work platform intended for use by a worker is dielectrically tested in accordance with section 5.3.4 of *CSA Standard CAN/CSA-C225-10 Vehicle-mounted aerial devices*, and
>
> (b) the insulating capability of the platform referred to in paragraph (a) is certified by the testing agency.

**Purpose of guideline**
The purpose of this guideline is to reference the additional requirements under section 13.23 of the *Regulation* for elevating work platforms to be tested and certified according to the relevant standard for the specific type of work platform. This is in addition to the need for dielectric testing.

**Inspection and certification of elevating work platforms**
Section 13.23(1) of the *Regulation* requires that all vehicle-mounted elevating work platforms and self-propelled boom-supported elevating work platforms must be inspected and certified at least every 12 months. Guideline G13.23(1) outlines the factors to be considered and who is authorized to certify the equipment.

#### G19.10(2)(a) Appropriate electrical protective equipment for working on low voltage electrical equipment

Issued April 13, 2011; Editorial Revision consequential to February 1, 2013 Regulatory Amendment

**Regulatory excerpt**
Section 19.10(2)(a) of the *OHS Regulation* ("*Regulation*") states:

> (2) Except as specified in subsection (3), if it is not practicable to completely disconnect low voltage electrical equipment, work must be performed by qualified and authorized workers and in accordance with written safe work procedures which
>
> (a) require the use of personal protective equipment and voltage-rated tools, appropriate to the hazards and risks associated with the voltage at which the electrical equipment is operating,

**Purpose of guideline**
The purpose of this guideline is to describe types of appropriate personal protective equipment for use with low voltage electrical equipment where it is impractical to completely de-energize the electrical equipment.

**Background**
While the first choice should always be to deactivate and lock out an energized system prior to working on it, it is sometimes impractical to do so.

When it is necessary to work on energized low voltage equipment, an important part of planning for safety is establishing written safe work procedures, selecting appropriate personal protective equipment and ensuring the work is performed by qualified and authorized workers. Care is to be taken to ensure worker safety where work is to be done on an energized electrical system. This includes provision and use of appropriate personal protective equipment (PPE), voltage-rated tools, and written safe work procedures. *Regulation* section 19.10(2)(a) specifies that work be done on low voltage electrical equipment in accordance with written safe work procedures which require "the use of personal protective equipment."

**Personal protective equipment**
"Personal protective equipment" for the purposes of this section of the *Regulation* is personal protective equipment that is appropriate for the hazard present while working on energized electrical equipment. This includes flame-resistant clothing, head protection, safety glasses, dielectric footwear, gloves, and face shields. It is the responsibility of the employer to ensure proper written safe work procedures are in place to deal with all aspects of low voltage live equipment work, including protection from electric shock and arc flash.

***CSA Standard Z462 - Workplace electrical safety***
*CSA Standard Z462 - Workplace electrical safety*, based in part on the *NFPA 70E Electrical Safety in the Workplace*, includes specific information on the type and level of PPE used when working on energized electrical equipment, appropriate to the level of risk involved. In addition, portions of *CSA Standard Z462* deal with work on energized low voltage electrical equipment.

In meeting the requirements under section 19.10(2)(a) of the *Regulation*, employers may find *CSA Standard Z462* to be valuable in assisting them in the development of appropriate written safe work procedures, and determining the hazards and necessary protection.

#### G19.10(3) Working on energized lighting circuits operating at more than 250 volts-to-ground

Issued December 14, 2012

**Regulatory excerpt**
Section 19.10(3) of the *OHS Regulation* ("*Regulation*") states:

> Work must not be done on energized parts of electrical equipment associated with lighting circuits operating at more than 250 volts-to-ground without the prior written permission of the Board

Section 19.8 of the *Regulation* states:

> (1) Electrical testing equipment may be used if it meets the requirements of
>
> (a) *CSA Standard C22.2 No. 160-M1985 (Reaffirmed 1992), Voltage and Polarity Testers*, or
>
> (b) *CSA Standard CAN/CSA-C22.2 No. 231 Series-M89, CSA Safety Requirements for Electrical and Electronic Measuring and Test Equipment*.
>
> (2) Electrical testing equipment not meeting a standard specified in subsection (1) may be used if it has
>
> (a) fusing or circuitry designed to protect the operator in the event of a fault resulting from inadvertent misuse of the meter, or a fault on the circuit being tested,
>
> (b) clearly and unambiguously marked measurement ranges,
>
> (c) lead wire insulation rated to the maximum voltage reading of the meter,
>
> (d) lead wires that are not cracked or broken, and having a current carrying capacity (ampacity) that meets or exceeds the maximum current measurement of the meter, and
>
> (e) a minimum exposure of metal on lead wire probes.
>
> (3) Appropriate safe work procedures must be established and followed for testing electrical equipment and circuits.

Section 1.1 of the *Regulation* states

> *"qualified"* means being knowledgeable of the work, the hazards involved and the means to control the hazards, by reason of education, training, experience or a combination thereof.

**Purpose of guideline**
This guideline gives permission for certain types of testing-related work on lighting circuits.

**Permission**
Pursuant to *Regulation* section 19.10(3), WorkSafeBC permits work on lighting circuits operating at more than 250 volts-to-ground to be done without further written permission where the work is limited to diagnostic testing, fault-finding, or routine safety checks, subject to the following:

- The lighting does not operate at more than 347 nominal volts-to-ground

- It is not feasible to perform the work while de-energized
- If test voltages are used the maximum output current available from the test instrument is less than 5 mA
- The work is performed by a qualified worker
- Safe work procedures developed under section 19.8(3) cover the requirements for a risk assessment that is carried out before testing begins and the means to identify the precautions that need to take place based on the risk assessment

Always consider parts to be live until proven otherwise. Note that *Regulation* sections 19.8 and 19.10(2) also apply and pertain to testing equipment and written safe work procedures.

**Other work**
For other work done on energized parts of electrical equipment associated with lighting circuits operating at more than 250 volts-to-ground, permission must be obtained from WorkSafeBC's Prevention Practice, Quality, and Engineering department prior to the work being performed.

#### G19.12 Working close to energized equipment — Low-voltage overhead lines

Issued August 1999; Revised September 28, 2016

**Regulatory excerpt**
Section 19.12 of the *OHS Regulation* ("*Regulation*") states:

> (1) Uninsulated, energized parts of low voltage electrical equipment must be guarded by approved cabinets or enclosures unless the energized parts are in a suitable room or similar enclosed area that is only accessible to qualified and authorized persons.
>
> (2) Each entrance to a room and other guarded location containing uninsulated and exposed, energized parts must be marked with a conspicuous warning sign limiting entry to qualified and authorized persons.
>
> (3) If uninsulated energized parts are not guarded with approved cabinets or enclosures
>
> (a) suitable barriers or covers must be provided if a worker unfamiliar with the hazards is working within 1 m (3.3 ft) of the uninsulated, energized parts, or
>
> (b) the worker must be informed of the potential hazards, and provided with and follow appropriate written safe work procedures.

**Purpose of guideline**
The purpose of this guideline is to describe minimum considerations for appropriate safe work procedures for working around low voltage overhead lines.

**Background**
Section 19.12 of the *Regulation* is applicable when working close to energized low voltage electrical equipment. This includes work around overhead trolley lines, low voltage overhead lines including neutral wire, communications, and cablevision lines. Also included are multiplex service drops and communication service drops that take power from the distribution system to individual customers' point of attachment.

Low voltage lines and service drops carry enough energy to cause serious injury, and should be treated with the same respect as high voltage lines. These types of energized lines are normally isolated from worker contact by position.

Safe work procedures should identify all constraints that are required to be applied to low voltage electrical equipment in order to maintain safe working conditions, and should include the following:

1. An assessment, or job safety analysis, to be performed before working near overhead lines, which considers proximity of the low voltage lines to high voltage electrical lines or equipment

2. A description of the type of work to be performed, the voltage threshold, and any specialized personal protective equipment (PPE) or tools required

3. Details of any specialized worker training or skills required to perform the work safely

4. Work permits or other approvals from the line owner

5. Any requirements for temporary protective grounds

6. A rescue plan

Overhead wires should be considered uninsulated, even though the wires generally have insulating cover. Weathering and possible contact from equipment or tree branches means the integrity of the wire's outer cover cannot be relied on to protect workers.

Worker and public safety is generally ensured by positioning energized lines up high, outside a person's normal reach. Where such wires come within a person's reach, they must be guarded from contact by enclosure in a conduit or other approved shielding or enclosure.

Where a work process results in a short term or temporary encroachment by a worker into the area of low voltage wires normally isolated by

position, such as by a worker using a ladder to facilitate painting or window cleaning, the requirements of section 19.12 may be met by barriers, covers, or the use of written safe work procedures.

Where a change in the workplace, including changes in equipment, machinery, work process, or plant layout results in workers coming into proximity of overhead lines formerly isolated by position, suitable barriers or covers must be provided. For example, if a new work platform or stairway allows workers to move close to the wires, the wires must be repositioned to provide at least one meter of clearance, or the wires must be enclosed in conduit or other shielding to prevent worker contact with the wires.

#### G19.15(1) Ground fault circuit interrupters and other acceptable means

Issued December 4, 2007; Revised September 19, 2008; Editorial Amendment February 4, 2010; Editorial Revision September 1, 2010; Revised December 2, 2011; Editorial Revision November 21, 2017

**Regulatory excerpt**
Section 19.15(1) of the *OHS Regulation* ("*Regulation*") states:

> When used outdoors or in a wet or damp location, portable electrical equipment, including temporary lighting, must be protected by an approved ground fault circuit interrupter of the class A type installed at the receptacle or on the circuit at the panel, unless another acceptable means of protection is provided.

**Purpose of guideline**
The purpose of this guideline is to discuss the use of a ground fault circuit interrupter (GFCI) as a safety device, describe good work practices for use of GFCIs, describe the application of this health and safety requirement in conjunction with The *B.C. Electrical Code* ("*Code*"), describe an Assured Grounding Program (AGP), and explain a restriction on the use of an AGP as another acceptable means of protection.

**Background**
The *B.C. Electrical Code* specifies that receptacles having CSA configuration 5-15R or 5-20R installed to provide power for buildings or projects under construction or demolition must be protected by GFCIs of the Class A type except by special permission. In the circumstance where special permission is required for the use of an AGP in lieu of GFCIs on construction and demolition sites, the permission is obtained from the electrical authority having jurisdiction.

The British Columbia Safety Authority (operating as Technical Safety BC — "TSBC") has published a directive describing the scope of the GFCI requirements with respect to temporary wiring and an information bulletin that describes its permission process for contractors that wish to use an AGP on construction and demolition sites.

Section 19.15(1) of the *Regulation* specifies when a GFCI or another acceptable means of protection must be used. There are also *B.C. Electrical Code* requirements for GFCIs. In accordance with *Code* Rule 76-016, WorkSafeBC does not permit an AGP as another acceptable means of protection outdoors or in wet and/or damp conditions (e.g., many construction and demolition sites) when used with portable electrical equipment unless special permission (as required by the *B.C. Electrical Code*) is first obtained from the electrical authority.

This guideline describes the use of GFCIs and AGPs. Further, it specifies that WorkSafeBC will normally accept an AGP if a contractor has obtained the appropriate permission from the TSBC or other electrical authority (as required by the *B.C. Electrical Code*).

**Ground Fault Circuit Interrupters (GFCIs)**
A Class A GFCI is a device that detects any leakage current between neutral and ground conductors or an imbalance of the current in the hot and neutral conductors in an electrical circuit and trips (turns off) the circuit whenever the leakage current or imbalance reaches 4 - 6 mA. The prime function of a Class A GFCI is to provide protection against hazardous electrical shocks from defective circuits or equipment. It cannot ensure the safety of a worker. For example, it does not provide protection against shock should a person make contact with two of the circuit conductors on the load side of the GFCI.

A GFCI is designed to trip at a current level below the level hazardous to workers. To prevent nuisance tripping of GFCIs, the following good work practices are recommended:

- Connect only one power tool to each GFCI
- Cover power tools to protect them from the rain when they are not in use
- Store power tools and extension cords in a dry location
- Maintain extension cords and power tools in good condition
- Use extension cords that meet the requirements of the *Code* Rule 4-038
- Use the shortest extension cord practicable, usually no longer than 45 metres (150 feet)

**GFCIs in the *Code***
Section 20 of the *Electrical Safety Regulation* adopts the current edition of the *Canadian Electrical Code, Part 1, (CSA Standard C22.1)* as the *Code*. There are several requirements in the *Code* for use of a GFCI. For example, Section 26 of the *Code* requires that for residential occupancies, electrical receptacles installed outdoors and within 2.5 m of finished grade be protected with a Class A GFCI.

There are also requirements for GFCIs in marinas and wharves (section 78), mobile homes (section 70), and recreational vehicles (section 72).

Rule 76-016 of the *Code* specifies that "Receptacles having CSA configuration 5-15R or 5-20R installed to provide power for buildings or

projects under construction or demolition shall be protected by ground fault circuit interrupters of the Class A type except by special permission." An *Explanation of the Rules of the CE Code, Part 1 (CSA C22.1HB-09)* states, in part

> Not all workers are informed about the potential shock hazards of long lengths of flexible cords or the increased potential for damage to cords and equipment caused by changing site and environmental conditions. In addition, unstable grounding conditions caused by site and environmental conditions can create areas where workers are using electrical equipment with a potential to ground lower than where the temporary service is connected to ground. Thus, Rule 76-016 requires that receptacles on the work site having CSA configurations 5-15R or 5-20R be protected by a Class A ground fault circuit interrupter (GFCI).

**BC Safety Authority Information Bulletin**
TSBC has issued Information Bulletin IB-EL 2011-01. It outlines the scope of *Code* section 76, and describes the TSBC process for obtaining permission to use an AGP in lieu of GFCIs in prescribed circumstances.

Further information about *Code* requirements and their application can be obtained from the electrical authority having jurisdiction, as follows:

Technical Safety BC
City of Burnaby
Municipality of Maple Ridge
City of North Vancouver
District of North Vancouver
City of Surrey
City of Vancouver
City of Victoria
City of West Vancouver

**General application of section 19.15 of the *Regulation***
Section 19.15(1) of the *Regulation* refers to "portable electrical equipment." This includes extension cords, temporary lighting, pig-tail receptacles, and power tools that are used on 120 volt systems and are not part of a permanent electrical system.

Section 19.15(1) requires that portable electrical equipment be protected by a GFCI when used outdoors or in a wet or damp location, unless another acceptable means of protection is provided. An AGP can be another acceptable means of protection when implemented and maintained in accordance with procedures and restrictions in this guideline.

**Application of section 19.15 of the *Regulation* to construction and demolition sites**
In circumstances where the *Code* requires the use of a GFCI (i.e., 5-15R and 5-20R receptacles on construction and demolition sites as described above), there are no other acceptable means of protection except by special permission of the electrical authority having jurisdiction. The TSBC has recognized that there may be situations where an AGP can provide an acceptable level of protection and outlines these situations in the information bulletin. Contractors seeking special permission to use an AGP should follow the guidance in the bulletin.

An owner or prime contractor, before starting construction or demolition, will be required to declare on the Notice of Project (NOP) that is submitted to WorkSafeBC under section 20.2 of the *Regulation* that either

- A GFCI means of protection will be used for the project, or
- An application to the applicable electrical authority is to be made by the electrical contractor(s) to allow an AGP as an alternate means of protection on the project. On the NOP, this is referred to as a variance to the *Code*.

Where an intention to use an AGP is declared on the NOP, the prime contractor will need to inform the electrical contractor of this intention. The electrical contractor, in turn, will need to follow the instructions of the electrical authority having jurisdiction in seeking special permission.

Where special permission has been granted by the electrical authority and is posted at the construction site, WorkSafeBC will normally accept an AGP as an alternate means of protection on that site if the AGP meets the requirements set out herein. In some circumstances, an AGP can constitute another acceptable means of protection without special permission from the electrical authority having jurisdiction (e.g., after lock-up on a residential construction site).

Although *Code* Rule 76-016 only applies to 5-15R and 5-20R receptacles, section 19.15 of the *Regulation* applies to all portable electrical equipment used outdoors or in a wet or damp location. The effect of this is that a GFCI or other acceptable means of protection (i.e., AGP) must be used for all portable electrical equipment in these circumstances, regardless of the receptacle type. In other words, all electrical receptacles that are part of portable electrical equipment used outdoors or in a wet or damp location, including locking receptacles, must be used with a GFCI or AGP. This applies regardless of whether the receptacle comes within the scope of *Code* Rule 76-016.

**Assured Grounding Program (AGP)**
The purpose of an AGP is to ensure that the hot wire, neutral wire, and in particular, ground wire of extension cords and power tool cords are connected to the proper terminals and are electrically continuous. This is done by performing a continuity test on every extension cord and power tool when it is first put into service, following repairs, and every three months. An AGP is described in the WorkSafeBC publication Working Safely Around Electricity.

An AGP contains the following four parts:

1. **Worker training**
   All workers using extension cords and power tools under an AGP must be trained on the program.
2. **Daily visual inspection**
   Extension cords and power tools must be checked daily for damage by the persons who will be using them. Any damage found must be repaired before the cord or tool is used. Damaged extension cords and power cords of tools must not be spliced. The cords can either be replaced or shortened to remove the damaged portion.
3. **Continuity and polarity testing every three months**
   A qualified worker must test every extension cord and power tool for circuit continuity and correct polarity before they are used for the first time, following repairs, and during the months of January, April, July, and October. A qualified worker is a person who has been authorized by a supervisor to perform the task and who has received appropriate training.
4. **Colour-coding extension cords and power tools**
   Extension cords and power tools that have been tested must be tagged with a coloured band about 10 centimetres (4 inches) from the male plug. Coloured electrical tape is suitable for this purpose. A different colour is required for each quarter of the year (see below). These colours are standard for all worksites using an AGP in British Columbia.

   **Red: January, February, March**
   **White: April, May, June**
   **Blue: July, August, September**
   **Green: October, November, December**

As an example, a new extension cord tested on February 8 will have a red tag at the male plug. The extension cord must be retested and marked with a white tag during April. The old coloured tag should be removed when the new coloured tag is affixed.

*A worksite may have a combination of GFCIs and an AGP. An AGP can be a good inspectional tool when used in conjunction with GFCIs.*

#### G19.15(1)-1 Use of GFCI outdoors in the film and performing arts industries

Issued September 14, 2023; Editorial Revision December 15, 2023

**Regulatory excerpt**
Section 4.3(1) of the *OHS Regulation* ("*Regulation*") states:

> (1) The employer must ensure that each tool, machine and piece of equipment in the workplace is
>
> (a) capable of safely performing the functions for which it is used, and
>
> (b) selected, used and operated in accordance with
>
> (i) the manufacturer's instructions, if available,
>
> (ii) safe work practices, and
>
> (iii) the requirements of this Regulation.

Section 19.15(1) of the *Regulation* states:

> Section 19.15(1) of the Regulation states:
>
> When used outdoors or in a wet or damp location, portable electrical equipment, including temporary lighting, must be protected by an approved ground fault circuit interrupter of the class A type installed at the receptacle or on the circuit at the panel, unless another acceptable means of protection is provided.

**Purpose of guideline**
The purpose of this guideline is to:

- Enhance understanding of the legal requirements around the use of a ground fault circuit interrupter (GFCI) as a safety device in the film and performing arts industries
- Describe when another acceptable means of protection may be appropriate

**Background**
Workers in the film and performing arts industries may work at outdoor workplaces, where they could be exposed to hazards from portable or handheld electrical equipment.

WorkSafeBC assigns firms into classification units based on the industry in which they operate. Classification units (CUs) that are typically applied to firms engaged in the film and performing arts industries include the following:

- CU 761010 — Circus, carnival, rodeo, or mechanical amusement ride

- CU 761011 — Live performance venue
- CU 761027 — Organizing or conducting special events (NES)
- CU 761030 — Performing arts
- CU 763025 — Motion picture, commercial, or television production

Workers in these industries may be engaged in work at outdoor workplaces. Work activities may include the use of a wide range of electrical equipment, including generators, portable electrical equipment, and handheld equipment.

**What is a GFCI?**
A GFCI is an electrical device intended to protect workers by interrupting a circuit when the fault current to ground exceeds a predetermined value. A GFCI can be installed at the electrical panel or placed as part of a power cord to protect a worker from electrical shocks. A class A GFCI will interrupt the circuit within a predetermined time when the ground fault current is 6 mA or more, but not when the ground fault current is 4 mA or less.

**GFCI use outdoors in the film and performing arts industries**
Section 19.15 of the *Regulation* requires that any portable electrical equipment used outdoors or in a wet or damp location must be protected by an approved class A type GFCI. A GFCI should be installed at the receptacle or on the circuit panel for 120-volt, 15-amp, and 20-amp portable electrical equipment. The *Regulation* also includes provisions for other acceptable means of protection.

An outdoor workplace in the film and performing arts industries may be a natural setting, such as a field or forest, or a temporary portable structure. An outdoor workplace is generally not protected from the elements by a permanent structure. Work that takes place under portable tents or canopies, or in partially enclosed structures (e.g., a gazebo or open-sided shelter), would generally be considered work in an outdoor workplace.

Common outdoor workplaces in the film and performing arts industries may include food services, change rooms, and holding areas. In most cases, these areas require a 120 or 240 volt electrical power supply.

**Selecting appropriate risk controls**
The hierarchy of controls should be considered when selecting and implementing the most effective measures to first eliminate, and then control, risks. Eliminating the hazard completely is always the first choice. This might include using electrical equipment indoors rather than outdoors (e.g., electric hair or makeup equipment). Substitution involves replacing a tool, piece of equipment, or process with a less hazardous one. For example, a battery-powered tool might be used in place of one connected to a power source.

When it is not possible to eliminate the hazards or substitute safer alternatives, engineering controls are the next best options. These controls involve using work equipment or other means to prevent workers from being exposed to a hazard (e.g., a double-insulated tool). A GFCI is a type of engineering control.

In the film and performing arts industries, there will be occasions where GFCIs can be easily used; for example, in the food services areas or holding tents for the cast and crew of a production. However, in some circumstances the use of GFCIs is not reasonably practicable and may create additional hazards. In these circumstances administrative controls may be considered. Administrative controls involve identifying and implementing safe work procedures so workers can perform their job duties safely.

**Typical equipment used outdoors in the film and performing arts industries**
The following table provides examples of equipment that is frequently used in the film and performing arts industries. This is not an exhaustive list.

| GFCI required | GFCI may not be reasonably practicable |
|---|---|
| • Handheld devices and equipment<br>• Food services equipment such as heating plates, coffee pots, refrigerators<br>• Portable lighting for enclosures<br>• Electric foggers<br>• Electric fans | • Set lighting on outdoor sets<br>• Sound and video equipment that operate on a generator system with surge protectors |

Employers must also comply with requirements set out in other standards and codes, including requirements in the Electrical Safety Regulation for receptacles having CSA configuration 5-15R or 5-20R. Additional information relevant to GFCIs can be found in the following standards, codes, directives, and bulletins:

- The *B.C. Electrical Safety Regulation* (B.C. Reg. 255/2022 and subsequent revisions)
- Various directives, bulletins, and publications from Technical Safety BC (formerly the BC Safety Authority)
- Using ground-fault circuit interrupters (GFCIs) in the motion picture production, television production, live venue, and performing arts industries (WorkSafeBC bulletin)
- *CSA Standard C22.1 (Canadian Electrical Code and BC amendments)*
- *CSA Z462 Workplace Electrical Safety*

- Local and municipal bylaws, resolutions, ordinances, and requirements

#### G19.16-1 Isolation and lockout

Issued August 1999; Editorial Revision October 14, 2004; Editorial Revision June 29, 2005; Editorial Revision March 7, 2011; Revised December 2, 2011; Editorial Revision September 21, 2012; Editorial Revision June 14, 2013; Editorial Revision June 26, 2014; Editorial Revision October 28, 2015; Editorial Revision November 21, 2017; Editorial Revision September 18, 2020; Editorial Revision September 11, 2025

**Regulatory excerpt**
Section 19.16 of the *OHS Regulation* ("*Regulation*") states, in part:

> (1) High voltage electrical equipment must, if practicable, be completely isolated, grounded, and locked out as required by this Regulation before starting work on it.
>
> (2) If it is not practicable to completely isolate high voltage electrical equipment,
>
> (a) written safe work procedures acceptable to the Board must be followed,
>
> (b) two or more qualified and authorized persons must be present while the work is being done, unless the procedures being followed under paragraph (a) specifically permit the work to be done by one person,
>
> (c) appropriate electrical protective equipment, including rubber blankets, hoses, hoods, gloves and live line tools must be selected, used, stored, tested, and maintained in accordance with a standard acceptable to the Board, and
>
> …

**Purpose of guideline**
Section 19.16(1) requires that high voltage electrical equipment must, where practicable, be isolated, grounded, and locked out before starting work on it. Where it is not practicable to completely isolate the equipment, certain work procedures must be followed. This guideline describes safe work procedures that are acceptable to WorkSafeBC under section 19.16(2)(a) of the *Regulation*, circumstances where work done by one person is acceptable under section 19.16(2)(b), and appropriate electrical protective equipment under section 19.16(2)(c).

**Safe work procedures**
Subject to any qualifications in this guideline, written safe work procedures for live line work compliant with the *Regulation* and the *Workers Compensation Act*, and developed using the rules of either of the following publications are acceptable to WorkSafeBC:

- The February 2024 edition of BC Hydro *Safety Practice Regulations* sections 100 to 800
- *National Electrical Safety Code*, ANSI/IEEE C2 - 2007

Note: If there is any conflict between the requirements of the *Regulation* and a provision of the above publications, the requirements of the *Regulation* prevail.

Written safe work procedures not developed following a standard listed above must be submitted to the Prevention Practice, Quality, and Engineering department at WorkSafeBC to determine their acceptability, prior to their use.

Some employers will have high voltage equipment that is not part of a power system. If the employer cannot meet the lockout requirements of section 19.16(1) for work on such equipment, the employer must have written safe work procedures under section 19.16(2)(a).

#### G19.16(2)(c) Appropriate electrical protective equipment - Standards acceptable to WorkSafeBC

Issued June 29, 2005; Editorial Revision January 1, 2007; Revised September 21, 2012

**Regulatory excerpt**
Section 19.16(2) of the *OHS Regulation* ("*Regulation*") states:

> If it is not practicable to completely isolate high voltage electrical equipment,
>
> (a) written safe work procedures acceptable to the Board must be followed,
>
> (b) two or more qualified and authorized persons must be present while the work is being done, unless the procedures being followed under paragraph (a) specifically permit the work to be done by one person,
>
> (c) appropriate electrical protective equipment, including rubber blankets, hoses, hoods, gloves and live line tools must be selected, used, stored, tested, and maintained in accordance with a standard acceptable to the Board, and
>
> (d) the use of metal ladders, wire reinforced side rail wooden ladders, metal scaffolds or metal work platforms must be in accordance with the procedures established under paragraph (a).

Section 4.3 of the *Regulation* states:

> (1) The employer must ensure that each tool, machine and piece of equipment in the workplace is
>
> (a) capable of safely performing the functions for which it is used, and
>
> (b) selected, used and operated in accordance with
>
> (i) the manufacturer's instructions, if available,
>
> (ii) safe work practices, and
>
> (iii) the requirements of this Regulation.
>
> (2) Unless otherwise specified by this Regulation, the installation, inspection, testing, repair and maintenance of a tool, machine or piece of equipment must be carried out
>
> (a) in accordance with the manufacturer's instructions and any standard the tool, machine or piece of equipment is required to meet, or
>
> (b) as specified by a professional engineer.
>
> (3) A tool, machine or piece of equipment determined to be unsafe for use must be identified in a manner which will ensure it is not inadvertently returned to service until it is made safe for use.
>
> (4) Unless otherwise specified by this Regulation, any modification of a tool, machine or piece of equipment must be carried out in accordance with
>
> (a) the manufacturer's instructions, if available,
>
> (b) safe work practices, and
>
> (c) the requirements of this Regulation.

**Purpose of guideline**
This guideline lists standards acceptable to WorkSafeBC, under section 19.16(2)(c), where applicable.

**Standards acceptable to WorkSafeBC**
The following standards are acceptable to WorkSafeBC under section 19.16(2)(c) where applicable:

| Standard Reference | Standard Title |
|---|---|
| *ASTM* | Standards in *ASTM Standards on Electrical Protective Equipment for Workers, 12th Edition, 2006* |
| *CAN/ULC-60895-04* | *Live Working - Conductive Clothing for use at Nominal Voltage up to 800 kV a.c. and ±600 kV d.c.* |
| *CEI/IEC 60895 (2002)* | *Live working - Conductive clothing for use at nominal voltage up to 800 kV a.c. and ±600 kV d.c.* |

Where the aforementioned standards do not specify how the applicable electrical protective equipment must be selected, used, stored, tested, or maintained the equipment must be:

- Selected and used in accordance with section 4.3(1)(b) of the *Regulation*
- Tested and maintained in accordance with section 4.3(2) of the *Regulation*.

#### G19.24.1 Minimum approach distance

Issued June 29, 2005; Editorial Revision to include February 1, 2011 Regulatory Amendment; Editorial Revision August 3, 2018; Editorial Revision consequential to March 1, 2023 Regulatory Amendment

**Regulatory excerpt**
Section 19.24.1 of the *OHS Regulation* ("*Regulation*") states:

> (1) Subject to section 19.24.2, or unless otherwise permitted by this Part, if exposed electrical equipment or conductors at a workplace have a voltage within a range set out in Column 1 of Table 19-1A, the following must remain at least the distance from the exposed electrical equipment and conductors that is set out in Column 2 opposite that range of voltage:

(a) a person working at the workplace;

(b) a tool, a machine, material or equipment at the workplace.

(2) If practicable, an employer must ensure that a tower crane operating at a workplace that has exposed electrical equipment or conductors that have a voltage within a range set out in column 1 of Table 19-1A is equipped with a zone-limiting device that prevents the crane from operating in the relevant minimum approach distance to the exposed electrical equipment or conductors set out opposite in column 2.

**Table 19-1A**

| **Column 1**<br>**Voltage** | **Column 2**<br>**Minimum approach distance for working close to exposed electrical equipment or conductors** | |
|---|---|---|
| **Phase to phase** | **Metres** | **Feet** |
| **Over 750 V to 75 kV** | 3 | 10 |
| **Over 75 kV to 250 kV** | 4.5 | 15 |
| **Over 250 kV to 550 kV** | 6 | 20 |

**Purpose of guideline**
This guideline describes the application of Table 19-1A minimum approach distances.

**Application of section**
This section of the *Regulation* applies to all workers unless the exceptions specified in sections 19.24.2 to 19.29 and 19.34 of the *Regulation* apply. The employer has a responsibility to provide workers with and instruct them in safe electrical work practices if the intended work may lead to an encroachment on the general limits of approach to energized high voltage equipment and conductors, as allowed by the exceptions to the general limits of approach under sections 19.25 to 19.29 and 19.34.

Therefore the employer must ensure either of the following:

- The limits of approach specified in Table 19-1A are maintained
- The additional requirements of the relevant sections of 19.24.2 to 19.34 are met

In determining whether the minimum clearance distance can be maintained by a piece of equipment, it must be determined whether the operation has been planned with due regard for environmental factors, the type of equipment, the capability of the operators, and movement on site so that no part of equipment, workers, or materials will come within the stipulated distance.

In cases where possible or theoretical movement of a piece of equipment into the minimum approach distance is prevented by a system such as a zone limiting device, section 19.25 does not apply and an assurance in writing is not required.

For instance, a tower crane may be positioned so that it is possible for the load line of the tower crane to travel within the limits of approach of a high voltage distribution line. However, the owner of the tower crane may put systems in place that prevent the tower crane from operating in an area that is in violation of the required limits of approach. In that case, section 19.25 of the *Regulation* does not apply and an assurance in writing is not required.

For minimum clearance distances related to moving equipment under exposed electrical equipment or conductors, refer to section 19.24.2 of the *Regulation* and OHS Guideline G19.24.2.

#### G19.24.2 Minimum clearance distance when passing under electrical equipment and conductors

Issued February 1, 2011

**Regulatory excerpt**
Section 19.24.2 of the *OHS Regulation* ("*Regulation*") states:

(1)This section applies in the circumstances where a person working at a workplace is moving or is involved in moving equipment under exposed electrical equipment or conductors and is not performing any work other than work related to moving the equipment.

(2) Unless otherwise permitted by this Part, in the circumstances set out in subsection (1), if exposed electrical equipment or conductors have a voltage within a range set out in Column 1 of Table 19-1B, the following must maintain at least the clearance distance from the exposed electrical equipment and conductors that is set out in Column 2 opposite that range of voltage:

(a) a person moving or involved in moving the equipment under the exposed electrical equipment or conductor;

(b) the equipment that a person referred to in paragraph (a) is moving;

(c) the load carried by the equipment referred to in paragraph (b).

**Table 19-1B**

| Column 1<br>Voltage | Column 2<br>Minimum clearance distance for passing under exposed electrical equipment or conductors | |
|---|---|---|
| **Phase to phase** | **Metres** | **Feet** |
| **Over 750 V to 75 kV** | 2 | 6.5 |
| **Over 75 kV to 250 kV** | 3 | 10 |
| **Over 250 kV to 550 kV** | 4 | 13 |

**Purpose of guideline**
This guideline describes the application of this *Regulation* section and describes examples.

**Application of the regulatory requirement**
*Regulation* section 19.24.2 provides an exception to section 19.24.1 when a vehicle or mobile equipment is being driven, provided the worker driving the vehicle or mobile equipment is not doing any work other than driving the vehicle or mobile equipment. The exception provides that the minimum clearance between a worker, any part of the vehicle or mobile equipment, or its load, and the exposed energized high voltage electrical equipment and conductors may be reduced to the limits in column 2 of Table 19-1B, subject to considerations in other sections in Part 19. (These other considerations are the different limits of approach for qualified electrical workers or specially trained and/or qualified workers following appropriate safe work procedures acceptable to WorkSafeBC.)

The minimum clearance distances in column 2 in Table 19-1B are based on consideration of the applicable standards published by organizations such as the Institute of Electrical and Electronics Engineers, as well as advice from electrical utility companies.

Section 19.24.2 includes application to vehicles hauling oversize loads on industrial sites or along haul roads. For example, off-highway log hauling trucks generally have loads higher than trucks hauling on public roads, and the employer or prime contractor will need to know and control the maximum load height for such off-highway log trucks as necessary to ensure the clearance specified in column 2 of Table 19-1B is maintained. Similarly, when equipment such as a log loader or feller-buncher is being driven from one work location to another, the employer will need to ensure the height of the equipment in the configuration being used when travelling or driving the equipment will allow it to pass under any overhead high voltage conductors by at least the clearance specified in column 2 of Table 19-1B.

The height of heaped loads on earth or rock hauling trucks also needs to be known and controlled to ensure the top of such loads can pass under any overhead conductors by at least the clearance specified in column 2 of Table 19-1B. When a truck box is raised to dump or spread material, the driver is doing more than just driving the vehicle and the clearance distances in column 2 of Table 19-1A apply. Refer to OHS Guideline G19.24.1 for minimum approach distance for working close to electrical equipment and conductors.

It is expected that road maintenance vehicles, such as road graders and trucks rigged up for snow plowing, salting/sanding, or dust suppression operations will have overall heights that ensure clearance to the limits in column 2 of Table 19-1A during grading, plowing, or salting/sanding/spraying operations. A worker grading a surface, or plowing snow, salting/sanding, or spraying water or other road treatment on a surface is considered to be doing more than just driving the vehicle or equipment.

If a vehicle or mobile equipment stops under exposed energized high voltage electrical equipment or conductors, then the clearance distances in column 2 of Table 19-1A apply.

#### G19.25 Assurance in writing

Issued August 1999; Revised June 29, 2005; Editorial Revision to include February 1, 2011 Regulatory Amendment; Editorial Revision consequential to February 1, 2012 Regulatory Amendments; Editorial Revision November 21, 2017; Revised September 25, 2019; Revised May 9, 2024

**Regulatory excerpt**
Section 19.25 of the *OHS Regulation* ("*Regulation*") states:

> (1) If the minimum distance in Table 19-1A cannot be maintained because of the circumstances of work or the inadvertent movement of persons or equipment, an assurance in writing on a form acceptable to the Board and signed by a representative of the owner of the power system, must be obtained.
>
> (2) The assurance must state that while the work is being done the electrical equipment and conductors will be displaced or rerouted from the work area, if practicable.
>
> (3) If compliance with subsection (2) is not practicable the assurance must state that the electrical equipment will be isolated and grounded, but if isolation and grounding is not practicable the assurance must state that the electrical equipment will be visually identified and guarded.

(4) The safeguards specified in the assurance must be in place before work commences and effectively maintained while work is taking place.

(5) If guarding is used,

(a) neither equipment nor unqualified persons may touch the guarding, and

(b) a safety watcher must be designated, or range limiting or field detection devices acceptable to the Board must be used.

(6) The assurance must be available for inspection at the workplace, as close as practicable to the area of work, and must be known to all persons with access to the area.

**Purpose of guideline**
This guideline provides information regarding the assurance in writing form; and, the hierarchy of protective measures intended by section 19.25 of the *Regulation*. This guideline does not apply when the applicable section is 19.24.2 of the *Regulation*.

**Assurance in writing form**
The "assurance in writing" form is referred to as a WorkSafeBC 30M33 form. The 30M33 form is provided to and used by all power system owners in B.C. It is currently the only assurance in writing form that is acceptable to WorkSafeBC.

The 30M33 form is needed to obtain information about high voltage electrical equipment and used when the requirements of section 19.25 of the *Regulation* apply to the work being performed. The 30M33 form does not need to be used when the work is being performed in compliance with sections 19.26, 19.27, 19.28, or 19.29 of the *Regulation*.

Section 19.25(1) of the *Regulation* requires that the 30M33 form be signed by the representative of the owner of the power system. The signature is an assurance that the safety precautions required by section 19.25 of the *Regulation* have been performed by the utility company. The signature of the representative of the utility owner is only an assurance that the work planned to be performed by the utility company has been performed by the utility company. The 30M33 form is not an assurance by the utility company that the safety procedures performed by the contractor are safe. A mechanically reproduced "approval," such as a rubber stamp, in lieu of a signature, is not acceptable. Contractors have sole responsibility for their systems and procedures that are intended to allow the work to be performed safely.

The 30M33 form may also be used as a record of decisions between the utility owner and the contractor indicating what work will, or will not, be performed by the utility owner in advance of the work to be performed by the contractor.

Section 19.25 of the *Regulation* applies to all workers who are not specially trained. Therefore, whenever the limits of approach contained in Table 19-1A cannot be maintained from the original or new location of the conductors, and any workers present do not meet the qualifications of sections 19.27, 19.28, or 19.29, then a 30M33 form must be completed according to the instructions contained on the form.

Section 19.25 of the *Regulation* applies when there is a potential for a person or piece of equipment to enter within the limits of approach. This includes the potential for inadvertent movement of the machine, load, rigging, or any other factor(s) that could allow contact with high voltage electrical equipment and no systems are in place to ensure that this access does not happen.

Section 19.25(6) of the *Regulation* does not specifically require that the 30M33 form be faxed to WorkSafeBC. However, any party may send a copy of the 30M33 form to WorkSafeBC.

**Hierarchy of requirements defined in sections 19.25(2) and 19.25(3) of the *Regulation***

**Option 1**

Section 19.25(2) - Electrical equipment and conductors must be displaced or rerouted if practicable

**Option 2 (only if option 1 is not practicable)**

Section 19.25(3) - Electrical equipment must be isolated and grounded if practicable.

**Option 3 (only if option 1 or option 2 are not practicable)**

Section 19.25(3) - Electrical equipment will be visually identified and guarded. For this option merely visually identifying the conductors is not sufficient. Guarding must also be installed.

For conductors that are visually identified and guarded, section 19.25(5) also applies.

**Note:**
If the option of visual identification and guarding is used, neither the limits of approach in Table 19-1A nor Table 19-2 apply.

Under sections 19.25(4) and (5) of the *Regulation*, the electrical hazard must be controlled by one of the previously listed methods before any workers commence performing tasks that could place workers, tools, or equipment within the limits of approach specified in Table 19-1A. Work performed according to the requirements of section 19.29 is not subject to the requirements of section 19.25.

**The selection above depends on what is practicable, the circumstances of each workplace, and is a matter of assessment.**

**Employers are expected to identify the potential risk and do everything that is practicable to prevent contact with the high voltage electrical equipment. Section 1.1 of the Regulation defines practicable as "that which is reasonably capable of being done." This includes making a risk-based decision that includes the location of the high voltage electrical equipment, duration of the job, number of workers exposed, type and amount of equipment being used, range limiting or field detection device(s) installed on equipment, and worker training.**

**Expectations for visual identification and guarding**
Where conductors must be visually identified and guarded, the following practices are expected:

- Up to 35 kV
  **Visual identification of conductors**
  - Highly visible coloured, such as orange or yellow, polyethylene non-conducting covers, 3 mm thick or ABS non-conducting covers positioned such that contact with the conductor is restricted
  - Other forms of visual identification acceptable to WorkSafeBC
  **Guarding**
  - Highly visible coloured, preferably orange, pennant flags attached to yellow synthetic rope (flagline) positioned at least 1.2 meters (4 ft) away from energized conductors and equipment
  - Other forms of guarding acceptable to WorkSafeBC

- From 35 kV to 60 kV
  - Highly visible coloured, preferably orange, pennant flags attached to yellow synthetic rope (flagline) positioned at a distance and direction away from energized conductors and equipment as specified on the Assurance in Writing form, or
  - Guard wire, marked by bright-coloured flag line, and suspended between a supplementary set of cross arms on the poles

- Over 60 kV
  - No visual identification option available

The highly visible covers over the powerline are intended to identify the powerlines from the ground and the flag line is intended to be the guarding to create awareness of overhead lines. No contact with the guarding is permitted. The covers are not to be considered electrically insulating.

The requirement to prevent workers or equipment from entering this safe distance from any area in which the worker is likely to pass or work applies to general workers covered by the *Regulation* section 19.24 but not, for example, to qualified workers under section 19.29 of the *Regulation*.

**Safety watcher**
Section 19.25(5) of the *Regulation* requires that a safety watcher or acceptable device must be used to ensure that the workers and/or equipment are prevented from entering the safe distance established by the flag line. The safety watcher must limit the approach of workers, tools, and equipment such that they do not touch the flag line (guarding).

The safety watcher must be given authority to stop the movement of the equipment when circumstances are warranted. An effective means of communication must be established between the safety watcher and the equipment operator, prior to commencement of work, such that the stop signal is unambiguous.

When equipment is operated, or intended to be operated, in proximity to energized conductors or equipment, the hazard due to contact is prevalent while the equipment is in motion. Therefore, the safety watcher should focus on that motion. The safety watcher may perform other duties while the equipment is not moving. It is essential that the safety watcher is somebody other than the person(s) controlling the movement of the equipment.

#### G19.26 Assurance not practicable – Role of the safety watcher

Issued June 29, 2005; Editorial Revision to include February 1, 2011 regulatory amendment; Editorial revision consequential to February 1, 2012 Regulatory Amendment

**Regulatory excerpt**
Section 19.26 of the *OHS Regulation* ("*Regulation*") states:

> (1) If exposed high voltage electrical equipment and conductors cannot be isolated, rerouted or guarded, work must not be done within the minimum distance in Table 19-1A until the following precautions are taken:
>
> (a) the area within which equipment or materials are to be moved must be barricaded and supervised to restrict entry only to those workers necessarily engaged in the work;
>
> (b) a safety watcher must be designated;
>
> (c) a positive means must be provided for the safety watcher to give a clear, understandable stop signal to workers in the area, and the watcher must give the stop signal by no other means.
>
> (2) While equipment is in motion in an area in proximity to energized electrical equipment or conductors, no person other than the

equipment operator may touch any part of the equipment or the material being moved by it.

(3) No person may move a load or any rigging line from its position of natural suspension if it is in proximity to an energized electrical conductor or equipment.

**Purpose of guideline**
The purpose of this guideline is to outline the role of the safety watcher under this section of the *Regulation*.

**Role of the safety watcher**
It is a rare occurrence when exposed high voltage electrical equipment and conductors cannot be isolated, rerouted, or guarded. For those exceptional cases, a safety watcher is required, and his/her duties should include monitoring the following criteria:

- Only necessary personnel shall be provided access to the restricted area in recognition of the hazards involved.
- When equipment is operated in proximity to energized conductors or equipment, the hazard due to contact is prevalent while the equipment is in motion. Therefore, the safety watcher needs to focus on that motion.
- An effective means of communication must be established between the safety watcher and the equipment operator prior to commencement of work such that the stop signal is unambiguous.
- The safety watcher needs to be given authority to stop the movement of the equipment when circumstances are warranted.
- No worker, not even the crane operator, is permitted at any time to move the rigging, suspension line, or load from its position of natural suspension, while any part is within the limits of approach of Table 19-1A. The crane operator may use the tag line to rotate the load about the suspension line. However, this must be done carefully so that the load is still suspended naturally. If it becomes necessary for an assisting worker to rotate the suspended load about the load line, then movement of the lifting equipment needs to be stopped. Once the suspended load has stopped, then an assisting worker may use a tag line to rotate the load about the load line. Once the load is rotated and the assisting worker has released the tag line and moved out of the danger area, then the equipment operator may resume moving the load with the crane.

#### G19.27 Specially trained

Issued June 29, 2005; Revised August 4, 2015; Editorial Revision April 6, 2023

**Regulatory excerpt**
Section 19.27 of the *OHS Regulation* ("*Regulation*") states:

(1) A worker who has taken a course of instruction approved by the Board may work up to the adjusted limits of approach in Table 19-2 when all the following conditions apply:

(a) the high voltage electrical equipment is energized to a potential of not more than 75 kV;

(b) the Board has determined that rerouting, de-energizing or guarding of the equipment is not practicable for the type of work being performed;

(c) the work is not being done for the owner of the power system;

(d) the work is of a type that must be done regularly;

(e) the worker follows written safe work procedures acceptable to the Board.

(2) A qualified electrical worker may work closer than the limits specified in Table 19-2 provided the worker is authorized by the owner of the power system and uses procedures acceptable to the Board.

Table 19-2: Adjusted limits of approach

| Voltage | Minimum distance | |
|---|---|---|
| Phase to phase | Metres | Feet |
| Over 750 V to 20 kV | 0.9 | 3 |
| Over 20 kV to 30 kV | 1.2 | 4 |
| Over 30 kV to 75 kV | 1.5 | 5 |

**Purpose of guideline**
The purpose of this guideline is to:

- List situations for which WorkSafeBC has determined that rerouting, de-energizing, or guarding of the equipment is not practicable for the work being performed, under section 19.27(1)(b).
- Explain the process for submitting requests to WorkSafeBC for
  - approval of written safe work procedures, under section 19.27(1)(e); and
  - a determination that rerouting, de-energizing or guarding of the equipment is not practicable under section 19.27(b).

- Highlight the distinctions between the requirements related to the adjusted limits of approach for workers, under section 19.27(1), and for qualified electrical workers, under section 19.27(2).

**Summary**
It may be possible for work to be performed under section 19.27 of the *Regulation* instead of sections 19.24, 19.25, or 19.26, if all the conditions under section 19.27(1) are met:

- The worker follows written safe work procedures, and has taken a course of instruction, that have been approved in writing by WorkSafeBC's Prevention Practice, Quality, and Engineering department (the prior approval letter must be available on site)
- WorkSafeBC's Prevention Practice, Quality, and Engineering department has determined (in this guideline or through prior written approval) that rerouting, de-energizing or guarding of the equipment is not practicable for the type of work being performed
- The high voltage electrical equipment is energized to a potential of not more than 75 kV
- The work is not being done for the owner of the power system
- The work is of a type that must be done regularly

**Examples of specified conditions under section 19.27(1)(b)**
Under section 19.27(1)(b), one of the conditions that must be met in order for a worker to be permitted to work up to the adjusted limits of approach in Table 19-2 is that WorkSafeBC has determined that rerouting, de-energizing, or guarding of the equipment is not practicable for the type of work being performed. WorkSafeBC has determined that for the following types of work, it is not practicable to reroute, de-energize, or guard the conductors:

- Changing light bulbs or electrical components of street lights or traffic signals
- Repairing or painting street light poles or poles primarily intended to support street lights or traffic signals
- Repairing or painting poles primarily intended to support electric trolley lines

If an employer would like WorkSafeBC to determine that rerouting, de-energizing, or guarding of equipment is not practicable for additional types of work, then a request must be submitted to WorkSafeBC prior to work commencing.

Requests for a determination of whether written safe work procedures are acceptable to WorkSafeBC, under section 19.27(1)(e) of the *Regulation* must also be submitted to WorkSafeBC.

**How to submit the requests for prior approval under section 19.27**
A request for approval under section 19.27(1) or 19.27(2) of the *Regulation* is to be submitted in writing to WorkSafeBC's Prevention Practice, Quality, and Engineering department, and to allow for efficient processing should include the following information:

- A list of the types of work intended to be performed under section 19.27 of the *Regulation.*
- An explanation for why the work must be done within the general limits of approach for energized equipment, as specified in Table 19-2.
- Support for why it is impractical to reroute, de-energize, or guard the conductors.
- A copy of the written safe work procedures to be used by the workers.
- A statement regarding whether the application is being made under section 19.27(1) or (2) of the *Regulation.*
- A statement regarding the qualifications of the workers affected. (Note: SkilledTradesBC recognized programs such as Construction Eletrician and Industrial Electrician may qualify as an acceptable course of instruction).
- A risk assessment showing how the proposed safe work procedures will provide effective protection to workers.
- A description of how the matter has been discussed with representatives of the workers affected (those who will be doing the work), such as through their representatives on the health and safety committee. (Endorsement of the proposal by the health and safety committee and/or other worker representatives is a preferred means of showing this aspect has been effectively performed.)
- The name, address, and telephone number of a contact person who is familiar with the submission package and can be contacted by WorkSafeBC personnel for clarification of items in the submission and who can provide additional information, if necessary.

**Requirements regarding the adjusted limits of approach for "workers" versus "qualified electrical workers"**
The worker working up to the adjusted limits of approach under section 19.27(1) of the *Regulation* is not required to be authorized by the owner of the power system. However, the qualified electrical workers who enter the adjusted limits of approach, under section 19.27(2), are required to be authorized by the owner of the power system.

OHS Guideline *G19.1-2 Electrical qualifications* highlights the criteria to be used to determine whether a worker is a "qualified electrical worker" under section 19.27(2).

#### G19.28 Emergency work

Issued June 29, 2005; Editorial Revision June 30, 2021

Section 19.28 of the *OHS Regulation* ("*Regulation*") states:

> (1) Sections 19.24 to 19.27 do not apply to emergency actions close to energized high voltage electrical equipment or conductors carried out by workers who have undergone a course of instruction approved by the Board.
>
> (2) During emergency actions, all reasonable precautions must be taken to control the hazards including, where practicable,

(a) restricting entry into the area within which equipment or materials are to be moved to workers necessarily engaged in the work,

(b) designating a safety watcher,

(c) when equipment is in motion, preventing a person other than the equipment operator from touching any part of the equipment or the material being moved by it, and

(d) requiring the equipment operator to operate the controls from the seat provided on the equipment, or from a metal stand that is integral with the frame of the equipment and clear of the ground, or from a metallic mat bonded to the frame of the machine and located on the ground beside the machine.

**Purpose of guideline**
The purpose of this guideline is to clarify the expectations regarding the course of instruction required by workers under section 19.28(1) of the *Regulation* and highlight reasonable precautions that must be taken under section 19.28(2), where practicable.

**Course of instruction approved by WorkSafeBC under section 19.28(1)**
This section applies to first responders who have to rescue a person from an immediate threat. Workers who carry out emergency actions close to energized high voltage equipment or conductors are to have awareness of high voltage hazards and appropriate work procedures in proximity to such systems in order comply with section 19.28 of the *Regulation* and section 21(2)(e) of the *Workers Compensation Act*. Specifically, an approved course certificate must be available from the workers for inspection by WorkSafeBC prevention officers. The course may be provided by any agency acceptable to WorkSafeBC.

**Reasonable precautions to control hazards under section 19.28(2)**
In addition to those precautions listed in section 19.28(2), the following are considered to be reasonable precautions to be taken to control the hazards that should be taken where practicable:

- Only necessary personnel may be provided access to the restricted area in recognition of the hazards involved (refer to section 19.28(2)(a).
- When equipment is operated in proximity to energized conductors or equipment, the hazard due to contact is prevalent while the equipment is in motion. Therefore, the watcher must focus on that motion.
- The watcher must be given authority to stop the movement of the equipment.
- An effective means of communication must be established between the watcher and the operator prior to commencement of work such that the stop signal is unambiguous.
- Workers must be positioned so as not to become part of the current path to ground in the event of the equipment contacting energized components of the high voltage electrical system.

#### G19.29 Authorization by owner

Issued June 29, 2005; Editorial Revision June 6, 2006; Editorial Revision to include February 1, 2011 regulatory amendment

**Regulatory excerpt**
Section 19.29 of the *OHS Regulation* ("*Regulation*") states:

> Qualified workers and workers under their direct supervision may work within the minimum distances to energized high voltage electrical equipment and conductors, as specified in Table 19-1A and Table 19-2, when authorized by the owner of the power system and using work procedures acceptable to the Board.

**Purpose of guideline**
The purpose of this guideline is to outline the circumstances where working within the minimum distances specified in Tables 19-1A and 19-2 is acceptable, as well as providing information on how to submit requests for approval.

**Authorization, qualified workers, and direct supervision**
Section 19.29 of the *Regulation* applies to qualified workers (refer to G19.1-2) and workers under their direct supervision who are authorized by the owner of the power system. Even if these workers are not performing electrical work, they still need to be authorized by the owner of the power system and use work procedures acceptable to WorkSafeBC, in order for them to be permitted to work within the minimum distances to the energized high voltage electrical equipment and conductors, specified in Table 19-1A and Table 19-2. There are no minimum limits of approach specified for these workers. Sections 19.24 to 19.28 do not apply to workers who qualify under section 19.29.

In order for workers to be under the direct supervision of the qualified workers, the qualified worker must have the authority to direct, limit, or eliminate the scope of work performed by these workers. This generally means that the "workers under their direct supervision" are also employed by or contracted to the same employer as the qualified workers. The qualified worker must be in a location that allows constant surveillance of the other workers.

Section 19.29 of the *Regulation* states that the work procedures must be acceptable to WorkSafeBC. WorkSafeBC must provide prior approval of these work procedures.

The decision on a request under the *Regulation* section 19.29 to determine whether work procedures are acceptable to WorkSafeBC, will be made by one of WorkSafeBC's persons authorized to grant "prior approvals."

**How to submit these requests**
A request under the *Regulation* section 19.29 is to be submitted in writing to WorkSafeBC's Prevention Practice, Quality, and Engineering department, and should include the following information to allow for efficient processing:

- The types of work intended to be performed under the *Regulation* section 19.29.
- An explanation of why the work must be done within the normal limits of approach for energized equipment.
- Evidential support for why it is impractical to reroute, de-energize or guard the conductors.
- A written copy of the work procedures to be used by the workers.
- A statement regarding the qualifications of the affected workers.
- A risk assessment showing how the proposed safe work procedures will provide effective protection to workers.
- A description on how the matter has been discussed with representatives of the workers affected (those who will be doing the work), such as through their representatives on the health and safety committee. (Endorsement of the proposal by the joint health and safety committee and/or other worker representatives is a preferred means of showing this aspect has been effectively done.)
- The name, address and telephone number of a contact person who is familiar with the submission package and can be contacted by WorkSafeBC personnel for clarification of items in the submission and can provide additional information, if necessary.

#### G19.30 Preliminary inspection

Issued August 1999; Editorial Revision to include February 1, 2011 regulatory amendment

**Regulatory excerpt**
Section 19.30 of the *OHS Regulation ("Regulation")* states:

> (1) Before commencing tree pruning or falling close to energized high voltage overhead conductors, the worksite must be inspected by a qualified person, authorized by the owner of the power system, to identify any hazardous areas, including situations where any part of a tree to be pruned or felled is within the applicable minimum distance from an energized conductor as specified in Table 19-1A, or may fall within that distance.
>
> (2) Immediately before commencing work, an inspection must be performed by a qualified person to verify the results of the initial inspection done under subsection (1) are still valid.

**Purpose of guideline**
The purpose of this guideline is to provide direction on inspections to take place prior to tree pruning and falling near energized conductors.

**Inspections to take place**
Someone authorized by the owner of the power system must do the inspections. The power system owner will decide whom to authorize for this role and is responsible for ensuring only people who are qualified for the task are authorized.

This section provides for two inspections because there is often a time lag between the initial inspection for planning of the work and the actual starting of the work. This lag may be several months. Growth of vegetation may cause areas not initially identified as "a hazardous area" to be hazardous when commencing the work. The purpose of the second inspection is to ensure all electrically hazardous areas are properly identified, so unqualified workers are not inadvertently dispatched or directed to work in electrically hazardous areas.

#### G19.34(5) Acceptable standard for insulated tools used by certified utility arborists

Issued November 18, 2009; Editorial Revision August 23, 2011

**Regulatory excerpt**
Section 19.34(5) of the *OHS Regulation* ("*Regulation*") states:

> An insulated tool acceptable to the Board may be used by a certified utility arborist
>
> (a) up to the limit of approach in column A of Table 19-3, and
>
> (b) from an insulated aerial device to remove vegetation closer than the limit of approach in column A of Table 19-3 up to but not touching an energized high voltage conductor of 75 kV or less.

**Purpose of guideline**
The purpose of this guideline is to specify criteria for acceptable insulated tools under section 19.34(5).

**Acceptable insulated tools**
Section 19.34(5) of the *Regulation* requires that insulated tools that are to be used up to the limits of approach or from an insulated aerial device be acceptable to WorkSafeBC. Insulated tools that meet the requirements of *ASTM Standards on Electrical Protective Equipment for Workers* are considered acceptable for the purposes of section 19.34(5). This compilation of standards includes specifications for a variety of electrical protective equipment, including but not limited to insulated and insulating hand tools, clampstick type live line tools, and measuring tools. The standards provide information on acceptance testing for insulated tools that are to be used for working on or near energized electrical apparatus or conductors. These tools will be considered acceptable to WorkSafeBC for the purposes of this section.

If other tools are to be used, WorkSafeBC's Prevention Practice, Quality, and Engineering department is to be contacted and the other tools may not be used until written acceptance is given by that Department.

#### G19.35 Tree pruning and falling equipment

Issued August 1999; Editorial Revision June 30, 2021

**Regulatory excerpt**
Section 19.35(2) of the *OHS Regulation* ("*Regulation*") states:

> An insulated hand tool and insulated aerial device must be maintained in a clean condition and be dielectrically tested to a standard acceptable to the Board.

**Purpose of guideline**
The purpose of this guideline is to set an acceptable standard as stated in section 19.35(2) of the *Regulation*.

The BC Hydro standards for insulated equipment, and for dielectric testing of such equipment, are standards acceptable to WorkSafeBC.

#### G19.36 Control systems - General requirements

Issued August 1999; Revised February 4, 2010

**Regulatory excerpts**
Section 19.1 of the *OHS Regulation* ("*Regulation*") states, in part:

> A control system is a manual, remote, automatic or partially automatic system for controlling the operation of equipment.

Section 19.36 of the *Regulation* states:

> (1) A control system must be designed, installed, operated and maintained in accordance with a standard acceptable to the Board.
>
> (2) Only qualified and authorized persons may design, install, operate and maintain a control system.
>
> (3) When designing a control system, the types of potential system failure and the effects of failures on the control system and the controlled equipment must be analysed.
>
> (4) Where practicable and required to minimize risk to workers, a control system must be designed so that
>
> (a) the controlled equipment cannot be inadvertently activated,
>
> (b) an effective basic diagnostic capability is incorporated,
>
> (c) hardwired emergency stop devices are provided at operator stations, and
>
> (d) operator controls other than emergency stop devices can be activated at only one station at a time.
>
> (5) A control system must be used to prevent automatic startup after a power interruption or low voltage occurrence, if automatic startup in such circumstances is likely to create a hazard to workers.
>
> (6) A control system must, where practicable, be designed so that the controlled equipment does not create a hazard to workers if the system fails or is shut down.
>
> (7) Equipment operated by a new or altered control system must not be used until the control system has been thoroughly checked and tested to verify that it will function in the intended manner.
>
> (8) The employer must ensure there is up-to-date documentation which is readily available to affected workers describing the design, installation, operation and maintenance of a control system.
>
> (9) Control system hardware must be protected from circumstances that could adversely affect the performance of the system including mechanical damage, vibration, extreme temperatures or humidity levels, high electromagnetic field levels, and power disturbances.
>
> (10) Written safe work procedures must be developed for the use of equipment operated by a control system, including lockout procedures as required by this Regulation.

**Purpose of guideline**
This guideline describes control systems commonly used in industrial applications.

**Application of *Regulation* sections**

Section 19.36 of the *Regulation* along with sections 19.37 to 19.40, applies to systems which respond to input signals (e.g. from parts of machine elements, sensors, operators, external equipment or any combination of these) and generate an output signal that causes a machine or piece of equipment to behave in an intended manner. The control system may utilize one or more of hydraulic, pneumatic, electrical/electronic, and mechanical technologies and may be programmable, automatic and/or remote control. Machinery and equipment with control systems require special consideration to ensure effective lockout procedures are implemented when required (See also OHS Guideline G10.10(2)).

#### G19.36(1) Acceptable standard for control systems

Issued March 11, 2009

**Regulatory excerpt**
Section 19.36(1) of the *OHS Regulation* ("*Regulation*") states:

> A control system must be designed, installed, operated and maintained in accordance with a standard acceptable to the Board.

**Purpose of guideline**
The purpose of this guideline is to specify an acceptable standard for control systems under section 19.36(1).

**Acceptable standard for control systems**
*BS EN ISO 13849: 2006 Safety of machinery - Safety-related parts of control systems*, as updated from time to time, is considered to be an acceptable standard under section 19.36(1) of the *Regulation*.

In some cases, control systems will meet a standard other than *BS EN ISO 13849: 2006*. In these cases, an application can be made to WorkSafeBC to have this alternate standard accepted.

#### G19.41 Electrofishing - Ensuring worker training and knowledge

Issued: September 28, 2005

**Regulatory excerpt**
Section 19.41 of the *OHS Regulation* ("*Regulation*") states:

> The employer must ensure that
>
> (a) only certified workers trained in a course acceptable to the Board conduct electrofishing operations,
>
> (b) workers are provided with a statement of their responsibilities and written safe work procedures, and
>
> (c) workers are trained in and are knowledgeable of their responsibilities and work procedures.

**Purpose of guideline**
The purpose of this guideline is to provide recommendations for employers to use as means of ensuring that workers are trained in and knowledgeable of their responsibilities and work procedures under section 19.41(c) of the *OHS Regulation*.

**Responsibility of the employer**
Section 19.41(c) places the responsibility directly on the employer to ensure that workers are trained in and knowledgeable of their responsibilities and work procedures. Although a worker may have valid electrofishing certification under section 19.41(a), employers and representatives of the employers (i.e. crew supervisors) need to ensure the ongoing competence of the electrofishing operators in their employ.

**Changes in electrofishing operations**
A wide range of changes related to electrofishing operations typically occurs over a given time period. Certified electrofishing operators need to keep up-to-date on such information as:

- changes in regulations governing electrofishing practitioners; for example, as set by fisheries regulatory agencies;
- changes in electrical safety requirements for certification of electrofishing units; and
- new safety features for electrofishing equipment.

For certified workers to remain knowledgeable of their responsibilities and work procedures, they may need to receive refresher training periodically.

**Demonstrating worker training in and knowledge of responsibilities and safe work procedures**
To demonstrate compliance with section 19.41(c), employers should document how workers have received training and demonstrated knowledge of applicable responsibilities and work procedures. Appropriate means for ensuring this include:

- holding regular safety review meetings (i.e., annual, monthly and trip-specific, including 'tailgates') to remind certified electrofishing operators of safe work procedures and equipment safety features. It is recommended that employers have workers sign a form indicating the sort of information that has been reviewed at these meetings;
- checking, on a regular basis, how workers conduct inspections of electrofishing equipment to ensure it is safe and in proper working order;

and
- recertification of workers, where appropriate.

Records of these activities should be kept in a central and accessible location for future reference by safety personnel (internal or external) as a means to maintain an effective training program, and in the event of an inspection or accident investigation.

#### G19.41(a) Electrofishing - Courses acceptable to WorkSafeBC

Issued August 11, 2010; Revised December 19, 2013; Editorial Revision April 14, 2015; Editorial Revision November 21, 2017

**Regulatory excerpt**
Section 19.41(a) of the *OHS Regulation* (*"Regulation"*) states:

> The employer must ensure that
>
> (a) only certified workers trained in a course acceptable to the Board conduct electrofishing operations,

**Purpose of guideline**
The purpose of this guideline is to provide a reference to the training courses acceptable to WorkSafeBC for the purposes of section 19.41(a) of the *Regulation*.

**Background**
Electrofishing is inherently hazardous work. Direct electrical current at elevated voltage is used to temporarily stun fish for research and environmental management purposes.

It is important that workers are initially trained to an acceptable standard so that the risks to themselves and their co-workers are adequately controlled. In recognition of the significant hazards faced by electrofishers, section 19.41(a) of the *Regulation* requires that only certified workers conduct electrofishing operations.

**Electrofishing courses acceptable to WorkSafeBC**
Electrofishing certification courses are an introduction to electrofishing theory, safety, and practices. The courses are two days in duration and include a classroom lecture-based session and a field-based practicum. The first day addresses the theory, concepts, identification, electrical safety, and equipment settings for safe and efficient electrofishing sessions. The second day is a field-based practicum in which participants operate backpack electrofisher equipment and apply the skills and knowledge gained during the classroom time. Emphasis is on safety but the theory and practice of backpack electrofishing are also addressed.

A list of acceptable electrofishing courses as well as the certifying organizations can be found at worksafebc.com/en/heath-safety-education-training-certification/electrofishing-operator.

**Other courses**
WorkSafeBC recognizes that other training courses may be developed that may meet the requirements for acceptance under section 19.41(a). WorkSafeBC will review any proposed courses for acceptance to ensure consistency and appropriateness with the accepted electrofishing training requirement. Any new courses WorkSafeBC identifies as acceptable under section 19.41(a) will be added to the list found on the webpage identified above for the information of workplace parties and WorkSafeBC prevention officers.

Persons wishing to have WorkSafeBC consider an alternative course for acceptance under section 19.41(a) may submit that course for review and evaluation. Please contact WorkSafeBC Certification Services for further information.

#### G19.41(b) Responsibilities and safe work procedures for electrofishers

Issued August 11, 2010; Editorial Revision November 21, 2017

**Regulatory excerpt**
Subsection 19.41(b) of the *OHS Regulation* (*"Regulation"*) states:

> The employer must ensure that
>
> (b) workers are provided with a statement of their responsibilities and written safe work procedures, and

**Purpose of guideline**
Subsection 19.41(b) of the *Regulation* requires that electrofishers be provided with a written statement of their responsibilities and with written safe work procedures. This guideline describes responsibilities (for employers, supervisors, and crew members) during electrofishing operations and describes areas of safety that should be addressed in written safe work procedures. Note that employers must also ensure under subsection 19.41(c) of the *Regulation* that workers are trained in and are knowledgeable of their responsibilities and work procedures.

**Responsibilities**
Electrofishing is an inherently dangerous work activity. Workers involved in electrofishing operations must be trained in the fundamentals of electricity, and follow written safe work procedures for operating electrofishing equipment.

Employers' responsibilities include the following:

- Ensuring only commercially available certified electrofishing equipment is used (Homemade equipment or in-house expertise equipment is not allowed. Electrofishing equipment is a regulated product and must be certified as required and enforced by British Columbia Safety Authority (operating as Technical Safety BC — "TSBC")
- Providing necessary supervision and ensuring workers are properly certified (see G19.41(a) for information on electrofishing certification)
- Providing appropriate safety equipment
- Ensuring workers are aware of their rights and responsibilities

Crew leader or supervisor's responsibilities include the following:

- Supervising daily operations and safety of the team
- Identifying and assessing site hazards, and ensuring adequate control measures are in place before initiating electrofishing work procedures
- Conducting bank-side crew talks regarding equipment checkout procedures and safe work procedures
- Inspecting equipment and ensuring maintenance and repair (Inspection should be daily and the testing/maintenance interval should not be greater than once a year)
- Preventing hazardous work procedures

Crew members' responsibilities include the following:

- Being knowledgeable of and following provided instruction, training, and written safe work procedures
- Ensuring a detailed instruction manual for electrofishing equipment is available and that they are thoroughly familiar with the manual
- Reporting identified and/or observed hazardous conditions to the supervisor or employer

**Written safe work procedures**
Written safe work procedures for electrofishing equipment should address the following areas of safety:

General factors

- Prior to commencing work, identify the crew leader and their responsibilities (e.g., safety, first aid, and equipment)
- The crew leader should ensure that all personal protective equipment is worn as required and that all personal clothing worn by crew members is appropriate for the task

Crew size

- An electrofishing team should typically be composed of either two or three people
- Written safe work procedures should clearly identify the crew size in each situation (e.g., backpacking, boat fishing, etc.) and the role of each crew member

Safe use of the equipment

- Prior to the equipment being taken into the field for use, a visual check of the equipment is to be done, paying particular attention to the generator, electrical control gear, and cable insulation
- Safe storage of the electrofishing equipment
- Procedures and circumstances in which electrofishing activity should cease (e.g., poor weather, faulty equipment, etc.)
- Refueling/recharging procedures
- Communication plan (among electrofishers) during use of the equipment
- Completion of an equipment log book to record use, inspections, troubles, and maintenance

Setup and security of work area at site

- Site assessment and crew briefing prior to starting electrofishing
- A clear system of working signals to ensure proper communication between team members
- Inspection of the work area and equipment prior to operating equipment
- Safe and appropriate use of equipment (e.g., fishing electrodes are not to be energized unless immersed in water)
- Established means of keeping other personnel, spectators, and animals clear of the hazard area (e.g., signs warning spectators that electrofishing is in progress and procedures for stopping work should animals or spectators approach too closely)
- Procedures and circumstances in which wading vs. boat-based electrofishing should take place, as well as procedures specific to each method

Maintenance of equipment

- Electrofishing equipment is to be properly maintained and checked regularly for mechanical and electrical faults
- The maintenance and checks are to be performed by qualified workers, and a record is to be kept
- Procedures for identifying and removing faulty equipment from service

Use of protective equipment and clothing, including

- Waders/Clothing (appropriate for conditions, non-conductive, leak-free, etc.)

- Footwear (rubber boots, studs on boots not penetrating soles to cause a shock hazard, etc.)
- Gloves that should be no less than 14" in length and have an electrical insulation rating of at least 5000 Volts
- Lifejackets when working from a boat or using chest waders

Emergency plan and written procedures addressing

- First aid procedures
- Action plans in case of accidents such as electric shock
- Transport of injured workers
- Emergency contact phone numbers