Part 40  Utility Workers – Electrical

Section 797  Application

The requirements of this Part may conflict with requirements appearing elsewhere in the OHS Code. This section clarifies that the requirements of this Part take precedence.

Section 798  Application

If a particular term is defined in both the OHS Code and the Alberta Electrical and Communication Utility Code (ECUC), the definition appearing in the ECUC, Second Edition, 2002, takes precedence. This eliminates any potential conflicts should identical terms be defined differently in both publications.

Section 799  Protective devices or equipment

Subsection 799(1)  Standards

To ensure the safety of protective devices and protective equipment used by workers, employers must ensure that the devices and equipment meet the requirements of the listed standards. The devices and equipment need not be approved by an independent third-party organization such as CSA, ULC, UL, or SEI as complying with the standards. A manufacturer’s self-declaration of compliance is satisfactory.

North American manufacturers presently make products that meet the requirements of the listed standards.

ULC standards

CAN/ULC-60832-99, Insulating Poles (Insulating Sticks) and Universal Tool Attachments ((Fittings) for Live Working, is an adoption, without modification, of IEC standard 60832. The Standard specifies performance characteristics for insulating poles and accessory attachments.
CAN/ULC-D60855-00, Live Working – Insulating Foam-Filled Tubes and Solid Rods for Live Working, is an adoption, with Canadian deviations, of IEC standard 60855. The Standard applies to insulating foam-filled tubes and solid rods made of synthetic materials and intended for tools and equipment for live work on systems operating at voltages above 1 kV. Separate special technical standards give details of tests for fittings and attachments to these poles and rods, adaptable tools and complete tools.

CAN/ULC-60895-04, Live Working – Conductive Clothing for Use at Nominal Voltage Up to 800 kV A.C. and +/- 600 kV D.C., is an adoption, without modification, of IEC standard 60895. The Standard applies to conductive clothing, either assembled from component parts or forming a single complete clothing element, worn by electrically skilled persons during live work, especially bare-hand work, at a nominal power system voltage up to 800 kV a.c. and 600 kV d.c. It is applicable to conductive jackets, trousers, coveralls, gloves or mitts, hoods, shoes, overshoe socks and socks.

CAN/ULC-60900-99, Hand Tools for Live Working up to 1000 V a.c. and 1500 V d.c., is an adoption, without modification, of IEC standard 60900. The Standard applies to insulated and insulating hand tools used for working live or close to live parts at nominal voltages up to 1000 V a.c. and 1500 V d.c. Not included are tools, equipment and material supplied from an external energy source, and insulating rods and poles used for working at distances which are covered by IEC Standard 855.

CAN/ULC-60903-04, Live Working – Gloves of Insulating Materials, is an adoption, without modification, of IEC standard 60903. The Standard applies to
(a) insulating gloves and mitts which should normally be used in conjunction with leather protector gloves worn over the insulating gloves to provide mechanical protection, and
(b) insulating gloves and mitts useable without over-gloves for mechanical protection.

Unless otherwise stated in the Standard, the use of the term “glove” includes both gloves and mitts. The use of the term “insulating gloves” designates gloves providing electrical protection only. The use of the term “composite gloves” designates gloves providing electrical and mechanical protection.

CAN/ULC-D60984-00, Sleeves of Insulating Material for Live Working, is an adoption, with Canadian deviations, of IEC standard 60984. The Standard applies to insulating sleeves for the protection of workers from accidental contact with live electrical conductors, apparatus or circuits.

CAN/ULC-D61112-01, Blankets of Insulating Material for Electrical Purposes, is an adoption, with Canadian deviations, of IEC standard 61112. The Standard applies to insulating blankets for the protection of workers from accidental contact with live or
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earthed electrical conductors, apparatus or circuits and avoidance of short circuits on a.c. and d.c. installations.

CAN/ULC-D61229-00, *Rigid Protective Covers for Live Working on a.c. Installations*, is an adoption, with Canadian deviations, of IEC standard 61229. The Standard applies to rigid insulating covers for live working on a.c. installations, including those described in IEC Standard 743.

CAN/ULC-61236-99, *Saddles, Pole Clamps (Stick Clamps) and Accessories for Live Working*, is an adoption, without modification, of IEC standard 61236. The Standard applies to saddles and pole clamps (stick clamps) used for live working, and to their accessories. The standard specifies the dimensional and mechanical characteristics to be given by the manufacturer for each tool, the corresponding mechanical tests, and the other points to be checked (visual, functional, marking, etc.).

**CSA standard**

CSA Standard, CAN/CSA-C225-00, *Vehicle-Mounted Aerial Devices*, sets criteria for the design, manufacture, testing, inspection, installation, maintenance, use and operation of vehicle-mounted aerial devices. These devices are installed on a chassis, are primarily used to position workers for work purposes, and are used for operator training. The vehicle may be a truck, trailer or all-terrain vehicle. The design and manufacturing requirements of the Standard apply to those devices manufactured after the date of publication of the Standard.

The Standard recognizes both insulated and non-insulated aerial devices. Insulated aerial devices are classified into three categories based on the degree of electrical protection they provide and the type of work being performed.

**Subsection 799(2) Effective date**

No explanation required.

**Subsection 799(3) Laboratories performing electrical testing**

Because electrical utility workers rely on high voltage protective devices and equipment such as voltage detectors, insulating sleeves, protective covers and insulating blankets for their protection, laboratories testing this equipment must ensure that testing is performed properly. Laboratories performing this work must meet the requirements of ASTM Standard D2865-06, *Standard Practice for Calibration of Standards and Equipment for Electrical Insulating Materials Testing.*
Compliance with the standard requires an employer to establish and maintain calibration procedures for measuring and test equipment used for testing electrical insulating materials. This ensures the accuracy and precision of any measurements. The Standard also presents requirements applicable to the calibration of reference standards and test and measuring equipment, and personnel training.

Section 800  Safe work practices for electric utilities and rural electrification associations

Subsection 800(1) Rules in the ECUC that apply

The Occupational Health and Safety (OHS) Act is the enabling legislation governing worker safety in Alberta. It is under the authority of the OHS Act that the OHS Regulation and OHS Code have been created. However, a number of worker safety rules have also historically appeared in the Alberta Electrical and Communication Utility Code (ECUC), under the authority of the Safety Codes Act. The ECUC, 2nd Edition, 2002, published by the Safety Codes Council, establishes minimum safety standards for the installation and maintenance of electrical and communication utility systems in Alberta.

When worker safety requirements are developed and administered outside of occupational health and safety legislation, confusion is created about which requirements apply and who is responsible for enforcement. Furthermore, workers become accustomed to referencing a particular regulation and are often unaware of rules in other regulations, rules that may be very important to their safety and well-being.

To end this potential confusion, the worker safety rules present in the ECUC have been transferred to the OHS Code. However, rather than reproduce the ECUC safety rules in the OHS Code, section 800 references the appropriate rules of the ECUC directly. Presented after the explanation to section 10 are the explanations of the referenced ECUC rules, which are now under the authority of the OHS Act and part of the OHS Code.

Subsection 800(2) Rules in the ECUC that do not apply

This subsection lists rules in section 4 of the ECUC that do not apply. Some of these rules are not relevant or have been replaced by requirements appearing in the OHS Code.
Section 801  Safe work practices for industrial power producers

No explanation required.

Section 802  Coordinated work

This section applies to situations where two or more sets of workers perform potentially dangerous work requiring coordination such as isolating equipment, energizing equipment, switching, and tagging. It is vital that all workers involved in the work follow the same safe work procedures.

When such coordinated work takes place, the employers involved i.e. electrical utility, industrial power producer, or rural electrification association, must jointly develop and follow one agreed upon set of safe work procedures for isolating electrical equipment and lines or blocking reclosing devices.

Section 803  Communication lines, cables

Paragraphs (a) and (b) are intended to eliminate the possibility of communication lines or cables contacting energized electrical equipment or lines.

Paragraphs (c) and (d) require that safe procedures and work methods be followed to ensure that the work is done safely. The work method must be acceptable to the owner/operator of the electric utility.

Sections 804  Work on energized electrical equipment or lines

(above 750 volts)

Subsection 804(1)

Rule 4-160 of the 2002 edition of the ECUC, with minor changes, now appears as section 804. Live line work must be performed by a 3-person crew consisting of a minimum of two qualified utility employees to perform the work and one utility employee at ground level. If an aerial device is used while performing the work, the aerial device must be equipped with both upper and lower controls. This ensures that the aerial device bucket can be returned to the ground by an appropriately trained utility employee should the worker or workers in the bucket be unable to do so.
Subsection 804(2)

Rule 4-162 of the 2002 edition of the ECUC now appears as section 805. As with the rule it replaces, section 805 exempts a utility worker from the requirement to have a minimum 3-person crew when performing live line work if certain conditions are met.

Subsection 804(2) now also exempts a utility from having to have a third worker on the ground when certain work is performed. If the employer’s hazard assessment (required by Part 2 of the OHS Code) indicates that the work can be done safely and a professional engineer certifies that an alternative live line work procedure provides adequate utility employee protection, then a crew of two qualified utility employees can perform the live line work. One of the two qualified utility employees must be at the work site at ground level.

Rule 4-162 required the utility to get “special permission” if a work procedure other than that described by rule 4-160 was to be followed. In preparing clause 805(a), the term “special permission” was removed to eliminate the need for a utility to apply to Workplace Health and Safety for an acceptance every time an alternative live line work practice is required. The authority to alter work practices should remain with the utility but for safety and accountability reasons, a professional engineer needs to certify the alternative procedure as providing an adequate level of worker protection.

Subsection 804(3)

Rule 4-164 of the 2002 edition of the ECUC, revised to include additional low risk activities, appears as section 806. Switching or fuse replacement work for example, involves the use of rated live line tools. This is a low risk activity because the tools are designed for this activity and there is minimal or no opportunity to violate the limits of approach during this activity. The other activities listed are also considered to be low risk activities.

Subsections 804(1) and 804(2) do not apply under the circumstances described.
Explanation of Rules Referenced from the ECUC, Second Edition

Rule 4-00  Scope

While this rule defines the scope of what is covered, it is important to note that work involving telecommunications work activities are regulated federally under the Canada Labour Code, Part II. For more information about which workers are covered by Alberta’s OHS Act and which are not, readers are referred to the explanation for the word “worker” appearing in Part 1 Definitions of the OHS Code Explanation Guide.

Rule 4-002  Duties

Subrule 4-002(1)  Competency

As required elsewhere in the OHS Code, the employer is responsible for determining worker competency. For more information about competency, readers are referred to the explanation of the term “competent” appearing in Part 1 Definitions of the OHS Code Explanation Guide. In the subsections that follow, the term “worker” is used in its broadest sense to refer to any worker, whether a utility, its contractors, or subcontractors employ the person. Similarly, the term “employer” refers to any employer, whether it be a utility, its contractor, or subcontractors.

Subrules 4-002(2) and (3)

No explanation required.

Subrule 4-002(4)

Utility tree trimmers are also considered utility employees when working near power lines.

Subrule 4-002(5)

Utility tree workers are also considered utility employees when working near power lines.
Rule 4-004 Interpretation of Rules

With the transfer of these selected rules from the ECUC to the OHS Code, the authority having jurisdiction is now the Minister responsible for the OHS Act. Workplace Health and Safety, part of Alberta Human Resources and Employment, is the group responsible for explaining and enforcing these rules.

Division A — General requirements for employers

Rule 4-006 Duties

The duties described in this rule are consistent with employer responsibilities described elsewhere in the OHS Code and the OHS Regulation. As required by this rule, the employer

(a) must ensure that a copy of the ECUC safety rules referenced by the OHS Code are accessible to each utility employee. This is meant to include all workers working on behalf of the utility, including those working for contractors and subcontractors on behalf of the utility. A copy of the safety rules need not be carried by each worker – the rules can be at a local office, in a truck, or available on-line as examples,

(b) must ensure that the worker has received instruction in how the safety rules are applied. This instruction should reflect the appropriate safety rules applicable to the work being done and the worker’s scope of work. Although not a requirement, it is suggested that a record of the completion of this instruction be kept by the employer,

(c) must ensure that workers follow the rules, perhaps through a system of supervision, and

(d) must have a method of evaluating worker competence to ensure that the worker is adequately qualified, suitably trained, and with sufficient experience to safely perform the assigned work.

Rule 4-008 Instruction

The employer must have a process to make sure that the state of electrical lines and equipment, and any abnormal conditions, is identified to workers to protect them from potential hazards.
**Rule 4-010 Visitors**

The employer is required to ensure the safety of all workers, visitors and employees who enter restricted areas. Examples are any area considered restricted by the employer. This includes locked areas such as substations, generating stations, fenced areas, and underground vaults, and unlocked areas such as transmission towers. A person authorized by the employer who is familiar with the hazards must accompany workers, visitors and employees who are unfamiliar with the hazards.

“Continuously supervised” is understood to mean the same as “direct supervision” as defined in the OHS Code i.e. that a competent worker is personally and visually supervising the worker, visitor or other employee in the restricted area, and that the competent worker is able to communicate readily and clearly with the worker, visitor or other employee in the restricted area.

**Rule 4-012 Employee in Charge**

**Subrule 4-012(1) More than one employee**

If two or more utility employees are working on or near the same electrical equipment or line at the same location, then one of the workers must be designated as the utility employee in charge. Doing so is intended to prevent any confusion as to who is in charge and directing work activities. While the term “utility employee” is used in this subrule, subrule 4-002(2) ensures that the requirement also applies to “qualified utility employees”. Depending on the type of work being done, the qualified utility employee or the utility employee could be identified as being the employee in charge.

**Subrule 4-012(2) Worker instruction**

The employer is responsible for ensuring that the employee in charge provides work instruction to all the workers under his or her direction. This should include a review of the identified hazards involved in the work and how these hazards will be controlled or eliminated. A tailboard meeting is one means of providing this information to affected workers.

**Rule 4-014 Work area**

This rule applies when work is required near energized electrical equipment that has been exposed and could be inadvertently contacted e.g. an open energized underground cabinet. The employer must ensure that work area protection is
provided e.g. permanent or temporary barriers, rubber gloves, cover up, signage, limits of approach, etc.

**Rule 4-016 Coordination**

An employer must assign an operator-in-charge (OIC) for the entire power system or, if more than one OIC is required, assign an OIC for each portion of the system that OIC is in control of. This serves to prevent any confusion as to who controls the operation of the electric utility system or each specific portion of the electric utility system. The employer must provide the OIC with sufficient information to allow the OIC to carry out his or her duties e.g. maps, logs, SCADA, switching diagrams, equipment information, etc.

The employer must provide written procedures to workers that describe the operation, isolation and maintenance of the power system. These procedures represent the general practices to be followed – they are not always a step-by-step procedure. The employer must also provide written procedures describing the safe installation and use of protective grounds.

Information about power system operation and grounding applications must be kept up-to-date and made available to the OIC and qualified utility employees. The OIC should be made aware of all changes to single line diagrams (paper or electronic), grounding, on the system and any operating procedures affecting the system as soon as practicable. The OIC needs this information to safely operate the system.

**Rule 4-018 Fire extinguishers**

An employer must ensure that workers are trained in how to use approved fire extinguishing equipment on or in close proximity to energized electrical equipment. The fire extinguishing equipment must be in accordance with the requirements of the current *Alberta Fire Code*.

At the present time, the 1997 edition of the *Alberta Fire Code* applies. In particular, section 6.2.3.7 *Extinguishers for Class C Fires* specifies the requirements applicable to portable fire extinguishers:

1. portable fire extinguishers for class C fires i.e. fires involving energized electrical equipment, must be provided in or near electrical equipment, and
2. the portable fire extinguishers must be distributed according to the applicable requirements of table 6.2.3.3 or table 6.2.3.5 of the *Alberta Fire Code*.

Readers are referred to these tables for information describing the size, quantity, and distribution of fire extinguishers required for their specific circumstances.
The *Alberta Fire Code* refers readers to National Fire Protection Association (NFPA) Standard 10, *Portable Fire Extinguishers*. The following explanatory information is based on what is presented in Section E.5 of the NFPA Standard.

When the power to a piece of electrical equipment is cut off, the fire changes character to that of a Class A fire (i.e. a fire involving combustible materials such as wood, cloth and paper), a Class B fire (i.e. fire involving a flammable liquid or combustible liquid, fat or grease), or a combined Class A and B fire, depending on the nature of the burning electrical components and any material burning in the immediate vicinity.

Isolating and grounding electrical equipment eliminates the possibility of shock hazards to the fire extinguisher operator if the operator accidentally comes into physical contact with the equipment, or if the operator brings any conductive part of a fire extinguisher within arcing distance. Isolating and grounding also eliminates fault currents from prolonging the fire or from being a source of re-ignition.

Switches or circuit breakers that cut electric power to specific equipment can prevent hazardous situations resulting from the loss of power. Often, fires involving an electrical component are relatively minor and, by a short application of a Class C extinguishant, can be effectively extinguished without disturbing electrical continuity.

The capacity of the fire extinguisher supplied for each major Class C hazard situation should be individually judged according to the following factors:
(1) size of the electrical equipment;
(2) configuration of the electrical equipment – particularly the enclosures of units – that influences how the extinguishing agent is distributed;
(3) effective range of the fire extinguisher stream; and
(4) quantity of Class A and Class B material involved.

For large installations of electrical equipment where power continuity is critical, fixed fire protection is desirable. At locations where such fixed systems are installed, it is practical to also provide Class C portable fire extinguishers units to handle quickly discovered fires; obviously, the number and size of these units can be reduced under such conditions.

**Rule 4-20 Equipment supply**

No explanation required.
Rule 4-022  Training and space

Training workers in the safe use of protective devices and equipment is a basic requirement and dealt with in its most general sense in section 15 of the *OHS Regulation*.

The employer is responsible for ensuring that workers have sufficient working space to safely operate live line tools and associated equipment so that the limit of approach distances are not violated in such spaces. Minimum working space requirements appear in CSA Standards C22.3 No. 1, *Overhead Systems*, and C22.3 No. 7, *Underground Systems*.

In the context in which it was originally written, the term “confined spaces” in paragraph (b) more correctly refers to “restricted spaces” i.e. spaces in which the amount of room provided to workers for easy movement is limited or “restricted”. The term does not refer to confined spaces as used in Part 5 of the OHS Code.

Rule 4-024  Identification

The employer must identify electrical equipment and power lines so that workers know what to safely operate. The identification of electrical equipment and circuits is described in rule 8-046 of the ECUC as follows:

8-046(1) Electrical equipment and circuits shall be identified for safety purposes by position, colour, number, letter, nameplate, label, design or equivalent means and the method of identification shall be uniform throughout the electrical utility system.

8-046(2) Identification marks shall not be placed on removable covers or casings where the interchanging of these removable parts would result in incorrect identification.

Rule 4-026  Rescue training

Utility employees required to work on or near energized electrical equipment or lines must be instructed in rescue and resuscitation practices. The rescue training employees receive must be appropriate to the type of work they perform and where the work is performed i.e. on a pole top, from a bucket, on a tower, inside a confined space, etc. Training in resuscitation practices includes training in cardiopulmonary resuscitation and first aid.
Rule 4-028  Prohibited equipment

Utility workers are trained to recognize electrical hazards and understand the limits of approach concept and the hazards conductive materials present near energized electrical equipment. Prohibiting the listed types of equipment from being used near energized electrical equipment reduces the potential for a contact.

The term “near” in this case means within the limits of approach applicable to that equipment and the worker’s authorization – qualified utility employee, utility employee, utility tree trimmer, utility tree worker. In cases where conductive materials must be moved in areas occupied by energized equipment, the safe limit of approach distances must be respected.

Division B — General requirements for utility employees

Rule 4-30  Duties

These duties are already recognized in a general sense in subsection 2(2) of the OHS Act and section 14 of the OHS Regulation. Regarding paragraph 4-030(e), the ECUC has historically been concerned with the safety of both workers and the public. Since the OHS Act concerns itself with the safety of workers and not members of the public, the reference to “persons” in this paragraph is meant to refer to workers only.

Rule 4-032  Instruction

A utility employee who is not competent to perform work must not perform the work unless he or she is under the direct supervision of a competent worker. For more information about competency, readers are referred to the explanation for the term “competent” appearing in Part 1 Definitions of the OHS Code Explanation Guide.

The term “direct supervision” is defined in Part 1 Definitions of the OHS Code. Specifically, it means that a competent worker is personally and visually supervising the worker who is not competent and is able to communicate readily and clearly with the worker who is not competent.
Rule 4-034  Authorized entry

No explanation required.

Rule 4-036  Hazard report

Utility employees and qualified utility employees have a responsibility to identify and report hazardous conditions to the operator of the utility system or their designate, guard the hazardous conditions and, where possible, take steps to eliminate or control the hazard for other workers and the public.

This last responsibility is a noteworthy departure from the OHS Code. With few exceptions, workers are rarely required to take direct action that results in a hazard being eliminated or controlled. Hazard elimination and control is normally an employer responsibility.

Rule 4-038  Equipment

Utility employees and qualified utility employees must use the proper tools and equipment in accordance with the regulation, standards identified, and the employer's safety rules.

Rule 4-040  Clothing

The requirements of paragraphs (1)(a) and (1)(b) do not apply – they have been superceded by section 232 of the OHS Code that reads as follows:

232(1) If a worker may be exposed to a flash fire or electrical equipment flashover, an employer must ensure that the worker wears flame resistant outerwear and uses other protective equipment appropriate to the hazard.

(2) A worker must ensure that clothing worn beneath flame resistant outerwear and against the skin is made of flame resistant fabrics or natural fibres that will not melt when exposed to heat.

Readers are referred to section 232 of the OHS Code Explanation Guide for a complete explanation of this requirement.
Paragraph (1)(c) and subsection (2) prohibit metallic articles from being in contact with the skin unless the articles are conductive clothing, eyeglasses or hearing protection acceptable for such use by the employer. These exceptions are noted because they are essential pieces of equipment that may not be available with totally non-metallic components. The prohibition on metallic articles against the skin reflects the fact that these articles can melt during an arc event and seriously injure a worker.

Paragraph (1)(d) requires workers to wear approved industrial protective headwear when working on or near energized equipment. This is a very general and non-specific requirement. Readers must follow the head protection requirements specified in sections 234 through 239 of the OHS Code that are far more detailed. Readers should refer to the OHS Code Explanation Guide for these sections to understand the headwear requirements.

Paragraph (1)(e) requires that when a worker is working on or near energized equipment, the worker must wear a long sleeved garment and the sleeves must be rolled down. This is intended to minimize the potential for electrical burns to the skin.

**Rule 4-042 Climbing**

The employer is required to have procedures in place that describe how a worker determines if a pole, wooden structure or tree will safely support the worker’s weight. The employer is also required to have procedures that allow a worker to determine that elevated portions of structures used for supporting a pole, wooden structure or tree will safely support the worker’s weight.

As required by section 8 of the *OHS Regulation*, the procedures must be in writing and available to workers at the work site affected by the procedures. Subrules (1) and (3) require the worker to follow these procedures.

In general, an articulating boom truck is used to support the pole, wooden structure or tree. In cases where a boom truck cannot get into the area to provide support, ropes and guy wires may be used.

The removal of guy wires or conductors, or alternating tensions in them, can cause a standing pole or structure to become unstable. Workers must be aware of this and make sure that additional support is provided to poles and structures as necessary.
Rule 4-044  Climbing spurs

Paragraph (a) does not apply.

To reduce the possibility of a worker gaffing himself or herself, climbing spurs must only be worn when required. While it is reasonable to wear them while walking or being transported from pole to pole, climbing spurs should not be worn in the office, restaurant, or similar location. Gaff guards are available to prevent injuries while the spurs are being worn.

Rule 4-046  Carrying tools

No explanation required.

Rule 4-048  Standards

The standards in this rule do not apply – they have been replaced by standards listed in section 799.

Rule 4-060  Authorization to perform operations or work

Subrule 4-060(1)

The qualified utility employee (QUE) or the qualified utility employee in charge (QUEIC) must get authorization from the operator in charge (OIC) before operating the system. This includes getting permission to remove the tags on tagged equipment.

Subrule 4-060(2)

When there are more than two workers, all QUEs must get authorization from the QUEIC to work on the system. This ensures that the work activities of all workers are coordinated.

Subrule 4-060(3)

The QUEIC must advise the OIC, before doing any work, that work is soon to begin. This ensures that the work activities of all workers are coordinated.
Subrules 4-060(4) and 4-060(5)

Paragraphs (a) through (c) describe special circumstances under which a QUE is allowed to do things in a way that would otherwise be prohibited.

Paragraph (a) allows a QUE to do what is necessary to safely protect life and property without having to get authorization from the OIC. However, the QUE must let the OIC know what was done and why as soon as possible after the event. This provision should rarely be used.

Paragraph (b) allows a QUE to replace a fuse, operate an automatic sectionalizer, oil circuit recloser, or 3-phase recloser to maintain continuity of service without having to get the authorization of the OIC. This is an initial troubleshooting technique for a power outage call and is done to determine if the fault is temporary. However, the QUE must let the OIC know what was done and why as soon as possible after the event. In the case of control centres operating on a 24/7 basis, the OIC is always contacted for prior authorization.

Paragraph (c) allows a QUE to operate the system in situations where communication with the OIC is impossible and operation of the system will not create an electrical hazard. However, the QUE must let the OIC know what was done and why as soon as possible after the event. This provision should rarely be used.

Rule 4-062 Authorization to work

Subrule 4-062(1)

Before performing work on electrical equipment or lines, a utility employee must get authorization to do so from the qualified utility employee in charge (QUEIC). This serves as a way of making sure that the utility employee is competent to safely perform the work.

Subrule 4-062(2)

This subrule allows a utility employee to work on electrical equipment and lines without having to get authorization from the QUEIC. The provision only applies if an emergency has occurred and the utility employee must perform the work in order to protect life and property. This provision is limited to tasks that involve working on the system e.g. cutting a line clear to protect another worker’s life – it does not include operating the system. This provision should rarely be used.
Although it is not stated as a requirement, the utility employee must let the QUEIC know what was done and why as soon as possible after the event.

**Rule 4-064 Identification**

Identification markings are required on switches, lines and equipment. These markings allow workers to correctly identify components when requests to perform work are made and authorized. Workers are required to use these identification markings when requesting or granting authorization to work on electrical equipment or lines.

**Rule 4-066 Duties of an operator-in-charge**

The operator-in-charge (OIC) must
(a) be aware of the status of equipment e.g. open or closed, out of service, recloser blockings, faulty equipment, etc.,
(b) be aware of the work being done that may affect operation of the system e.g. live line work, permits establishing safe work areas for workers, switching that has occurred, etc., system capacity, system loading, flow, interconnection agreements, and the status of interconnection points, and
(c) have up-to-date information on the status of the system – this can be through maps, status boards, logs, computer software systems, etc.

Control centres are the locations that system status and operation information is kept and from where the OIC communicates with workers. A control centre can be in an office or in a vehicle, as long as all the requirements of paragraph (d) are met.

**Rule 4-068 Duties of a qualified utility employee in charge**

A qualified utility employee in charge must
(a) make sure all workers working under his or her direction are aware of the safety rules that apply to the work being done,
(b) keep all necessary documentation such as permits, job plans, hazard assessments, etc.,
(c) follow the communication requirements of the operating procedures,
(d) as far as reasonably possible, keep unauthorized workers away from hazardous areas, and
(e) prohibit the use of any tools or devices unsuited to the work – equipment must be properly rated, tested and certified as appropriate for the work being done.
There should always be a qualified utility employee in charge at a worksite where work is being done on energized equipment operating at 750 volts or greater e.g. foreman, sub-foreman, lead hand.

**Rule 4-070  Repeating messages**

Verbal messages are often exchanged during work on electrical equipment and lines, and to request or grant authorizations. To prevent mistakes resulting from misunderstood messages, this rule requires that verbal messages be repeated so that the sender and receiver understand one another correctly. The use of full names is required to eliminate the chance of an error happening should multiple workers involved in the work have the same first name.

**Rule 4-072  Handling underground electrical equipment**

This requirement ensures that underground cables are safe to handle. In general, positively identifying the cable involves spiking or cutting the cable with insulated tools.

**Rule 4-074  Disconnecting devices**

Disconnecting devices such as switches, breakers and overcurrent relays must be capable of safely breaking the arc when the contacts are opened. Paragraph (2) specifies the order in which load break and non-load break switches are to be opened and closed.

**Rule 4-076  Air gap devices**

Visible air gaps are the preferred method of indicating isolation because of their simplicity and reliability. Non-air gap devices can be used but their use is subject to the conditions listed in paragraph (2).

**Rule 4-078  Non-air gap devices**

Visible air gaps are the preferred method of indicating isolation because of their simplicity and reliability. Non-air gap devices can be used but their use is subject to the conditions listed in this rule.
Rule 4-080  Isolation

To safely isolate equipment and lines, workers must follow the isolation procedure in the step-by-step sequence described in rules 4-082 to 4-098. Because of conditions related to the work or worksite, a qualified utility employee may be switching at one location and another qualified utility employee testing for potential. In this case each employee completes a portion of the step-by-step sequence, in the correct sequence. In another case a qualified utility employee may switch, then test for potential on the same pole, then ground, and finally tag when he or she comes down the pole.

Rule 4-084  Tagging

Subrule 4-084(1)

The purpose of tagging is to advise others of the status of the power system, thereby preventing it being operated or inadvertently energized. This tagging applies to all utility power system operations and the ancillary systems that can affect the utility power system. Service panels, shop cranes, appliances and similar equipment, etc. that do not affect the operation of the utility system must follow the control of hazardous energy requirements of Part 15 of the OHS Code.

The electrical utility industry must follow two different safety regulations when dealing with lock out situations – Alberta’s Electrical and Communication Utility Code (ECUC) and the Occupational Health and Safety Code. The lock out requirements of the ECUC apply to electrical utility systems operating at voltages greater than 750 volts i.e. generation, transmission and distribution systems, and to the auxiliary metering and control circuits operating at lower voltages that affect or influence these high voltage systems.

Strict adherence to the requirements of the ECUC ensures the safety of workers working on such systems and circuits. This is achieved through the use of elaborate procedures involving an operator-in-charge, voice commands, non-personal locks and/or warning tags.

For voltages and systems other than those described above, the electrical utility industry must meet the requirements of Part 15 of the OHS Code.
Subrules 4-084(2) and 4-084(3)

The time and date required in this subrule is the time and date at which the device is actually tagged. Sometimes devices will be tagged that are already open e.g. a normally open switch or a fuse that opened in the night and is tagged in the morning once it has been discovered. The worker who requests the isolation could be the operator-in-charge or the operator-in-charge of an adjoining area. The operator-in-charge is responsible for recording the information that appears on the tag.

Subrule 4-084(4)

Once the designated switches have been isolated, the qualified utility employee directing the switching must inform the worker who requested the isolation that the electrical equipment or lines have been isolated.

Rule 4-086  Test for potential

Electrical equipment or lines that have been isolated must have their isolation confirmed before they are grounded. The potential testing device used to confirm isolation must be tested immediately prior to checking the isolation to make sure that it is working properly. Testing of the potential testing device must be done according to the manufacturer’s specifications.

Although the use of potential testing devices is the preferred and most reliable method of confirming isolation, buzzing with a live line tool is acceptable for voltages greater than 5 kV. In situations where buzzing is of questionable reliability, in windy conditions or in areas with the potential for induction for example, isolation should be confirmed using a potential testing device.

Rule 4-088  Installing protective grounds

Subrule 4-088(1)

Protective grounds are installed to protect workers from electrical equipment or lines that could become unintentionally energized e.g. accidentally energized by a worker, through induction, by lightning, etc. The employer is required to have procedures for installing protective grounds. As required by section 8 of the OHS Regulation, the procedures must be in writing and available to workers at the work site affected by the procedures.
Subrules 4-088(2) and 4-088(3)

Live line tools must be used when installing protective grounds. These tools protect the worker performing the work by isolating him or her from direct contact with ungrounded conductors. However, some switchgear assemblies eliminate the need to use live line tools when grounding. Examples include grounding switches in substations, grounding buggies on SF6 and submersible switchgear, and network transformers.

Subrules 4-088(4) and 4-088(5)

Grounds must be installed between the point on the electrical equipment or line where the worker is working and every potential source of energy that may feed energy into the system being worked on. This is to protect the worker in case any equipment or lines become energized. This grounding must be done in accordance with procedures prepared by the employer.

When equipotential bonding and grounding techniques are used this places the worker at the same potential as the electrical equipment or lines that are being worked on.

Subrule 4-088(6)

Because it is possible for there to be electrical potential on the isolated circuit, the ground must be connected first to prevent having a live conductor in the work area.

Subrule 4-088(7)

“Stations” means locations such as substations, generating stations and switch yards. Switches may make grounding easier to complete.

Rule 4-090  Proceeding with work

Subrules (1) and (2) describe various responsibilities that ensure that there is always someone in charge at the worksite.

After the protective grounds have been connected, the qualified utility employee in charge is authorized to work on or near the isolated and grounded electrical equipment or lines. Before performing work, or directing the work of utility employees on isolated and grounded electrical equipment or lines, each utility
employee in charge must first get direction from the qualified utility employee. The utility employee in charge and the utility employee can only work on isolated and grounded circuits; they are not authorized to work on energized equipment.

**Rule 4-092  Restoring equipment to operating conditions**

Before equipment or lines are restored to operating condition, all workers must be clear of the equipment or lines. Utility employees in charge must report to their qualified utility employee in charge and, if multiple working groups are involved, the utility employee in charge of each group must report clear conditions to the qualified utility employee in charge of the entire operation.

**Rule 4-094  Removing protective grounds**

This rule ensures that an authorized employee removes the protective grounds and notifies the operator-in-charge that the grounds have been removed and all workers are clear.

**Rule 4-096  Tag removed**

No explanation required.

**Rule 4-098  Closing switches**

A switch cannot be closed unless the tag has been removed.

**Rule 4-100  Transfer of work permission**

The transfer of work permission between workers can occur in circumstances such as shift changes, illness and personal emergencies. The “record” referred to in subrule (3) could include a permit, tag, or day timer entry.
Rule 4-102 Transfer of work permission

The transfer of work permission must be done in an orderly manner so that all workers involved know who is in charge and who is responsible for the workers under their direction.

Rule 4-104 Blocking reclosing devices

Subrules 4-104(1) and 4-104(2)

Blocking a reclosing device makes the device inoperable, preventing electrical equipment or lines from being energized after a fault. Reclosing allows lines to be energized after a temporary fault to minimize customer service interruptions.

If rendered inoperable, the reclosing device must be tagged and although it is not explicitly stated in this rule, it is understood that the tag will bear the information required by rule 4-084. If the automatic reclosing device is operated remotely, it must be appropriately controlled to prevent reclosing.

Rule 4-106 Connecting to an energized circuit

Because it is possible for there to be electrical potential on the isolated circuit, the connecting conductor or device must be connected to the isolated electrical equipment or lines before being connected to the energized circuit. Doing so prevents the possibility of having a live connecting conductor or device in the work area.

Rule 4-108 Disconnecting from an energized circuit

Following the procedure described in this rule prevents the possibility of having a live connecting conductor or device in the work area. This is the reverse of the procedure described by rule 4-106.
Rule 4-110 Switches on energized equipment

Some manually operated switches on energized equipment or lines have operating handles that require the use of live line tools in order to operate the switches safely. By requiring the use of live line tools with these switches, workers are protected from electric shock and being in the flash zone.

Rule 4-112 Conductors

It is possible for a conductor being strung or removed near energized electrical equipment or lines to become energized through induction or direct accidental contact. Because of this, the conductor must be grounded or treated as if it was energized.

Rule 4-114 Current transformers

Following the specified procedure protects the worker doing the work from contacting energized high voltage windings.

Rule 4-116 Capacitor banks

Subrule 4-116(1)

Waiting five minutes allows the capacitor to discharge its stored energy, eliminating the possibility of an arc forming when the grounds are applied.

Subrule 4-116(2)

Short circuiting or grounding an isolated capacitor protects workers from a discharge should they need to contact the capacitor’s terminals, jumpers or conductors during work activities.
Rule 4-118  Fuses

At voltages greater than 300 volts between conductors, workers are required to use protective insulated devices to handle fuses. Commonly used devices are insulated pullers and hot sticks. These devices ensure that the worker is a safe distance away from the fuse should a fault occur while it is being handled.

Rule 4-120  Work on equipment below 750 V

Rubber gloves with leather protectors are required when workers work on or near exposed electrical equipment or lines operating at voltages between 300 volts and 750 volts, AC or DC. Being energized, the equipment or lines have not been isolated or grounded, and therefore present a potential hazard to workers. Standard work practices address work done on 120/240-volt circuits.

Rule 4-122 Contact with equipment below 750V

Utility employees can only contact isolated electrical equipment or lines operating at less than 750 volts if the equipment or lines have been potential tested, grounded, or both. Potential testing and grounding are additional checks to confirm that the equipment or lines are safe to contact without workers having to use rubber gloves.

A voltmeter or potential testing device must be used to positively identify that the equipment or lines are safe to contact.

Rule 4-124  Work on equipment in joint use

Communication equipment and lines may be in joint use, sharing a common space with electrical equipment and lines. Prior to working on any of this equipment or lines, utility employees are required to perform tests to confirm that there are no hazardous potentials.

This requirement only applies if a utility employee is actually working on communication equipment or lines. If the utility employee is not actually working on the communication equipment or lines e.g. a lineman is simply climbing over the communication space, then testing is not required.
Rule 4-126 Communication lines, cable

This rule does not apply. It has been replaced by section 803 of the OHS Code.

Rule 4-128 Overhead lines in joint use

No explanation required.

Division E — Limits of approach

Rule 4-130 General application

Subrule 4-130(1)

Electrical equipment and lines are sometimes operated at less than their design voltage. In such cases a utility employee can establish the safe limit of approach distance based on the operating voltage rather than the design voltage. Despite this, all other workers must continue to use the design voltage in determining the safe limit of approach distance that applies to them. Also see subrule 4-130(4).

Subrules 4-130(2) and 4-130(3)

To simplify the use of limit of approach distances, all voltages between 750 volts and 41.4 kilovolts must use the distance required for 4.16 kilovolt systems.

To ensure worker safety, the next higher nominal voltage level must be used if the operating voltage of a system exceeds the nominal voltage shown in Tables presented in the ECUC. Also see subrule 4-130(4).

Subrule 4-130(4)

Subrules 4-130(1), 4-130(2) and 4-130(3) do not apply if the employer calculates the approach distance based on the operating voltage and insulating level of the electrical equipment or lines. The employer could have an engineer calculate the limit of approach distance using accepted mathematical models or recognized national or international standards. The resulting calculation or report should be available should an officer wish to confirm the basis for the distance being used.
Rule 4-132  Utility employee distances

Subrules 4-132(1) and 4-132(2)

Unless the utility employee is in the continual presence of and under the direction of a qualified utility employee, or the energized parts of the electrical equipment or lines involved are guarded as required by Section 8 of the ECUC, a utility employee must follow the limit of approach distances shown in Table 4-1 of the ECUC.

Table 4-1 Limit of Approach Distances in Millimetres for Utility Employees

<table>
<thead>
<tr>
<th>Voltage Levels</th>
<th>Utility employees</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal voltage to ground kV</td>
<td>Nominal voltage phase to phase kV</td>
</tr>
<tr>
<td>Column 1</td>
<td>Column 2</td>
</tr>
<tr>
<td>0.6 (DC only)</td>
<td>0.6 - 4.16</td>
</tr>
<tr>
<td>0.3 - 2.4</td>
<td>8</td>
</tr>
<tr>
<td>14.4</td>
<td>13.8</td>
</tr>
<tr>
<td>19.9</td>
<td>34.5</td>
</tr>
<tr>
<td>69, 72</td>
<td>79.2</td>
</tr>
<tr>
<td>138, 144</td>
<td>158.4</td>
</tr>
<tr>
<td>230, 260</td>
<td>285</td>
</tr>
<tr>
<td>500</td>
<td>550</td>
</tr>
</tbody>
</table>

Note: (1) Limit of approach distances in Column 4 have been calculated using IEEE minimum tool distances plus 750 mm safety factor, rounded to the nearest 50 mm.
Subrule 4-132(3) and 4-132(4)

These subrules require that a utility employee working on energized equipment that has not been properly insulated is either trained to do the work i.e. competent, or must maintain the minimum specified approach distance of 800 mm. These subrules apply at operating voltages of less than 750 volts between conductors. Because qualified utility employees are appropriately trained, the 800 mm distance does not apply to them.

Rule 4-134 Tree work distances

In paragraph (a), utility tree trimmers performing tree work near energized power lines follow the limit of approach distances listed in Table 4-5. The decreased approach distances shown in columns 5(2) and 6(3) of Table 4-5 reflect the fact that in some cases insulated tools are being used, while in others the work is done out of an insulated aerial device that is electrically rated and insulated.
### Table 4-5 Limit of Approach Distances in Millimetres for Utility Tree Trimmers

<table>
<thead>
<tr>
<th>Nominal voltage to ground (kV)</th>
<th>Nominal voltage phase to phase (kV)</th>
<th>Maximum operating voltage phase to phase (kV)</th>
<th>Limit of approach for utility tree trimmers and conducting objects to exposed energized parts (mm)</th>
<th>Limit of approach for rated insulating tools to exposed energized parts (mm)</th>
<th>Limit of approach for rated insulating booms (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.6 (DC only)</td>
<td></td>
<td></td>
<td>1050</td>
<td>40</td>
<td>500</td>
</tr>
<tr>
<td>2.4</td>
<td>4.16</td>
<td>4.58</td>
<td>1050</td>
<td>40</td>
<td>500</td>
</tr>
<tr>
<td>8</td>
<td>13.8</td>
<td>15.18</td>
<td>1100</td>
<td>120</td>
<td>550</td>
</tr>
<tr>
<td>14.4</td>
<td>25</td>
<td>27.5</td>
<td>1200</td>
<td>210</td>
<td>650</td>
</tr>
<tr>
<td>19.9</td>
<td>34.5</td>
<td>37.95</td>
<td>1300</td>
<td>290</td>
<td>750</td>
</tr>
<tr>
<td>69, 72</td>
<td>79.2</td>
<td></td>
<td>1600</td>
<td>610</td>
<td>1050</td>
</tr>
<tr>
<td>138, 144</td>
<td>158.4</td>
<td></td>
<td>1900</td>
<td>920</td>
<td>1350</td>
</tr>
<tr>
<td>230, 260</td>
<td>285</td>
<td></td>
<td>2400</td>
<td>1410</td>
<td>1850</td>
</tr>
<tr>
<td>500</td>
<td>550</td>
<td></td>
<td>3700</td>
<td>2710</td>
<td>3150</td>
</tr>
</tbody>
</table>

**Note:**
1. Limit of approach distances in Column 4 have been calculated using IEEE minimum tool distances plus 1000 mm safety factor, rounded to the nearest 50 mm.
2. Limit of approach distances in Column 5 have been calculated using IEEE minimum tool distances, rounded to the nearest 10 mm.
3. This column does not apply to utility or qualified utility employees doing tree work near energized electrical equipment or lines.

Paragraph (b) requires utility tree workers and utility workers to follow the “regular” approach distances of Table 2-1 that apply to persons and equipment. Utility tree workers are not qualified to perform aerial trimming so different rules apply to them as compared to utility tree trimmers.
Table 2-1  Limits of Approach Distances from Overhead Power Lines for Persons and Equipment  
(See Rules 2-012 & 4-134)

<table>
<thead>
<tr>
<th>Operating voltage of overhead power line between phase conductors</th>
<th>Safe limit of approach distance for persons and equipment</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 - 750 V insulated or polyethylene covered conductors (1)</td>
<td>0.3 m</td>
</tr>
<tr>
<td>0 - 750 V bare, uninsulated</td>
<td>1.0 m</td>
</tr>
<tr>
<td>Above 750 V insulated conductors (1)(2)</td>
<td>1.0 m</td>
</tr>
<tr>
<td>.75 kV - 40 kV</td>
<td>3.0 m</td>
</tr>
<tr>
<td>69 kV, 72 kV</td>
<td>3.5 m</td>
</tr>
<tr>
<td>138 kV, 144 kV</td>
<td>4.0 m</td>
</tr>
<tr>
<td>230 kV, 260 kV</td>
<td>5.0 m</td>
</tr>
<tr>
<td>500 kV</td>
<td>7.0 m</td>
</tr>
</tbody>
</table>

Notes:  
(1) Conductors must be insulated or covered throughout their entire length to comply with these groups.  
(3) Conductors must be manufactured to rated and tested insulation levels.

Rule 4-136  Qualified utility employee distances

Subrules 4-136(1) and 4-136(2)

Qualified utility employees are required to follow the limit of approach distances shown in Table 4-2, Column 4 unless
(a) live line tools are used – these are electrically rated and insulated,
(b) the energized electrical equipment or lines are protected with rated protective insulating devices or guarded in accordance with Section 8 of the ECUC – rated insulating devices allow approach distances to be reduced. Limits of approach for qualified utility employees using rated protective insulating cover-up is generally considered to be up to and not touching, accidental brush contact. Protective insulating devices are considered to be “insulating cover-up” as mentioned in rules 4-166 and 4-168, or
(c) rubber insulating gloves or barehand techniques are used – these must be used according to the safety rules of the ECUC.
Table 4-3  Limit of Approach Distances in Millimetres for Qualified Utility Employees Performing Live Line Work Using Rubber Gloves  
(See Rule 4-140)

<table>
<thead>
<tr>
<th>Nominal voltage to ground (kV)</th>
<th>Nominal voltage phase to phase (kV)</th>
<th>Maximum operating voltage phase to phase (kV)</th>
<th>Limit of approach for work performed from a rated insulated device</th>
<th>Unprotected body parts to exposed work</th>
<th>Unprotected body parts to exposed adjacent phases, structure surfaces or ground parts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Column 1</td>
<td>Column 2</td>
<td>Column 3</td>
<td>Column 4(1)</td>
<td>Column 5(2)</td>
<td></td>
</tr>
<tr>
<td>2.4</td>
<td>4.16</td>
<td>4.58</td>
<td>40(3)</td>
<td>500</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>13.8</td>
<td>15.18</td>
<td>120</td>
<td>550</td>
<td></td>
</tr>
<tr>
<td>14.4</td>
<td>25</td>
<td>27.5</td>
<td>210</td>
<td>650</td>
<td></td>
</tr>
<tr>
<td>19.9</td>
<td>34.5</td>
<td>37.95</td>
<td>290</td>
<td>750</td>
<td></td>
</tr>
<tr>
<td>69; 72</td>
<td>79.2</td>
<td>(4)</td>
<td>(4)</td>
<td>(4)</td>
<td></td>
</tr>
<tr>
<td>138; 144</td>
<td>158.4</td>
<td>(4)</td>
<td>(4)</td>
<td>(4)</td>
<td></td>
</tr>
<tr>
<td>230; 260</td>
<td>285</td>
<td>(4)</td>
<td>(4)</td>
<td>(4)</td>
<td></td>
</tr>
<tr>
<td>500</td>
<td>550</td>
<td>(4)</td>
<td>(4)</td>
<td>(4)</td>
<td></td>
</tr>
</tbody>
</table>

Note:
(1) Limit of approach distances in Column 4 have been calculated using IEEE minimum tool distances rounded to the nearest 10 mm.
(2) Limit of approach distances in Column 5 have been calculated using IEEE minimum tool distances plus 450 mm safety factor, rounded to the nearest 50 mm.
(3) Work performed directly from a pole or structure on electrical equipment or lines operating at voltages below 5 kV between conductors must be done in accordance with Rule 4-142.
(4) Live line work using rubber gloves is not normally done at these voltage levels. Rubber insulating equipment may be required to handle isolated and grounded lines that normally operate at these voltage levels.
Rule 4-142  Working from a structure

This rule provides minimum clearance distances in situations where a qualified utility employee performs live line work from a pole or structure on electrical equipment or lines using rubber gloves. The electrical equipment or lines must operate at voltages below 5 kilovolts between conductors.

Rule 4-144  Exception

Rated insulated devices provide a safety barrier – if used, rules 4-140 and 4-142 do not apply.

Rule 4-146  Employee in training

A utility employee in training is learning specialized skills and is not yet considered to be fully competent. He or she must therefore be under the direct supervision of a qualified utility employee when performing work in accordance with rules 4-140 to 4-144.

Rule 4-148  Barehand techniques

This rule specifies clearance distances that must be maintained when a qualified utility employee performs barehand work. The distances are shown in Table 4-4 and Table 4-2.
Table 4-4  Limit of Approach Distances in Millimetres for Qualified Utility Employees Performing Live Line Work Using Barehand Techniques

(See Rule 4-148)

<table>
<thead>
<tr>
<th>Nominal voltage to ground kV</th>
<th>Nominal voltage phase to phase kV</th>
<th>Maximum operating voltage phase to phase kV</th>
<th>Qualified utility employees</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage levels</td>
<td>Limit of approach for work performed from a rated insulated device or from an energized phase conductor mm</td>
<td>Energized body parts to exposed structure surfaces or grounded parts mm</td>
<td>Energized body parts to exposed adjacent phases mm</td>
</tr>
<tr>
<td>Column 1</td>
<td>Column 2</td>
<td>Column 3</td>
<td>Column 4(1)</td>
</tr>
<tr>
<td>2.4</td>
<td>4.16</td>
<td>4.58</td>
<td>(3)</td>
</tr>
<tr>
<td>8</td>
<td>13.8</td>
<td>15.18</td>
<td>(3)</td>
</tr>
<tr>
<td>14.4</td>
<td>25</td>
<td>27.5</td>
<td>(3)</td>
</tr>
<tr>
<td>19.9</td>
<td>34.5</td>
<td>37.95</td>
<td>(3)</td>
</tr>
<tr>
<td>69, 72</td>
<td>79.2</td>
<td>610</td>
<td>1060</td>
</tr>
<tr>
<td>138, 144</td>
<td>158.4</td>
<td>920</td>
<td>1590</td>
</tr>
<tr>
<td>230, 260</td>
<td>285</td>
<td>1410</td>
<td>3050</td>
</tr>
<tr>
<td>500</td>
<td>550</td>
<td>2710</td>
<td>6650</td>
</tr>
</tbody>
</table>

Note:
(1) Limit of approach distances in Column 4 have been calculated using IEEE minimum tool distances rounded to the nearest 10 mm.
(2) Limit of approach distances in Column 5 have been calculated using IEEE minimum tool distances formula applied to phase-to-phase voltage, rounded to the nearest 10 mm.
(3) Live line work using barehand techniques is not normally done at these voltage levels. Barehand techniques may be used with other work techniques on lines operating at these voltage levels.
Table 4-2 Limit of Approach Distances in Millimetres for Qualified Utility Employees  
(See Rules 4-136 & 4-148)

<table>
<thead>
<tr>
<th>Nominal voltage to ground kV</th>
<th>Nominal voltage phase to phase kV</th>
<th>Maximum operating voltage phase to phase kV</th>
<th>Limit of approach to exposed energized parts mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Column 1</td>
<td>Column 2</td>
<td>Column 3</td>
<td>Column 4(1)</td>
</tr>
<tr>
<td>0.6 (DC only)</td>
<td>500</td>
<td>500</td>
<td>500</td>
</tr>
<tr>
<td>2.4</td>
<td>4.16</td>
<td>4.58</td>
<td>500</td>
</tr>
<tr>
<td>8.0</td>
<td>13.8</td>
<td>15.18</td>
<td>550</td>
</tr>
<tr>
<td>14.4</td>
<td>25</td>
<td>27.5</td>
<td>650</td>
</tr>
<tr>
<td>19.9</td>
<td>34.5</td>
<td>37.95</td>
<td>750</td>
</tr>
<tr>
<td>69, 72</td>
<td>79.2</td>
<td>1050</td>
<td></td>
</tr>
<tr>
<td>138, 144</td>
<td>158.4</td>
<td>1350</td>
<td></td>
</tr>
<tr>
<td>230, 260</td>
<td>285</td>
<td>1850</td>
<td></td>
</tr>
<tr>
<td>500</td>
<td>550</td>
<td>3150</td>
<td></td>
</tr>
</tbody>
</table>

Note: (1) Limit of approach distances in Column 4 have been calculated using IEEE minimum tool distances plus 450 mm safety factor, rounded to the nearest 50 mm.
Rule 4-150 Employee in training

A utility employee in training is learning specialized skills and is not yet considered to be fully competent. He or she must therefore be under the direct supervision of a qualified utility employee when performing work in accordance with rule 4-148.

Division F — Work on energized electrical equipment or lines (above 750 V)

Rule 4-152 Application

No explanation required

Rule 4-154 Employer duties

The employer is required to establish and maintain safe work procedures for live line work. As required by section 8 of the OHS Regulation, the procedures must be in writing and available to workers at the work site affected by the procedures.

The procedures must meet the minimum requirements of the ECUC. Being specialized work that may not be adequately covered by existing legislation, the employer must ensure that the procedures are in accordance with recognized electrical industry standards such as those prepared by CSA, IEC, IEEE, ANSI, etc.

Rule 4-156 Qualified utility employee duties

This rule makes the qualified utility employee responsible for performing live line work in accordance with the ECUC and the employer’s safe work procedures.

Rule 4-158 Training

A qualified utility employee being trained to perform live line work is learning specialized skills and is not yet considered to be fully competent. When being trained in live line work, he or she must therefore be under the direct supervision of a qualified utility employee trained in live line work techniques.
Rule 4-160  Work standards

This rule does not apply. It has been replaced by subsection 804(1).

Rule 4-162  Exceptions

This rule does not apply. It has been replaced by subsection 804(2).

Rule 4-164  Exceptions

This rule does not apply. It has been replaced by subsection 804(3).

Rule 4-166  Insulating cover-up

No explanation required.

Rule 4-168  Rated insulating devices

Rated insulating devices must be used when insulating cover-up is placed on electrical equipment or lines. The insulating devices, such as live sticks, must be rated for the voltage to which they will be exposed.

Rule 4-170  Live line tool work

Qualified utility employees performing live line work must be trained in live line tool techniques – they must be competent in this skill.

Rule 4-172  Distances

When performing live line work with live line tools, the qualified utility employee must still maintain the approach distance limits of Table 4-2 between the employee’s unprotected body parts and the energized electrical equipment or lines. This helps ensure that the work is performed safely.
Table 4-2  Limit of Approach Distances in Millimetres for Qualified Utility Employees  
(See Rules 4-136 & 4-148)

<table>
<thead>
<tr>
<th>Nominal voltage to ground kV</th>
<th>Nominal voltage phase to phase kV</th>
<th>Maximum operating voltage phase to phase kV</th>
<th>Limit of approach to exposed energized parts mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Column 1</td>
<td>Column 2</td>
<td>Column 3</td>
<td>Column 4(1)</td>
</tr>
<tr>
<td>0.6 (DC only)</td>
<td>4.16</td>
<td>4.58</td>
<td>500</td>
</tr>
<tr>
<td>2.4</td>
<td>13.8</td>
<td>15.18</td>
<td>550</td>
</tr>
<tr>
<td>14.4</td>
<td>25</td>
<td>27.5</td>
<td>650</td>
</tr>
<tr>
<td>19.9</td>
<td>34.5</td>
<td>37.95</td>
<td>750</td>
</tr>
<tr>
<td>69, 72</td>
<td></td>
<td>79.2</td>
<td>1050</td>
</tr>
<tr>
<td>138, 144</td>
<td>158.4</td>
<td></td>
<td>1350</td>
</tr>
<tr>
<td>230, 260</td>
<td>285</td>
<td></td>
<td>1850</td>
</tr>
<tr>
<td>500</td>
<td>550</td>
<td></td>
<td>3150</td>
</tr>
</tbody>
</table>

Note: (1) Limit of approach distances in Column 4 have been calculated using IEEE minimum tool distances plus 450 mm safety factor, rounded to the nearest 50 mm.
Rule 4-174  Tools

This rule refer to Division C of the ECUC which contains only a single rule, rule 4-148. However, subsection 800(2) of the OHS Code indicates that rule 4-148 does not apply. This is because the standards listed in 4-148 have been replaced and moved to section 799 of the OHS Code.

Insofar as they describe the safe use of live line tools, the listed standards must be used. Otherwise, the manufacturer’s specifications for the live line tools must be followed as required by section 12 of the OHS Code.

Rule 4-176  Gloves prohibited

This rule does not apply. The prohibition described in subrule 4-176(1) came from a time when wooden live line sticks were used and is no longer applicable.

Rule 4-178  Rubber glove work

Live line work involving the use of rubber gloves can only be performed by qualified utility employees trained in rubber glove work techniques – the workers must be competent in this skill.

Rule 4-180  Rubber gloves

Paragraph (a) refers to Division C of the ECUC, which contains only a single rule, rule 4-148. However, subsection 800(2) of the OHS Code indicates that rule 4-148 does not apply. This is because the standards listed in rule 4-148 have been replaced and moved to section 799 of the OHS Code.

Insofar as they describe the safe use of rated insulated devices, the listed standards must be used. Otherwise, the manufacturer’s specifications for the rated insulated devices must be followed as required by section 12 of the OHS Code.

Paragraph (b) requires that the limit of approach distances specified in Table 4-3 be followed when live line work using rubber insulating gloves is performed.
Table 4-3 Limit of Approach Distances in Millimetres for Qualified Utility Employees Performing Live Line Work Using Rubber Gloves

(See Rule 4-140)

<table>
<thead>
<tr>
<th>Nominal voltage to ground (kV)</th>
<th>Nominal voltage phase to phase (kV)</th>
<th>Maximum operating voltage phase to phase (KV)</th>
<th>Unprotected body parts to exposed work (Mm)</th>
<th>Unprotected body parts to exposed adjacent phases, structure surfaces or ground parts (Mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Column 1</td>
<td>Column 2</td>
<td>Column 3</td>
<td>Column 4(1)</td>
<td>Column 5(2)</td>
</tr>
<tr>
<td>2.4</td>
<td>4.16</td>
<td>4.58</td>
<td>40(3)</td>
<td>500</td>
</tr>
<tr>
<td>8</td>
<td>13.8</td>
<td>15.18</td>
<td>120</td>
<td>550</td>
</tr>
<tr>
<td>14.4</td>
<td>25</td>
<td>27.5</td>
<td>210</td>
<td>650</td>
</tr>
<tr>
<td>19.9</td>
<td>34.5</td>
<td>37.95</td>
<td>290</td>
<td>750</td>
</tr>
<tr>
<td>69, 72</td>
<td>79.2</td>
<td>(4)</td>
<td>(4)</td>
<td>(4)</td>
</tr>
<tr>
<td>138, 144</td>
<td>158.4</td>
<td>(4)</td>
<td>(4)</td>
<td>(4)</td>
</tr>
<tr>
<td>230, 260</td>
<td>285</td>
<td>(4)</td>
<td>(4)</td>
<td>(4)</td>
</tr>
<tr>
<td>500</td>
<td>550</td>
<td>(4)</td>
<td>(4)</td>
<td>(4)</td>
</tr>
</tbody>
</table>

Note:
(1) Limit of approach distances in Column 4 have been calculated using IEEE minimum tool distances rounded to the nearest 10 mm.
(2) Limit of approach distances in Column 5 have been calculated using IEEE minimum tool distances plus 450 mm safety factor, rounded to the nearest 50 mm.
(3) Work performed directly from a pole or structure on electrical equipment or lines operating at voltages below 5 kV between conductors must be done in accordance with Rule 4-142.
(4) Live line work using rubber gloves is not normally done at these voltage levels. Rubber insulating equipment may be required to handle isolated and grounded lines that normally operate at these voltage levels.

Paragraph (c) requires the qualified utility employee performing this work to work from a rated insulated device e.g. rated aerial device, rated work platform (“insulated diving board”), etc. Readers are referred to rule 4-182 for an exception.
Rule 4-182 Work from uninsulated surface

Subrule 4-182(1) exempts a qualified utility employee from having to perform rubber glove work from a rated insulated device (as required by subrule 4-180(c)) if the electrical equipment or lines operate at a voltage less than 5 kilovolts between conductors. As long as this voltage limit is not exceeded, work can be performed from a non-insulated surface such as a dry wooden pole which is not likely to conduct electricity.

If work is done in this way, subrule 4-182(2) requires that, as specified in rule 4-142, the worker must maintain a limit of approach distance of
(a) 150 mm between unprotected body parts and the exposed energized phase being worked on, and
(b) 500 mm between unprotected body parts and exposed adjacent phases or exposed grounded parts.

Rule 4-184 Barehand work

Live line work using barehand techniques can only be performed by qualified utility employees trained in barehand techniques – the workers must be competent in this skill.

Rule 4-186 Insulating devices

This rule refers to Division C of the ECUC, which contains only a single rule, rule 4-148. However, subsection 800(2) of the OHS Code indicates that rule 4-148 does not apply. This is because the standards listed in rule 4-148 have been replaced and moved to section 799 of the OHS Code.

Insofar as they describe the safe use of live line tools, the listed standards must be used. Otherwise, the manufacturer’s specifications for the live line tools must be followed as required by section 12 of the OHS Code.

Insulating devices must be handled, supported or contained in a manner that minimizes contamination to ensure that they function properly e.g. contaminants may reduce the dielectric strength of a device and reduce its insulating performance.
Rule 4-188  Barehand techniques

Leakage current must be continuously monitored to ensure that the insulating ladders and aerial devices being used provide adequate levels of insulation protection. Leakage current levels serve as a measure of potential flashover.

Shielding and bonding techniques must be used to limit the potential difference between surfaces that a worker can contact while working. Shielding and bonding techniques limit the possibility of workers being subjected to an electric shock event by keeping them at the same potential as the line voltage.

The employer is required to have specific instructions covering shielding and bonding in the employer's operating procedures. As required by section 8 of the OHS Regulation, the procedures must be in writing and available to workers at the work site affected by the procedures.

Areas where workers may be subjected to hazardous potential differences must be roped off or guarded to prevent workers from contacting surfaces that could be dangerous.

Rule 4-190  Work methods

This rule presents the techniques that a qualified utility employee must follow when using barehand techniques. Specifically, the worker must

(a) use rated insulating devices when approaching energized parts,

(b) maintain the limit of approach distances specified in Table 4-2, column 4 and Table 4-4, columns 4 and 5,

(c) measure the actual limit of approach distances rather than simply estimate them,

(d) use shielding and bonding methods and equipment – these will be described in the employer's operating procedures as required by rule 4-188(e), and

(e) not reach across insulators that have not been jumpered – this is intended to keep the qualified utility employee at the same potential as his or her immediate work area.
Table 4-2 Limit of Approach Distances in Millimetres for Qualified Utility Employees
(See Rules 4-136 & 4-148)

<table>
<thead>
<tr>
<th>Nominal voltage to ground kV</th>
<th>Nominal voltage phase to phase kV</th>
<th>Maximum operating voltage phase to phase kV</th>
<th>Limit of approach to exposed energized parts mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Column 1</td>
<td>Column 2</td>
<td>Column 3</td>
<td>Column 4(1)</td>
</tr>
<tr>
<td>0.6 (DC only)</td>
<td></td>
<td></td>
<td>500</td>
</tr>
<tr>
<td>2.4</td>
<td>4.16</td>
<td>4.58</td>
<td>500</td>
</tr>
<tr>
<td>8.0</td>
<td>13.8</td>
<td>15.18</td>
<td>550</td>
</tr>
<tr>
<td>14.4</td>
<td>25</td>
<td>27.5</td>
<td>650</td>
</tr>
<tr>
<td>19.9</td>
<td>34.5</td>
<td>37.95</td>
<td>750</td>
</tr>
<tr>
<td>69, 72</td>
<td></td>
<td>79.2</td>
<td>1050</td>
</tr>
<tr>
<td>138, 144</td>
<td></td>
<td>158.4</td>
<td>1350</td>
</tr>
<tr>
<td>230, 260</td>
<td></td>
<td>285</td>
<td>1850</td>
</tr>
<tr>
<td>500</td>
<td></td>
<td>550</td>
<td>3150</td>
</tr>
</tbody>
</table>

Note: (1) Limit of approach distances in Column 4 have been calculated using IEEE minimum tool distances plus 450 mm safety factor, rounded to the nearest 50 mm.
Table 4-4 Limit of Approach Distances in Millimetres for Qualified Utility Employees Performing Live Line Work Using Barehand Techniques

(See Rule 4-148)

<table>
<thead>
<tr>
<th>Nominal voltage to ground (kV)</th>
<th>Nominal voltage phase to phase (kV)</th>
<th>Maximum operating voltage phase to phase (kV)</th>
<th>Qualified utility employees</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Limit of approach for work performed from a rated insulated device or from an energized phase conductor</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Energized body parts to exposed structure surfaces or grounded parts (mm)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Energized body parts to exposed adjacent phases (mm)</td>
</tr>
<tr>
<td>Column 1</td>
<td>Column 2</td>
<td>Column 3</td>
<td>Column 4(1)</td>
</tr>
<tr>
<td>2.4</td>
<td>4.16</td>
<td>4.58</td>
<td>(3)</td>
</tr>
<tr>
<td>8</td>
<td>13.8</td>
<td>15.18</td>
<td>(3)</td>
</tr>
<tr>
<td>14.4</td>
<td>25</td>
<td>27.5</td>
<td>(3)</td>
</tr>
<tr>
<td>19.9</td>
<td>34.5</td>
<td>37.95</td>
<td>(3)</td>
</tr>
<tr>
<td>69, 72</td>
<td>79.2</td>
<td>610</td>
<td>1060</td>
</tr>
<tr>
<td>138, 144</td>
<td>158.4</td>
<td>920</td>
<td>1590</td>
</tr>
<tr>
<td>230, 260</td>
<td>285</td>
<td>1410</td>
<td>3050</td>
</tr>
<tr>
<td>500</td>
<td>550</td>
<td>2710</td>
<td>6650</td>
</tr>
</tbody>
</table>

Note:
1. Limit of approach distances in Column 4 have been calculated using IEEE minimum tool distances rounded to the nearest 10 mm.
2. Limit of approach distances in Column 5 have been calculated using IEEE minimum tool distances formula applied to phase-to-phase voltage, rounded to the nearest 10 mm.
3. Live line work using barehand techniques is not normally done at these voltage levels. Barehand techniques may be used with other work techniques on lines operating at these voltage levels.
Rule 4-192 Flashover prevention

The insulation must be checked to confirm that its insulating performance is sufficient to prevent flashover. An insulation tester should be used for making this assessment. Insulation testers can only be used on ceramic insulation, not synthetic insulation.

Division G — Electrical transportation systems

Rule 4-194 Safety rules and electrical transportation systems

“Electrical transportation systems” include electric trolley systems and light rail transit systems. The rules that apply to electrical equipment or lines also apply to transportation systems.

Rule 4-196 Electrical transportation right-of-way

Subrule 4-196(1)

Before entering an electrical system right-of-way to perform work on electrical equipment or lines, a utility employee must first get the authorization of the transportation system operator-in-charge. This ensures that the operator-in-charge is aware of the worker’s presence.

As required elsewhere in the rules, the utility employee must also get the authorization of the utility operator-in-charge before beginning work on the electrical equipment or lines.

Subrule 4-196(2)

Utility employees must be able to communicate with the transportation system operator-in-charge at all time. Portable two-way radios, cellular telephones, or similarly effective means are considered acceptable.

Utility employees working in transportation right-of-ways must wear high visibility vests or similar clothing so that the transportation vehicle operator can see them. This requirement is consistent with subsections 194(2) and 194(3) of the OHS Code.
Rule 4-198 Electrical transportation tunnels

When working in transportation tunnels, at least two utility employees are required as a way of improving the personal safety of the workers. Poor lighting, working in spaces that may have limited workspace and difficulty in seeing or hearing transportation vehicles are examples of the type of hazards that may be present. A second worker can help to overcome or deal with these hazards.

Auxiliary lighting devices must be available to the utility employee working in the tunnel. Each device must bear the mark or label of a nationally accredited testing organization such as CSA, ULC, UL, ETL, etc. as evidence that the device has been approved to a Canadian electrical safety standard appropriate to that specific device.

Division H — Tree work near energized electrical equipment or lines performed by utility tree trimmers, utility tree workers or other workers

Rule 4-200 Applicability

The rules of this Division apply to workers, other than utility employees, that perform tree work near energized electrical equipment or lines.

Rule 4-202 Worker requirements

Utility tree trimmers, utility tree workers and “other” workers are required to be familiar with (know and understand) and comply with Sections 0, 2 and 4 of the ECUC. “Other” workers are considered to be individuals working under the direct supervision of a tree trimmer or tree worker i.e an entry-level position within the utility tree work industry.

Rule 4-204 Control of tree work

A qualified utility employee must be in control of the tree work. This is because the qualified utility employee is familiar with the hazards associated with the electric system and the appropriate controls.
“Control” means having systems and processes in place to monitor the work activities and mitigate any hazards that might occur related to the work activities. It also means assisting with securing work permissions and establishing the safe work area. The qualified utility employee can be an operator-in-charge as long as he or she can effectively control the tree work.

**Rule 4-206 Aerial tree trimming**

Aerial tree trimming includes trimming aloft in trees as well as in an insulated aerial device. Work must be done in teams of at least two workers, one worker having to be a utility tree trimmer. Tree workers are not qualified to do aerial tree trimming.

**Rule 4-208 Non-aerial trimming**

For tree trimming done from the ground near energized equipment or lines, a utility tree trimmer or utility tree worker must be designated as being in charge. As required by rule 4-012, the employer must designate this person. Work must be done in teams of at least two workers, one worker having to be a utility tree trimmer or utility tree worker.

**Rule 4-210 Establish voltage**

Limit of approach distances are based on operating voltages. To be able to perform work safely, the utility tree trimmer or utility tree worker in charge of the tree work must contact the qualified utility employee controlling the work to establish the nominal voltage of the electrical equipment or lines. The utility tree trimmer and utility tree worker are not considered to be competent to establish this nominal voltage.

**Rule 4-212 Establishing procedures**

The employer responsible for the workers performing the tree work must prepare procedures that describe how the work is to be safely done. As required by section 8 of the OHS Regulation, the procedures must be in writing and available to workers at the work site affected by the procedures. Further, the procedures must by “acceptable”, a word defined in the ECUC to mean “acceptable to the owner/operator of the utility”.
These procedures must reflect, as applicable, the distance limits specified in Table 4-6 and Table 4-7 of the ECUC.

Table 4-6   Tree to Energized Electrical Equipment Or Lines Distances in Millimetres for Utility Tree Trimmers, Utility Tree Workers and Other Workers

See Rules 4-212, 4-214 & 4-226)

<table>
<thead>
<tr>
<th>Voltage levels</th>
<th>Utility tree trimmers, utility tree workers and other workers</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Nominal voltage to ground kV</td>
</tr>
<tr>
<td>Column 1</td>
<td>Column 2</td>
</tr>
<tr>
<td>0.6 (DC only)</td>
<td>800</td>
</tr>
<tr>
<td>2.4</td>
<td>4.16</td>
</tr>
<tr>
<td>8</td>
<td>25</td>
</tr>
<tr>
<td>14.4</td>
<td>69, 72</td>
</tr>
<tr>
<td>19.9</td>
<td>69, 72</td>
</tr>
<tr>
<td>69, 72</td>
<td>230, 260</td>
</tr>
<tr>
<td>138, 144</td>
<td>500</td>
</tr>
<tr>
<td>230, 260</td>
<td>69, 72</td>
</tr>
<tr>
<td>500</td>
<td>69, 72</td>
</tr>
</tbody>
</table>

Note: (1) Tree to energized electrical equipment or line distances in Column 4 have been calculated using IEEE tool distances plus 750 mm safety factor, rounded to the nearest 50 mm.
Table 4-7  Tree to Energized Electrical Equipment Or Lines Distances in Millimetres for Utility Tree Trimmers Using Rated Insulated Tools

(See Rules 4-212, 4-214 & 4-228)

<table>
<thead>
<tr>
<th>Nominal voltage to ground</th>
<th>Nominal voltage phase to phase</th>
<th>Maximum operating voltage phase to phase</th>
<th>Tree to energized electrical equipment or lines distance using rated insulating tools</th>
<th>Tree to energized electrical equipment or lines distance using rated insulating tools from a rated insulating aerial device</th>
</tr>
</thead>
<tbody>
<tr>
<td>kV</td>
<td>kV</td>
<td>kV</td>
<td>mm</td>
<td>mm</td>
</tr>
<tr>
<td>Column 1</td>
<td>Column 2</td>
<td>Column 3</td>
<td>Column 4(1)</td>
<td>Column 5(2)</td>
</tr>
<tr>
<td>0.6 (DC only)</td>
<td>350</td>
<td>not touching</td>
<td>350</td>
<td>not touching</td>
</tr>
<tr>
<td>2.4</td>
<td>4.16</td>
<td>4.58</td>
<td>350</td>
<td>not touching</td>
</tr>
<tr>
<td>8</td>
<td>13.8</td>
<td>15.18</td>
<td>400</td>
<td>not touching</td>
</tr>
<tr>
<td>14.4</td>
<td>25</td>
<td>27.5</td>
<td>500</td>
<td>not touching</td>
</tr>
<tr>
<td>19.9</td>
<td>34.5</td>
<td>37.95</td>
<td>600</td>
<td>not touching</td>
</tr>
<tr>
<td>69, 72</td>
<td>79.2</td>
<td>900</td>
<td>600</td>
<td></td>
</tr>
<tr>
<td>138, 144</td>
<td>158.4</td>
<td>1200</td>
<td>900</td>
<td></td>
</tr>
<tr>
<td>230, 260</td>
<td>285</td>
<td>1700</td>
<td>1400</td>
<td></td>
</tr>
<tr>
<td>500</td>
<td>550</td>
<td>3000</td>
<td>2700</td>
<td></td>
</tr>
</tbody>
</table>

Note:
(1) Tree to energized equipment or lines distances in Column 4 have been calculated using IEEE minimum tool distances plus 300 mm safety factor, rounded to the nearest 50 mm.
(2) Tree to energized electrical equipment or lines distances in Column 5 for 69 kV lines and higher have been calculated using IEEE minimum tool distance rounded to the nearest 50 mm.
Rule 4-214  Tree handling

Workers performing tree work near energized electrical equipment or lines must follow the procedures required by rule 4-212.

Rule 4-216  Duties of worker in charge

The duties of the worker in charge are largely self-evident. To prevent mistakes resulting from misunderstood messages, paragraph (d) requires that verbal messages be repeated so that the sender and receiver understand one another correctly.

Rule 4-218  Trimming above electrical equipment

This rule deals with the situation in which trimming cannot be safely done from below energized equipment or lines – the option presented in this rule should be used as a last resort.

Paragraph (a) requires that a tree trimming procedure, which is required by rule 4-212, be acceptable. As required by section 8 of the OHS Regulation, the procedure must be in writing and available to workers at the work site affected by the procedure. Further, the procedure must be “acceptable”, a word defined in the ECUC to mean “acceptable to the owner/operator of the utility”.

Use of this trimming approach
(a) is restricted to electrical equipment or lines operating at voltages less than 30 kilovolts between conductors,
(b) requires a fully insulated aerial device with an articulating boom,
(c) requires a utility tree trimmer to operate the aerial device (this worker is trained to perform trimming work from an aerial device),
(d) the boom is controlled by the worker in the bucket, and
(e) the aerial device if positioned and stabilized according to the manufacturer’s specifications.
Rule 4-220 Worker in training

A worker in training is learning specialized skills and is not yet considered to be fully competent. He or she must therefore be in the continual presence of, and under the direct supervision of, a utility tree trimmer. This requirement allows a worker that is not trained as a tree trimmer to be trained in a controlled environment.

Rule 4-222 Insulating devices

This rule refers to Division C of the ECUC, which contains only a single rule, rule 4-148. However, subsection 800(2) of the OHS Code indicates that rule 4-148 does not apply. This is because the standards listed in 4-148 have been replaced and moved to section 799 of the OHS Code.

Insofar as they describe the safe use of insulating devices used to perform tree work near energized electrical equipment or lines, the listed standards must be used. Otherwise, the manufacturer’s specifications for the live line tools must be followed as required by section 12 of the OHS Code.

Rule 4-224 Trimmer approach limit

Utility tree trimmers must respect the limit of approach distances specified in Table 4-5.
Table 4-5  Limit of Approach Distances in Millimetres for Utility Tree Trimmers

<table>
<thead>
<tr>
<th>Nominal voltage to ground</th>
<th>Nominal voltage phase to phase</th>
<th>Maximum operating voltage phase to phase</th>
<th>Limit of approach for utility tree trimmers and conducting objects to exposed energized parts</th>
<th>Limit of approach for rated insulating tools to exposed energized parts</th>
<th>Limit of approach for rated insulating booms</th>
</tr>
</thead>
<tbody>
<tr>
<td>kV</td>
<td>kV</td>
<td>kV</td>
<td>mm</td>
<td>mm</td>
<td>mm</td>
</tr>
<tr>
<td>Column 1</td>
<td>Column 2</td>
<td>Column 3</td>
<td>Column 4(1)</td>
<td>Column 5(2)</td>
<td>Column 6(3)</td>
</tr>
<tr>
<td>0.6 (DC only)</td>
<td>1050</td>
<td>40</td>
<td>500</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.4</td>
<td>4.16</td>
<td>4.58</td>
<td>1050</td>
<td>40</td>
<td>500</td>
</tr>
<tr>
<td>8</td>
<td>13.8</td>
<td>15.18</td>
<td>1100</td>
<td>120</td>
<td>550</td>
</tr>
<tr>
<td>14.4</td>
<td>25</td>
<td>27.5</td>
<td>1200</td>
<td>210</td>
<td>650</td>
</tr>
<tr>
<td>19.9</td>
<td>34.5</td>
<td>37.95</td>
<td>1300</td>
<td>290</td>
<td>750</td>
</tr>
<tr>
<td>69, 72</td>
<td>79.2</td>
<td>1600</td>
<td>610</td>
<td>1050</td>
<td></td>
</tr>
<tr>
<td>138, 144</td>
<td>158.4</td>
<td>1900</td>
<td>920</td>
<td>1350</td>
<td></td>
</tr>
<tr>
<td>230, 260</td>
<td>285</td>
<td>2400</td>
<td>1410</td>
<td>1850</td>
<td></td>
</tr>
<tr>
<td>500</td>
<td>550</td>
<td>3700</td>
<td>2710</td>
<td>3150</td>
<td></td>
</tr>
</tbody>
</table>

Note:
1. Limit of approach distances in Column 4 have been calculated using IEEE minimum tool distances plus 1000 mm safety factor, rounded to the nearest 50 mm.
2. Limit of approach distances in Column 5 have been calculated using IEEE minimum tool distances, rounded to the nearest 10 mm.
3. This column does not apply to utility or qualified utility employees doing tree work near energized electrical equipment or lines.
Subrule 4-224(2) allows for an air gap as a barrier from a grounded object to eliminate a possible 2nd point of contact and electrical path to ground. This provides the utility tree trimmer with additional protection.

This subrule only applies when tree-trimming work involves the use of insulated tools in an insulated aerial device. It does not apply when moving into position. It is good practice to prevent the insulated portion of the boom or bucket from contacting any grounded objects when moving or repositioning. Travel can be up to but not touching grounded objects when moving the bucket and not trimming.

**Rule 4-226 Climbing tree distance**

Utility tree trimmers, utility tree workers or other workers are prohibited from cutting or climbing any tree, or portion of a tree, that is closer to energized electrical equipment or lines that the distances specified in Table 4-6. “Other” workers are considered to be individuals working under the direct supervision of a tree trimmer or tree worker i.e. and entry-level position within the utility tree work industry.

This prohibition does not apply to utility tree trimmers using rated insulated devices and following these safety rules. Utility tree trimmers have more extensive training than the other listed workers and when using rated insulated devices, can use the clearance distances specified in Table 4-7 (see rule 4-228).
Table 4-7  Tree to Energized Electrical Equipment Or Lines Distances in Millimetres for Utility Tree Trimmers Using Rated Insulated Tools

(See Rules 4-212, 4-214 & 4-228)

<table>
<thead>
<tr>
<th>Nominal voltage to ground (kV)</th>
<th>Nominal voltage phase to phase (kV)</th>
<th>Maximum operating voltage phase to phase (kV)</th>
<th>Tree to energized electrical equipment or lines distance using rated insulating tools (mm)</th>
<th>Tree to energized electrical equipment or lines distance using rated insulating tools from a rated insulating aerial device (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.6 (DC only)</td>
<td>350</td>
<td>not touching</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.4</td>
<td>4.16</td>
<td>4.58</td>
<td>350</td>
<td>not touching</td>
</tr>
<tr>
<td>8</td>
<td>13.8</td>
<td>15.18</td>
<td>400</td>
<td>not touching</td>
</tr>
<tr>
<td>14.4</td>
<td>25</td>
<td>27.5</td>
<td>500</td>
<td>not touching</td>
</tr>
<tr>
<td>19.9</td>
<td>34.5</td>
<td>37.95</td>
<td>600</td>
<td>not touching</td>
</tr>
<tr>
<td></td>
<td>69, 72</td>
<td>79.2</td>
<td>900</td>
<td>600</td>
</tr>
<tr>
<td></td>
<td>138, 144</td>
<td>158.4</td>
<td>1200</td>
<td>900</td>
</tr>
<tr>
<td></td>
<td>230, 260</td>
<td>285</td>
<td>1700</td>
<td>1400</td>
</tr>
<tr>
<td></td>
<td>500</td>
<td>550</td>
<td>3000</td>
<td>2700</td>
</tr>
</tbody>
</table>

Note:
(1) Tree to energized equipment or lines distances in Column 4 have been calculated using IEEE minimum tool distances plus 300 mm safety factor, rounded to the nearest 50 mm.
(2) Tree to energized electrical equipment or lines distances in Column 5 for 69 kV lines and higher have been calculated using IEEE minimum tool distance rounded to the nearest 50 mm.
Rule 4-228 Trimming tree distance

As mentioned in the explanation to rule 4-226, utility tree trimmers are subject to the clearance distances specified in Table 4-7 when they use rated insulated tools and when they use rated insulated tools from a rated insulated aerial device.

Utility tree trimmers have more extensive training than utility tree workers or other workers and therefore different clearance distances apply. “Other” workers are considered to be individuals working under the direct supervision of a tree trimmer or tree worker i.e. entry-level position within the utility tree work industry.