

Electrical Utility Safety Rules

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FOREWORD

These safety rules (revised January 2019) are for the purpose of preventing personal injury, illness and property damage. However, be aware that the rules expressed are minimum requirements for the workplace and for public safety.

These rules were revised with input from key stakeholders and the dedicated efforts of a Joint Working Team made up of representatives from Hydro One Inc. and the Infrastructure Health & Safety Association (IHSA).

The Electrical Utility Safety Rules are a reflection of the experience of the membership and others of the industry, and the knowledge to identify, eliminate and control hazards and prevent injuries and illnesses.

In addition to these rules, the current Ontario *Occupational Health and Safety Act* (OHS Act) and Regulations outline specific duties and responsibilities of employers and workers. These safety rules must be used in conjunction with existing federal and provincial health and safety regulations.

Application

The following safety rules have been designed primarily for work in the electrical utility industry. However, the rules apply equally well to any work performed on or in proximity to electrical transmission or distribution systems or apparatus. These rules are in addition to all other pertinent safety rules, and are to be used to comply with current Regulations made under the Ontario *Occupational Health and Safety Act* and all other applicable legislation in Ontario.



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DEFINITIONS

Alive

See “**Energized.**”

Apparatus

All equipment pertaining to the generation, transmission, distribution and use of electricity.

Approved

A device or method that has been evaluated and selected from alternatives that meet the specific requirements of the job.

Approved Practice

A trade skill or work procedure used in situations where isolation of energy sources is not used. It can only be used to provide safety for the person who is exercising the **approved practice**.

Skills are developed from a combination of education, training and experience. **Approved practices** are normally documented in training material, trade handbooks or work methods instructions.

Approved Work Procedure(s)

An **approved**, documented, step-by-step method that ensures the task can be performed safely.

Arc Flash

A dangerous condition associated with the release of energy caused by an electric arc.

Arc Rated (AR)/Flame Resistant (FR) NEW

The value attributed to materials that describes their performance to electric **arc flash** events.

The property of a material whereby combustion is prevented, terminated, or inhibited following the application of a flaming or non-flaming source of ignition, with or without subsequent removal of the ignition source.

Authorized Worker(s)

A **worker** who has been given formal permission by the owner and **employer** and is competent to perform work in **proximity** to **energized apparatus**.

Bonded

Electrically connected to ensure that two or more objects are at the same potential.

Bonding (electrical)

Making a mechanically secure electrical connection between two or more objects to ensure they are at the same potential.

Cable(s)

All insulated **conductors** used for transmitting or distributing electrical energy.

Certified Insulated Aerial Device(s)

An aerial device that has successfully passed dielectric testing of the insulated portion of the boom, as prescribed by a **certified laboratory**.

Certified Laboratory Rev 01/19

A laboratory that has received certification from a governing agency, and has established specific testing standards for electrical equipment, tools, protective equipment and aerial devices.

Charged

Isolated but not **de-energized**; containing stored energy. Electrical equipment not physically connected to a source of energy may still be **charged** through **induction** or capacitance.

Competent Person

A person who,

- a) is qualified because of knowledge, training and experience to organize work and its performance;
- b) is familiar with the provisions of the *Occupational Health and Safety Act* and the Regulations that apply to the work; and
- c) has knowledge of any potential or actual danger to health or safety in the **workplace**.

Competent Worker

In relation to specific work, means a **worker** who,

- a) is qualified because of knowledge, training and experience to perform the work;
- b) is familiar with the *Occupational Health and Safety Act* and with the provisions of the Regulations that apply to the work; and
- c) has knowledge of all potential or actual danger to health or safety in the work.

Conductor(s)

That part of a **cable**, overhead line or **apparatus** intended to conduct the flow of electrical energy.

Confined Space(s)

A fully or partially enclosed space,

- a) that is not both designed and constructed for continuous human occupancy; and
- b) in which atmospheric **hazards** may occur because of its construction, location or contents or because of work that is done in it.

Controlling Authority

The person(s) who occupies a position responsible for the control of specific equipment and devices. This includes the responsibility for performing, directing or authorizing changes in the conditions or in the position of the equipment or devices.

Critical Hazard

A condition that has the potential for unwanted energy flow that may result in an injury to a **worker** or the public.

Dedicated Observer

A **worker** competent in the tasks being performed and having no other duties while monitoring the work continuously.

Dedicated Signal Person NEW

A **competent worker**, designated as a signaller, having no other duties while monitoring the work continuously. They shall be positioned in full view of the operator with a clear view of the energized electrical apparatus and of the vehicle or equipment.

De-Energized

Where electrical energy has been discharged through a mechanically secure connection to an effective ground potential.

Drop Zone NEW

The area identified as the location where there is potential for electrical hazard or objects to fall to the ground while work is being performed aloft creating a risk to workers or the public.

Dynamically Alive

Connected (that is, not *isolated*) to a source of energy such as an electrical generator, storage battery, or other source of electrical energy.

Emergency

A situation, that requires immediate action to prevent serious adverse effects on the health and safety of employees, the public or the environment. An **emergency** may be the result of uncontrolled explosions, fires, releases of hazardous materials or natural disasters.

Emergency Response Plan

A documented and communicated process designed to ensure a safe environment for all **workers** and the public to be used when responding to a specific **emergency**.

Employer(s)

A person who employs or contracts the services of one or more **workers**.

Energized

Capable of delivering energy by reason of being **dynamically alive** or **charged**.

Equipotential

Where no differences in electrical potential exist.

Equipotential Zone

A work area where no differences in electrical potential exist.

FRP

Fibre Reinforced Plastic.

Grounded Rev 01/19

Mechanically secure connection to an effective ground potential.

Hazard(s)

A source of energy that may affect the **safe work area**.

Hold-Off(s)

A device having its operation restricted to previously agreed limits by the placement of a **hold-off** tag. **Hold-offs** are most commonly used to block the automatic reclosing or the manual re-energization of a line following an automatic trip.

Hold-offs are for equipment protection and must not be used in place of a **work permit**.

Holder

The person who has accepted the **Work permit** or Supporting Guarantee and therefore has attained working and/or testing rights for the work group. The **Holder** is assigned responsibilities for ensuring that everyone in the work group is protected from the viewpoint of the **Utility Work Protection Code**.

Induction

Voltage produced on a conductive object that is subjected to a changing magnetic field.

Isolated

Separated from all sources of dynamic energy.

Isolated Zone

A section of line or portion of **apparatus** between isolation points, separated from all sources of dynamic energy.

Job Plan

A work plan agreed to by all **workers** involved that identifies all known **hazards**, eliminates the **hazards** where practical, controls the **hazards** that cannot be eliminated, protects against injury if a **hazard** gets out of control, minimizes the severity of an injury if one takes place and identifies each **worker's** responsibilities in the performance of the work.

Lines

All overhead **conductors** used for transmitting or distributing electrical energy.

Line Clearing Operations NEW

Removal of vegetation in **proximity** to energized electrical **apparatus**.

Live Line Work

Work activities carried out by **authorized workers** on live **conductors** and associated **apparatus**, using special equipment and **approved work procedures**.

Maintenance Chamber and/or Vault

A chamber or enclosure used in an underground electrical distribution system to house electrical **apparatus** or the entrance way thereto.

Nominal Voltage

The normal operating voltage measured phase-to-phase on multi-phase equipment, or phase to neutral on single-phase equipment.

Non-Insulated Booms and Non-Insulated Portion of Aerial Devices

An articulated or extendable lifting device with no tested electrical insulating qualities.

Personal Protective Equipment

Approved safety equipment worn and used to reduce the risk of personal injury.

Proximity

Proximity is defined by the following limits of approach and does not apply to **apparatus** that is designed, built and installed to be intrinsically safe for human touch,

- a) within 3 metres (10 feet) of **energized apparatus** above 750 V to 150 kV;
- b) within 4.5 metres (15 feet) of **energized apparatus** above 150 kV to 250 kV; and
- c) within 6 metres (20 feet) of **energized apparatus** above 250 kV.

Safe Limits of Approach

A procedural barrier system for **authorized workers** or **workers** under the continuous direction of an **authorized worker**, intended to minimize the risk associated with working in **proximity** to exposed **energized apparatus**.

Safe Work Area

A specifically identified area for work where all known **hazards** have been eliminated or are controlled.

Safety Interlock

A device or system which prohibits the improper sequence of operations.

Second Point of Contact

Anything at a potential other than that of the **worker**.

Supervisor

A person who has charge over a **workplace** or authority over a **worker**.

Utility Work Protection Code

The written procedures to establish an *isolated* tagged and/or locked out condition for work. The **Utility Work Protection Code** has been *approved* and adopted by the Infrastructure Health & Safety Association of Ontario and Hydro One Inc.

Worker(s)

A person who performs work or supplies services for monetary compensation.

Work Permit

A **Work permit** is a written guarantee:

- that an *isolated*, or *isolated* and *de-energized* condition has been established for work, and
- will continue to exist, except for authorized tests.

Workplace(s)

Any land, premises, location or thing at, upon, in or near which a **worker** works.

ELECTRICAL UTILITY SAFETY RULES

100 General

1. The first consideration by **workers** in the course of their work must be the safeguarding of life and the avoidance of personal injury.
2. These rules are mandatory and must be followed at all times.
3. In situations where a specific rule does not apply or where the rules themselves are not wholly understood, specific instructions and procedures shall be obtained from the **supervisor** before proceeding with work.

101 Employer's Management of Rules

The **employer** shall establish a written policy and procedure to manage these safety rules and to ensure they are correctly applied. The policy must deal with resolving disagreements on the interpretation of a rule.

If it should become necessary to depart from any portion of the rules, the departure must,

- result in a level of safety equal to or greater than that provided by the *Electrical Utility Safety Rules*;
- be fully documented and **approved** by the **employer**, and
- be sent to the Joint Health and Safety Committee or the Health and Safety Representative, if any, for the **workplace**.

102 Knowledge of Rules

Workers conducting work on or in **proximity** to exposed **apparatus** of an electrical distribution or transmission

system shall have a copy of these safety rules.

Workers shall be trained in the application of the rules.

Workers shall follow all rules applicable to their particular duties and to the duties of any employee they supervise.

103 Personal Conduct

1. A **worker** under the influence of any drug or intoxicant which may inhibit safe work performance shall not perform work or be permitted to work.
2. **Workers** are not to engage in any pranks, contests, feats of strength, unnecessary running or rough and boisterous conduct in the **workplace** nor urge fellow **workers** to take unnecessary risks.

104 Physical and Other Limitations Rev 01/19

Workers shall inform their **supervisor** of any mental, physical, personal or other limitations that may reduce their ability to work safely.

105 Jewelry and Long Hair

1. Jewelry must not be worn where it would present an increased risk of injury.
2. Long hair, including facial hair, must be suitably confined where it would present an increased risk of injury.

106 Authorization for Work

Only **authorized workers** or **workers** under the direction of an **authorized worker** may perform work on or in **proximity** to exposed **energized apparatus**.

107 Job Planning Rev 01/19

1. a) All work must be properly planned and communicated, taking into account all **workers**, the general public, **approved work procedures**, equipment, and the physical and environmental conditions at the **workplace**. The purpose of this process is to establish a **safe work area** by identifying the job steps, **hazards** and appropriate barriers. The steps to be taken in case of an **emergency** shall also be documented.
 - b) Barriers used to protect against electrical **hazards** must be made of materials having an adequate electrical insulation value, and barriers used to protect against mechanical **hazards** must be of adequate strength for the purpose intended. Visual barriers must be used wherever practical to identify clearly the **safe work area(s)** for the **worker(s)**, and/or to restrict access to unauthorized people.
 - c) Visual barriers must be,
 - made of approved materials;
 - posted with the appropriate warnings;
 - installed before the work begins; and
 - respected in the same manner as other safety barriers.
2. A documented **job plan** must be completed and AGREED TO by each worker confirming understanding prior to the performance of all tasks,
- a) on or in **proximity to energized** electrical equipment;
 - b) requiring the establishment of work protection; or
 - c) involving **critical hazards** such as, but not limited to, falling, hoisting, **confined space**, hazardous substance, etc.

3. If a change is encountered in the job, work must stop, and the new **hazard** must be identified and eliminated or controlled. The revised **job plan** must be communicated to all **workers** and, where necessary, to the **controlling authority** before re-starting work.
4. The **controlling authority** shall be notified of work location and duration of work when work is performed on or in **proximity** to equipment **energized** above 750 V.
5. A means of communication shall be readily available at all times between the **controlling authority** and any work crews performing work in **proximity** to **apparatus energized** above 750 V.

108 Weather Conditions

1. When weather conditions make the job unduly hazardous, work must be suspended immediately.
2. All work on or near **apparatus** where a lightning strike may cause personal injury will be suspended immediately whenever deemed to be unsafe by the on-site **supervisor/worker**.

109 Operating Maps and Component Nomenclature

1. All electrical components used in the control of an electrical transmission, distribution or generating system, including non-utility generation, must be identified and appropriately labelled with legible nomenclature.
2. Up-to-date operating maps and diagrams must be readily available to **workers** for all locations where work is being performed.

110 First Aid Rev 01/19

1. **Employers** must develop and maintain an **emergency** response capability in their **workplaces**, including the training of personnel to meet all the requirements of the *Workplace Safety and Insurance Act* and all applicable current legislation.
2. A list of names and telephone numbers of ambulance services, hospitals, fire departments, police, and members of the company who are to be called in emergencies shall be provided at the work location.
3. First aid training must include the “Life Saving” module of CPR and AED.
4. First aid kits meeting *Workplace Safety and Insurance Act* standards shall be maintained and suitably located in all **workplaces** and vehicles.

111 Emergency Response

1. **Workplaces** must have an **emergency response plan** and the plan shall be posted in a conspicuous location at the **workplace** or project.
2. All **workers** must be instructed in the **emergency response plan** and must practice it at regular intervals.
3. Should an **emergency** make it necessary to deviate from these safety rules, the **worker(s)** performing the work shall take every precaution reasonable in the circumstances to protect all **workers** and the general public by maintaining a safe work environment.
4. If a **worker** takes immediate action in an **emergency** to safeguard life or property, it must be followed promptly with a report to his/her **supervisor**, stating the action taken and the reasons for it.

112 Rescue Operations

1. Each **employer** shall establish written policies and procedures for performing rescue operations. All appropriate **workers** and their **supervisor(s)** shall be familiar with, and competent in, the execution of the rescue technique, including first aid.
2. Employees who may be required to perform a rescue shall be trained in the appropriate rescue procedure for the work being performed.
3. To ensure competency is maintained, the minimum requirement is to perform at least one practice session per year for each specific rescue procedure that may be required in the performance of duties.
4. All rescue procedure training and practice sessions shall be documented, and records kept.
5. A synthetic rescue rope or mechanical device **approved** for rescue purposes shall be conspicuously located and readily available where crews are engaged in overhead or underground work operations. The rope shall be designed for life saving purposes and shall have a minimum breaking strength (MBS) of 2,300 kilograms (5,000 pounds).

113 Arc Rated/Flame Resistant Protective Equipment Rev 01/19

When **workers** are required to perform work on exposed **energized apparatus** or where exposure to an **arc flash hazard** exists, all practical measures shall be taken to protect **workers** against the effects of electric **arc flash**.

1. When working on or in **proximity** to exposed **energized apparatus**,
 - a) The **AR/FR** clothing and **approved** protective equipment selected must provide an adequate level of protection to protect the **worker**.

- b) The outer layer of clothing must be made of **AR/FR** material.
 - c) Clothing worn in conjunction with **AR/FR** clothing must not contribute to increased **worker** injury.
 - d) **AR/FR** clothing, foul-weather clothing and protective equipment must be manufactured, tested and maintained to current recognized industry standards.
 - e) **Workers** shall wear **approved** eye protection in all circumstances where there is a possibility of an electrical flash or arc.
2. **AR/FR** clothing may not be required to be worn for **workers** working up to the limits as specified in Rule 129 “**Safe Limits of Approach**” for **authorized workers**, if the following requirements are met. The **worker**,
- a) is authorized;
 - b) is appropriately trained in the work to be performed; and
 - c) establishes safe conditions of work (see Rule 114).

114 Safe Conditions for Work

No work shall be done on electrical **apparatus**, mobile or fixed equipment, mechanical equipment or systems that may have electrical, dynamic or potential energy, unless safe conditions for work are provided by one or more of the following methods:

- a) The **apparatus** is **isolated** and **de-energized** in accordance with the **Utility Work Protection Code**.
- b) **Worker** protection is provided by an **approved** isolation procedure as defined in the **Utility Work Protection Code**.
- c) The **apparatus** is physically removed from the immediate vicinity of any source of electrical, dynamic or potential energy, has no ready means of connection, and has had all stored energy discharged.
- d) **Worker** protection is provided by an **approved practice**, the work is performed by an **authorized**

worker and all limits of approach are followed as per Rule 129 “**Safe Limits of Approach**”.

115 Work on Isolated Circuits

1. No work shall be performed on an **isolated** circuit until formal work protection is established and the circuit **de-energized** in accordance with the **Utility Work Protection Code**.
2. All isolating, de-energizing, tagging and locking of devices must comply with the provisions of the **Utility Work Protection Code**.

116 Work on Neutral Conductors, Buses and Skywires

1. All work on neutral **conductors**, neutral buses and skywires must be performed in accordance with Rule 128 “**Apparatus to be Treated as Energized**”.
2. When cutting, splicing or repairing a neutral **conductor**, neutral bus or skywire, the use of adequate jumpers to prevent a potential difference shall be used and installed/removed using **approved work procedures**.

117 Establishment of Hold-Offs

1. Where the electrical system equipment exists, a **hold-off** shall be established for equipment protection and must not be used in place of a **work permit** whenever,
 - a) **live line work** procedures are being performed;
 - b) stringing, sagging, raising or lowering **conductors** or stringing ropes in **proximity to energized apparatus**;
 - c) installing or removing poles that are within the “**Safe Limits of Approach**” as per Rule 129 for **Non-Insulated Booms and Non-Insulated Portion of Aerial Devices**;
 - d) installing or removing loops of airbreak switches,

- load interrupters, loadbreak switches and bypass tubes;
- e) installing or removing live line openers (**conductor** and clamp assembly);
 - f) moving **energized cables** over 750 V; or
 - g) an **employer, supervisor, worker, or controlling authority** considers it necessary or it is determined during job planning.

118 Static Electricity and Induction

Workers must identify all sources of static electricity and **induction**. **Approved** grounding and **bonding** procedures must then be used to eliminate or control these **hazards**.

119 Use of Temporary Grounds

1. Temporary grounds must be used in accordance with **approved** grounding/**bonding** procedures and the **Utility Work Protection Code**.
2. Potential tests must be performed prior to the application of any grounding or **bonding** equipment.
3. **Equipotential** point-of-work grounding shall be the first choice for grounding systems on overhead circuits.
4. Temporary grounding devices must be of adequate current-carrying capacity to withstand the maximum available fault currents.
5. Grounds must be highly visible through the use of a coloured **conductor** jacket, marker or flag.
6. Temporary grounds must be applied and removed using live line tools and **approved work procedures**.
7. No work shall be carried out on **de-energized apparatus** until a **safe work area** has been established.

8. Temporary grounds shall not be removed until the **workers** or the **Holder** requiring the grounds have completed their work, or removal is required by an **approved** testing procedure.
9. An **approved cable**-spiking tool shall be used to ensure positive identification before cutting an underground **cable** with an operating voltage of greater than 750 V.
10. **Conductors** of all circuits above 300 V **nominal**, which have the ability to be connected but have not yet been placed in service or released to a **controlling authority**, must remain **de-energized** until the **conductors** are connected for service.

120 Electrical-Testing Devices

1. Only certified and **approved** electrical-testing devices that have been verified as operational prior to use shall be used when testing electrical **apparatus**.
2. Electrical-testing devices shall only be used in accordance with the manufacturers' specifications and **approved work procedures**.
3. All voltmeters, multimeters, and phase-rotation indicators rated up to 750 volts AC that utilize direct contact to **energized** equipment shall be equipped with fused leads.
4. All voltmeters and multimeters shall be designed and **approved** for use on outdoor distribution systems.

121 High-Voltage Testing

1. All high-voltage testing shall be conducted,
 - a) using **approved work procedures**; and
 - b) where applicable in accordance with the **Utility Work Protection Code**.

2. All potential indicators used on voltages greater than 750 V, must be re-certified yearly by a **certified laboratory**, or more often if deemed necessary, following the manufacturers' recommendations and shall be marked with a legible test/expiry date.

122 Working Alone Rev 01/19

1. A **worker** must NOT work alone when,
 - a) conditions for the use of fall arrest, fall restricting or travel restraint systems are required;
 - b) working aloft on a straight or extension ladder before it is secured;
 - c) working on a **nominal** voltage of 300 V or greater;
 - d) working in **proximity** to exposed **energized apparatus** except when meeting conditions in 2 a) below;
 - e) performing switching operations in an underground electrical system that involves the operation of elbows or exposed switching devices;
 - f) working in a **confined space**;
 - g) patrolling **lines** if weather conditions or other factors make it potentially hazardous to patrol safely alone and a means of two-way communication cannot be maintained; or
 - h) working in a battery room except when meeting conditions in 2 c). Where the room is partitioned, only the part containing the batteries is considered the battery room.
2. Working alone is permitted,
 - a) in **proximity** to exposed **energized apparatus** up to the limits as specified in Rule 129 "**Safe Limits of Approach**" for **authorized workers**, when a **worker** meets the following conditions:
 - is authorized;
 - is appropriately trained in the work to be

- performed; and
 - safe conditions of work have been established as per Rule 114 a), b), c)
- b) when operating switches and replacing fuses that are part of an overhead electrical system, while working from the ground;
 - c) for visual inspections in a battery room;
 - d) for any work where a **hazard** assessment determines there are no factors that make it unsafe to work alone.
3. If a **worker** encounters **hazards** or conditions that are judged to be unsafe to proceed while working alone, or is not competent to complete the required work alone, the work must not proceed until the concern is resolved.
 4. When a second **worker** is required, he/she must be a suitably equipped, **competent worker** who can perform rescue operations including CPR and AED, and shall be available and positioned to see the **worker** performing the work.

For work in a **confined space**, a second **worker** shall be positioned immediately outside the entrance to the **confined space** and maintain constant two-way communication with **worker(s)**.

123 Aerial Devices/Boom Trucks Rev 01/19

1. Aerial devices/boom trucks shall be operated within,
 - a) the limitations of the manufacturers' specifications;
 - b) the current legislation; and
 - c) the "**Safe Limits of Approach**" (see Rule 129).

2. An **approved** bucket evacuation device (control descent device) shall be carried on each aerial device.
3. When a **worker** is aloft in an aerial device, a rope of sufficient length to raise a bucket evacuation device shall be carried.
4. Aerial devices, booms, jibs, buckets and liners shall be dielectrically tested at regular intervals as per Rule 134 “**Inspection, Testing and Selection of Live Line Tools, Protective Equipment and Aerial Devices**”, or more often should this equipment become suspect or whenever any insulated component is altered, changed or repaired. All testing shall be performed by a **certified laboratory** in accordance with the current applicable National Standards of Canada and manufacturers’ specifications.
5. Aerial devices/boom trucks shall be visually inspected for structural, mechanical and hydraulic defects, including holding valve checks, each day, prior to the equipment being used. These inspections shall be performed in accordance with manufacturers’ specifications and current legislation, and shall be documented.
6. Aerial devices used to raise **workers** aloft for **live line work** at more than 750 V **nominal** shall be equipped with upper and lower controls. Lower controls shall be capable of positively overriding upper controls.
7. **Workers** shall not be allowed to remain in the bucket of an aerial device during **emergency** lowering operations when pressure on the hydraulic system is manually released.
8. Boom trucks used as person-lifts shall not be simultaneously used for hoisting operations

unless specifically designed for that purpose by the manufacturer, and used following **approved** procedures.

9. Bucket liners shall be used in the buckets of an aerial device when engaged in rubber glove live line techniques and barehand techniques.
10. Prior to commencing work aloft, all boom and bucket covers shall be completely removed.
11. Rubber glove **live line work** above 15 kV **nominal** shall not be carried out from extendable boom type aerial devices or boom trucks with insulated boom and bucket attachments unless the unit is specifically designed and certified for the voltage to be worked on.
12. When performing rubber glove **live line work** up to 15 kV **nominal** from extendable boom type aerial devices or radial boom derricks with insulated booms, as a minimum, the restricted "**Safe Limits of Approach**" between the **worker's** reach and the non-insulated portion of the boom shall be maintained at all times.
13. Aerial devices with upper boom insulation only, and mobile work equipment such as radial boom derricks, augers, cranes, or other hoisting equipment being operated in **proximity** to **energized apparatus** operating above 750 V, and where there is a possibility of contact,
 - a) shall be adequately **grounded** unless the equipment is specifically designed and manufactured to be operated without equipment grounds; and
 - b) the operator shall remain on the operator platform; or where no operator platform is provided, the

operator must stand on an **approved** ground gradient control mat, with an **approved** connection to the chassis of the vehicle, while handling the controls; and

- c) where two or more aerial devices/boom trucks are within 3 m (10 ft.) of each other, and at least one of the units does not have a certified lower boom insert, the vehicles shall be **bonded** together and connected to an effective ground.

14. Aerial devices equipped with a lower boom insert and a turret elevator, that are used where the lower boom below the insulated portion is in **proximity**, shall be adequately **grounded**.
15. Auxiliary hydraulic hoses used in **proximity** must be dielectric, and clearly identified as such and meet **approved** industry standards.
16. Unless otherwise prescribed by an **approved practice** or **approved work procedure**, aerial devices used for rubber glove techniques above 15 kV phase-to-phase, shall be subjected to a metered current leakage test for the voltage to be worked on, immediately prior to commencement of work, and the results recorded.

124 Raising and Lowering of Tools and Material Rev 01/19

1. An **approved** handline must be used for raising or lowering tools and material to **workers** and only **approved** tool bags may be used in conjunction with the handline. Where the risk of falling material presents a **hazard**, overhead protection must be provided. Where this is not practical, the **drop zone** shall be identified in the **job plan** and protected by appropriate barriers.
2. When in **proximity** to **energized apparatus**, a **safe**

work area shall be established prior to raising or lowering equipment. Establish communication between ground workers and workers aloft before moving tools and materials.

3. Any rope being carried aloft by a **worker** or attached to an anchor point on a structure where **workers** are present shall be appropriately controlled.
4. When working in proximity, a second **worker** shall be positioned to prevent any part of the rope from breaching the applicable limit of approach, or the rope shall be securely attached to the structure at a location that will maintain the applicable "**Safe Limits of Approach**".
5. When vehicular, machinery or pedestrian traffic is present, and any part of the rope reaches the ground or could be contacted by vehicles or pedestrians, a second **worker** shall be positioned to prevent any part of the rope from making contact with all vehicular, machinery or pedestrian traffic and/or the use of other protective barriers, barricades, warning signs or other effective barriers to prevent the rope from being contacted by vehicular, machinery or pedestrian traffic.

125 Switching Authorization

1. For authorization to perform switching operations refer to Rule 106 "**Authorization for Work**".
2. **Workers** must NOT perform switching operations without approval from the **controlling authority**, except as allowed by Rule 111 "**Emergency Response**". If switching operations are completed as per Rule 111, notification must be made as soon as reasonably possible to the **controlling authority**.

126 Switching Operations

1. All switching operations must be performed in accordance with the ***Utility Work Protection Code***.
2. Contact points on switches used as isolating devices for the purpose of work protection shall be visually checked as open; or where dependence on switches with concealed contacts is unavoidable, the ***employer*** shall have a written procedure describing the alternative method(s) which affords at least equal protection for the ***worker(s)***.
3. All switches that have been opened or closed for any reason shall be checked visually or by electronic means to ensure that the proper operation has occurred.
4. ***Approved*** live line tools of sufficient length to maintain a safe working distance from exposed ***energized apparatus*** shall be used.
5. ***Workers*** shall wear all appropriate and ***approved personal protective equipment*** during switching operations.
6. ***Approved*** ground gradient mats shall be used when standing on the ground and,
 - a) operating air break switches, load interrupters, load-break switches; or
 - b) operating motor-operated switches manually.
7. Ground gradient mats are not required when ***FRP*** live line tools are being used.

IHSA Supplemental

Rubber gloves shall be worn during all switching operations as follows:

- a) Up to 750 V **nominal**, rubber gloves with a minimum Class 0 rating shall be used.
- b) Above 750 V **nominal**, rubber gloves with a minimum Class 1 rating shall be used.
- c) When within reaching or falling distances above 5 kV **nominal**, rubber gloves with a minimum Class 2 rating shall be used.

Hydro One Inc. Supplemental

Rubber gloves of a minimum Class 2 shall be worn as an additional barrier when,

- a) operating airbreak switches, load interrupters, load break switches or motor-operated switches manually;
- b) operating all switching devices in an underground electrical system, such as pad-mount transformers, pole transformers and sectionalizing switches;
- c) operating switches in an overhead electrical system, where the **worker** would be within the Restricted Zone of exposed electrical **apparatus energized** at 750 V nominal or greater (see Rule 129 “**Safe Limits of Approach**”); or
- d) using switch sticks under damp or adverse weather conditions.

127 Guarding and Safety Interlocking for Personnel Protection

1. Guards and **safety interlocks** must NOT be removed except for troubleshooting and/or testing, and **approved work procedures** must be used to protect employees and the public from any exposed **hazards**.
2. **Safety interlocks** must NOT be bypassed by the use of devices such as jumpers or spare keys except for the

following situations:

- a) The device to be worked on or operated and the associated interlock system are both contained within an **isolated zone**; **OR**
 - b) Troubleshooting and/or testing is being performed by a **competent worker** and the following conditions are met:
 - A documented **job plan** identifying **hazards** and the use of barriers to control these **hazards** has been completed and communicated to all members of the work group; and
 - At least one member of the work group remains within view of the device for which the interlock has been bypassed, and is close enough to prevent any unauthorized personnel from entering the work area.
3. The **safety interlock** system must not be bypassed before the guaranteed isolation zone is established, and it must be returned to service before the isolation is surrendered.

128 Apparatus to be Treated as Energized

All electrical **apparatus** is to be considered **energized** unless,

- a) the **apparatus** is **isolated** and **de-energized** in accordance with the **Utility Work Protection Code**; or
- b) the equipment is physically removed from the immediate vicinity of any source of electrical, dynamic or potential energy, has no ready means of connection, and has had all stored energy discharged.

129 Safe Limits of Approach Rev 01/19

The limits specified in the following table are the minimum requirements. To obtain the safest work environment, **workers** must maintain maximum clearance and use equipment and procedures adequate to protect against electrical shock or burns.

Limits of Approach						
Maintain Maximum Clearances and Install Barriers Where Practical						
	Personnel Zones			Mobile Work Equipment		
Voltages	OHSA Minimum	Authorized Worker	Restricted Zone	OHSA	Non-Insulated Boom	Certified Insulated Aerial Device
750 V to 15 kV	> 3.0 m (10 ft.)	> 0.9 m (3 ft.)	0.9 m to 0.3 m (3 ft. to 1 ft.)	> 3.0 m (10 ft.)	> 0.9 m (3 ft.)	> 0.3 m (1 ft.)
> 15 kV to 35 kV			0.9 m to 0.45 m (3 ft. to 1.5 ft.)			> 0.45 m (1.5 ft.)
> 35 kV to 50 kV		> 1.2 m (4 ft.)	1.2 m to 0.6 m (4 ft. to 2 ft.)		> 1.2 m (4 ft.)	
> 50 kV to 150 kV		> 1.5 m (5 ft.)	1.5 m to 0.9 m (5 ft. to 3 ft.)		> 24 m (8 ft.)	> 0.9 m (3 ft.)
> 150 kV to 250 kV	> 4.5 m (15 ft.)	> 2.1 m (7 ft.)	2.1 m to 1.2 m (7 ft. to 4 ft.)	> 4.5 m (15 ft.)	> 3.0 m (10 ft.)	> 1.2 m (4 ft.)
> 250 kV to 550 kV	> 6.0 m (20 ft.)	> 3.7 m (12 ft.)	3.7 m to 2.75 m (12 ft. to 9 ft.)	> 6.0 m (20 ft.)	> 4.6 m (15 ft.)	> 2.75 m (9 ft.)
SYMBOLS				cranes, power shovels back- hoes, mech. brush cutter	RDB, aerial ladder, work plat- form, uncertified aerial device	certified and tested by certified laboratory
≤ less than or equal to > greater than < less than						

For Authorized Workers:

- Only **authorized workers** or **workers** under the continuous direction of an **authorized worker** may approach, work or allow material or conductive tools to approach exposed **energized** electrical **apparatus** to limits stated.
- In planning the task to be performed, consideration must be given to the **worker's** position in relation to the exposed **energized apparatus** such that movements of the **worker's** body or conductive tools, material or vegetation will not result in any encroachment upon these limits.
- **Authorized workers** shall not ascend or descend vegetation that is or has the potential to encroach the restricted zone.

Limits of Approach

Maintain Maximum Clearances and Install Barriers Where Practical

	Personnel Zones			Mobile Work Equipment		
Voltages	OHSA Minimum	Authorized Worker	Restricted Zone	OHSA	Non-Insulated Boom	Certified Insulated Aerial Device
750 V to 15 kV	> 3.0 m (10 ft.)	> 0.9 m (3 ft.)	0.9 m to 0.3 m (3 ft. to 1 ft.)	> 3.0 m (10 ft.)	> 0.9 m (3 ft.)	> 0.3 m (1 ft.)
> 15 kV to 35 kV			0.9 m to 0.45 m (3 ft. to 1.5 ft.)			> 0.45 m (1.5 ft.)
> 35 kV to 50 kV		> 1.2 m (4 ft.)	1.2 m to 0.6 m (4 ft. to 2 ft.)		> 1.2 m (4 ft.)	
> 50 kV to 150 kV		> 1.5 m (5 ft.)	1.5 m to 0.9 m (5 ft. to 3 ft.)		> 2.4 m (8 ft.)	> 0.9 m (3 ft.)
> 150 kV to 250 kV	> 4.5 m (15 ft.)	> 2.1 m (7 ft.)	2.1 m to 1.2 m (7 ft. to 4 ft.)	> 4.5 m (15 ft.)	> 3.0 m (10 ft.)	> 1.2 m (4 ft.)
> 250 kV to 550 kV	> 6.0 m (20 ft.)	> 3.7 m (12 ft.)	3.7 m to 2.75 m (12 ft. to 9 ft.)	> 6.0 m (20 ft.)	> 4.6 m (15 ft.)	> 2.75 m (9 ft.)
SYMBOLS ≤ less than or equal to > greater than < less than				cranes, power shovels back-hoes, mech. brush cutter	RDB, aerial ladder, work platform, uncertified aerial device	certified and tested by certified laboratory

For Work in the Restricted Zone:

The minimum clearances provided in the restricted zone for **authorized workers** may only be reduced when **authorized workers** are performing **approved** live line procedures, or when **approved** cover-up (rated for the voltage being worked on) has been applied. The **worker** and equipment must maintain a minimum distance of 15 cm (6 inches) from the installed, **approved** barrier(s).

Authorized workers or a **worker(s)** in training under the continuous direction of an **authorized worker** may approach or allow material or conductive tools to approach exposed **energized** electrical **apparatus** as stated in the Restricted Zone section, only when the following conditions are adhered to:

- for all work up to 50 kV, appropriate rubber gloves must be worn while in the Restricted Zone;
- barriers and/or cover-up must be installed where practical to minimize exposure to **energized** electrical **apparatus** and all **second points of contact**;
- a **dedicated observer** must be in place, who is competent in the task being performed and has no other duties while monitoring the work continuously;
- either the **worker** performing the work or the **dedicated observer** must have successfully completed the 4th year of a formal Powerline Technician Apprenticeship training program or equivalent; and
- the **worker's** position in relation to the exposed **energized** electrical **apparatus** shall be such that movements of the **worker's** body or conductive tools, material or vegetation will not result in any encroachment.

Limits of Approach

Maintain Maximum Clearances and Install Barriers Where Practical

Voltages	Personnel Zones			Mobile Work Equipment		
	OHSA Minimum	Authorized Worker	Restricted Zone	OHSA	Non-Insulated Boom	Certified Insulated Aerial Device
750 V to 15 kV	> 3.0 m (10 ft.)	> 0.9 m (3 ft.)	0.9 m to 0.3 m (3 ft. to 1 ft.)	> 3.0 m (10 ft.)	> 0.9 m (3 ft.)	> 0.3 m (1 ft.)
> 15 kV to 35 kV			0.9 m to 0.45 m (3 ft. to 1.5 ft.)			> 0.45 m (1.5 ft.)
> 35 kV to 50 kV		> 1.2 m (4 ft.)	1.2 m to 0.6 m (4 ft. to 2 ft.)		> 1.2 m (4 ft.)	
> 50 kV to 150 kV		> 1.5 m (5 ft.)	1.5 m to 0.9 m (5 ft. to 3 ft.)		> 24 m (8 ft.)	> 0.9 m (3 ft.)
> 150 kV to 250 kV	> 4.5 m (15 ft.)	> 2.1 m (7 ft.)	2.1 m to 1.2 m (7 ft. to 4 ft.)	> 4.5 m (15 ft.)	> 3.0 m (10 ft.)	> 1.2 m (4 ft.)
> 250 kV to 550 kV	> 6.0 m (20 ft.)	> 3.7 m (12 ft.)	3.7 m to 2.75 m (12 ft. to 9 ft.)	> 6.0 m (20 ft.)	> 4.6 m (15 ft.)	> 2.75 m (9 ft.)
SYMBOLS ≤ less than or equal to > greater than < less than				cranes, power shovels back-hoes, mech. brush cutter	RDB, aerial ladder, work platform, uncertified aerial device	certified and tested by certified laboratory

Non-Insulated Booms and Non-Insulated Portion of Aerial Devices:

- Only **authorized workers** or **workers** under the continuous direction of an **authorized worker** are permitted to operate non-insulated booms or **non-insulated portion of aerial devices** in **proximity** to exposed **energized apparatus**.
- Unless otherwise prescribed by an **approved work procedure**, the distances stated must be strictly followed for all parts of the equipment, including the booms, hoisting cables and any part of the load being hoisted. Additional clearance must allow for any change in boom angle, swing of the hoisting cable and load while it is being moved.
- For hoisting and rigging operations in the **proximity** of **energized** electrical **apparatus**, a **dedicated signal person** must be used.

Limits of Approach

Maintain Maximum Clearances and Install Barriers Where Practical

Voltages	Personnel Zones			Mobile Work Equipment		
	OHSA Minimum	Authorized Worker	Restricted Zone	OHSA	Non-Insulated Boom	Certified Insulated Aerial Device
750 V to 15 kV	> 3.0 m (10 ft.)	> 0.9 m (3 ft.)	0.9m to 0.3m (3ft. to 1ft.)	> 3.0 m (10 ft.)	> 0.9 m (3 ft.)	> 0.3 m (1 ft.)
> 15 kV to 35 kV			0.9m to 0.45m (3ft. to 1.5ft.)			> 0.45 m (1.5ft.)
> 35 kV to 50 kV		> 1.2 m (4 ft.)	1.2m to 0.6 m (4 ft. to 2 ft.)		> 1.2 m (4 ft.)	> 0.9 m (3 ft.)
> 50 kV to 150 kV		> 1.5 m (5 ft.)	1.5m to 0.9 m (5 ft. to 3 ft.)		> 2.4 m (8 ft.)	> 1.2 m (4 ft.)
> 150 kV to 250 kV	> 4.5 m (15 ft.)	> 2.1 m (7 ft.)	2.1m to 1.2 m (7 ft. to 4 ft.)	> 4.5 m (15 ft.)	> 3.0 m (10 ft.)	> 2.75 m (9 ft.)
> 250 kV to 550 kV	> 6.0 m (20 ft.)	> 3.7 m (12 ft.)	3.7 m to 2.75 m (12 ft. to 9 ft.)	> 6.0 m (20 ft.)	> 4.6 m (15 ft.)	> 2.75 m (9 ft.)
SYMBOLS ≤ less than or equal to > greater than < less than				cranes, power shovels back- hoes, mech. brush cutter	RDB, aerial ladder, work platform, uncertified aerial device	certified and tested by certified laboratory

Certified Insulated Aerial Devices:

- Only **authorized workers** or **workers** in training under the continuous direction of an **authorized worker** are permitted to operate **certified insulated aerial devices** in **proximity** to exposed **energized apparatus** as per the distances specified.
- For voltages up to and including 50 kV, **approved** barriers and/or cover-up must be installed when the minimum clearance stated in this table cannot be maintained.
- For voltages where there are no **approved** barriers, the stated limits in this table must never be reduced.
- For hoisting and rigging operations in the **proximity** of **energized** electrical **apparatus**, a dedicated signal person must be used.

Limits of Approach						
Maintain Maximum Clearances and Install Barriers Where Practical						
Voltages	Personnel Zones			Mobile Work Equipment		
	OHSA Minimum	Authorized Worker	Restricted Zone	OHSA	Non-Insulated Boom	Certified Insulated Aerial Device
750 V to 15 kV	> 3.0 m (10 ft.)	> 0.9 m (3 ft.)	0.9 m to 0.3 m (3 ft. to 1 ft.)	> 3.0 m (10 ft.)	> 0.9 m (3 ft.)	> 0.3 m (1 ft.)
> 15 kV to 35 kV			0.9 m to 0.45 m (3 ft. to 1.5 ft.)			> 0.45 m (1.5 ft.)
> 35 kV to 50 kV		> 1.2 m (4 ft.)	1.2 m to 0.6 m (4 ft. to 2 ft.)		> 1.2 m (4 ft.)	
> 50 kV to 150 kV		> 1.5 m (5 ft.)	1.5 m to 0.9 m (5 ft. to 3 ft.)		> 2.4 m (8 ft.)	> 0.9 m (3 ft.)
> 150 kV to 250 kV	> 4.5 m (15 ft.)	> 2.1 m (7 ft.)	2.1 m to 1.2 m (7 ft. to 4 ft.)	> 4.5 m (15 ft.)	> 3.0 m (10 ft.)	> 1.2 m (4 ft.)
> 250 kV to 550 kV	> 6.0 m (20 ft.)	> 3.7 m (12 ft.)	3.7 m to 2.75 m (12 ft. to 9 ft.)	> 6.0 m (20 ft.)	> 4.6 m (15 ft.)	> 2.75 m (9 ft.)
SYMBOLS ≤ less than or equal to > greater than < less than				cranes, power shovels back-hoes, mech. brush cutter	RDB, aerial ladder, work platform, uncertified aerial device	certified and tested by certified laboratory

130 Items in Direct Contact with Energized Apparatus

Unless otherwise prescribed by an **approved practice** or **approved work procedure**, **workers** must not make contact with any pole, structure, vegetation or non-insulated vehicle that is in direct contact with **apparatus energized** at voltages greater than 750 V.

Items in direct contact with **energized apparatus** may only be cleared,

- a) while working from an insulated aerial device and using live line techniques;
- b) using insulated **FRP** tools from the ground while wearing rubber gloves; or
- c) by de-energizing the electrical **apparatus** according to the **Utility Work Protection Code**.

131 Painting

1. **Approved work procedures** must be in place for painting operations in **proximity** to **energized apparatus**.
2. Painting operations must NOT be carried out where paint spray or a string of paint may reduce the Restricted Limits of Approach to exposed **energized apparatus**.

132 Work on or in Proximity to Energized Apparatus Rev 01/19

1. A formal risk assessment shall be conducted and written procedures shall be established and implemented to adequately protect a **worker** from all electrical shock and burn.
2. Before performing work on or in **proximity** to **energized apparatus**, a review of the written procedure, or if the written procedure is not available, the job steps must be listed directly on the documented **job plan** and communicated to all **workers**.

3. **Workers** shall use protective equipment and barriers adequate to protect them from electrical shock or burn.

133 Authorization for Live Line Work

Live line work shall only be performed by **authorized workers**, or **workers** under the continuous direction of an **authorized worker**, while using **approved work procedures**.

134 Inspection, Testing and Selection of Live Line Tools, Protective Equipment and Aerial Devices

1. Initial electrical acceptance tests, regular inspections, electrical retesting and maintenance practices must be followed for all **FRP** live line tools and rubber or fibre/plastic protective equipment. (See Table 1.)
2. Initial electrical acceptance tests and regular electrical retests for rubber gloves, **FRP** live line tools and rubber or fibre/plastic protective equipment, shall be performed by a **certified laboratory**.
3. The expiry date must be clearly shown on the piece of equipment, and it must never be used beyond the expiry date. If the expiry date is not visible, the equipment shall not be used and must be returned for laboratory retesting.
4. Pole pruners used in live line applications shall be **approved** and equipped with an insulated insert in the rope.
5. Motorized non-insulated pole pruners/pole saws shall not be used in **proximity** to **energized apparatus** operating at voltages greater than 750 V, and where there is a possibility of contact.

6. All live line tools, rubber gloves and protective equipment must be clean and visually inspected each day, prior to use.
7. When defects, such as cracks, bruises, punctures or other abnormalities, are detected through inspection, the equipment must be removed from service and returned to a **certified laboratory** for retesting.
8. Only **approved** cover-up shall be used on voltages greater than 750 V.
9. Protective cover-up must not be allowed to remain on **energized apparatus** longer than absolutely necessary, in order to maintain its dielectric integrity.

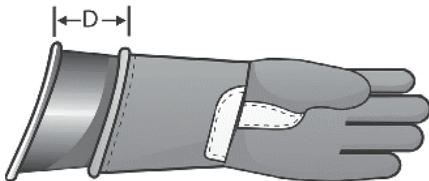
Table 1
Live Line Tools and Protective Equipment
Electrical Retesting Requirements

Protective Equipment	Maximum Use Voltage Phase to Phase	Retest Frequency
Rubber Gloves		
Class 00	500 V	90 days
Class 0	1,000 V	90 days
Class 1	7,500 V	90 days
Class 2	17,000 V	90 days
Class 3	26,500 V	90 days
Class 4	36,000 V	90 days
Rubber Blankets, Line Hose, Couplers and Hoods		
Class 0	1,000 V	1 year
Class 1	7,500 V	1 year
Class 2	17,000 V	1 year
Class 3	26,500 V	1 year
Class 4	36,000 V	1 year
Bypass Jumpers/Tubes		
15 kV	15,000 V	1 year
35 kV	35,000 V	1 year
46 kV	46,000 V	1 year
Fibre/Plastic Cover-up		
Class 2	14,600 V	1 year
Class 3	26,500 V	1 year
Class 4	36,600 V	1 year
Class 5	48,300 V	1 year
Class 6	72,500 V	1 year
Insulated Pole Platform	15,000 V	3 years
FRP Live Line Tools		3 years
Hydraulic Pruners/ Pole Saws		1 year
Certified Insulated Aerial Device		1 year
Certified Insulated Aerial Device Barehand	As per the individual unit's current test certification	6 months
Bucket Liner		1 year

135 Rubber Glove Work Rev 01/19

1. **Workers** who are required to wear rubber gloves shall be trained in the proper Class selection, and the care and use of rubber gloves and leather protectors.
2. For selection of the appropriate Class of rubber glove, see Rule 134 “**Inspection, Testing and Selection of Live Line Tools, Protective Equipment and Aerial Devices**”.
3. Only rubber gloves that have received initial acceptance tests in accordance with American Standards Testing of Material (ASTM) specifications and sized to fit the **worker** shall be issued.
4. All rubber gloves shall be marked with a legible expiry date and shall never be used beyond this date.
5. **Approved** protective covers must be used in conjunction with rubber gloves, and never be used separately as a work glove.
6. Rubber gloves shall,
 - a) be air tested and visually inspected each day, prior to use;
 - b) be exchanged when they become damaged or when the **worker** to whom they are assigned has reason to doubt their condition;
 - c) be stored away from **energized** electrical **apparatus** where ionization or corona may be present;
 - d) be used only with **approved** protective covers; and
 - e) never be worn inside out.
7. Jewelry must not be worn while wearing rubber gloves.

8. To ensure electrical integrity, the covers must be sized so the minimum cuff distance meets the requirements for each glove Class (see figure below for minimum distances between glove gauntlet and cuff, as required by ASTM).



Distance Between Gauntlet and Cuff (D)		
Class	Inches	Millimetres
00	0.5	13
0	0.5	13
1	1	25
2	2	51
3	3	76
4	4	102

9. Rubber glove techniques shall be carried out under the establishment of a **hold-off** where the electrical equipment exists.
10. Rubber gloves shall be worn when,
- controlling poles by using tools and/or ropes in the **proximity of energized** overhead **apparatus**;
 - stringing or sagging **conductors** in the **proximity of energized** overhead **apparatus**;
 - workers** on the ground are guiding materials being raised aloft and distances specified in the “**Safe Limits of Approach**” for **non-insulated booms** cannot be maintained.

11. Rubber glove work from 15 kV to 36 kV **nominal** shall be performed while working from a **certified insulated aerial device**.

12. Removing Rubber Gloves for Specific Jobs

When performing overhead rubber glove work, certain jobs present undue difficulty of performance while wearing rubber gloves. In such cases, after measures have been taken using rubber gloves to provide a protected area that will guard against any possibility of inadvertent contact with **energized apparatus**, at the discretion and with the permission of the **worker** at the worksite immediately in charge of the work, rubber gloves may be removed and other appropriate hand protection used during the interval of the specific job. Rubber gloves in these cases shall be worn when approaching and leaving the protected area.

IHSA Supplemental Rev 01/19

1. Ground-to-Ground/Rest-to-Rest Rule

Rubber gloves of the appropriate voltage rating shall be put on before leaving the ground, and worn continuously while work is carried out on any pole or structure carrying **conductors** that are **energized** or could become **energized** at potentials to 36 kV. The highest voltage on which work is to be performed shall determine the appropriate voltage rating of rubber gloves. In addition, consideration must be given to “**Safe Limits of Approach**” to any higher voltage **apparatus**.

2. Lock-to-Lock Rubber Glove Rule

Rubber gloves of the appropriate voltage rating shall be worn before opening doors or gates, removing covers or panels to enclosures or compartments that will expose **energized conductors** within falling or reaching distance, and shall be worn continuously while work is being performed in the enclosures or compartments until,

- a) the covers or panels have been replaced and the gates or doors closed and locked; or
- b) the **conductors** have been **de-energized** and/or a **safe work area** established.

Note: Hands-on work on this equipment energized above 750 V is prohibited.

3. Line Clearing Operations

Workers shall wear the appropriate rubber gloves with leather protectors when the **worker** or that which is being worked on is within 3 m (10 ft.) of **energized apparatus**, as follows:

- a) up to 500 V **nominal**, minimum Class 00;
 - b) up to 750 V **nominal**, minimum Class 0;
 - c) up to 5 kV **nominal**, minimum Class 1;
 - d) over 5 kV and up to 50 kV **nominal**, minimum Class 2.
4. Rubber glove work from 5 kV to 15 kV phase-to-phase shall be carried out while standing on an insulated pole platform or from a **certified insulated aerial device**.
5. Rubber glove work from 15 kV to 36 kV phase-to-phase shall be carried out from a **certified insulated aerial device**.

Hydro One Inc. Supplemental Rev 01/19

1. Rubber gloves shall be worn when,
 - a) working on electrical **apparatus energized** at voltages greater than 300 V **nominal**;
 - b) working within the Restricted Zone to exposed electrical **apparatus energized** at 750 V **nominal** or greater (see Rule 129 “**Safe Limits of Approach**”);
or
 - c) using live line **FRP** tools under damp or adverse weather conditions.

2. Rubber glove work on voltages greater than 750 V up to 15 kV **nominal** shall be performed while working from an insulated pole platform or insulated aerial device.

136 Live Line Tool Work

1. Live line tool techniques shall be carried out under the direct supervision of a **worker** authorized to perform the work.
2. When working on **energized lines** or equipment using live line tools, at least two **authorized workers** shall be assigned to do the work.
3. During live line tool work, rubber gloves shall be worn whenever the **worker** is in the Restricted Zone (Rule 129 "**Safe Limits of Approach**").
4. Live line tool techniques shall be carried out under the establishment of a **hold-off** where the electrical equipment exists.
5. When live line tool work is in progress, no other work shall be carried out on the pole, structure or any adjacent structures.

137 Barehand Work

1. Barehand techniques shall only be performed by **authorized workers** who have received formal training in this method.
2. Barehand work shall only be carried out under the continuous observation of an authorized **dedicated observer** who has no other duties that would distract from monitoring the work.
3. Barehand work shall only be performed while **workers**

are in a **certified, insulated aerial device approved** for barehand work or using certified and **approved** equipment (helicopter).

4. Aerial devices used for barehand work shall be,
 - a) dielectrically tested at least every six months (boom, bucket, jib, etc.); and
 - b) subjected to a metered current leakage test for the voltage to be worked on, immediately prior to commencement of work, and the results recorded.
5. The barehand technique shall be carried out under the establishment of a **hold-off** where the electrical equipment exists.
6. **Bonding** leads and clamps shall only be used to establish and maintain grid potential and their combined length shall never exceed the depth of the bucket.
7. **Workers** shall only contact objects or equipment to which they are **bonded**.

138 Stringing and Removing Conductors Rev 01/19

1. **Workers** operating stringing equipment shall be either authorized or under the direct supervision of an **authorized worker**, and shall follow **approved** documented procedures.
2. **Workers** involved in stringing or removing **conductors** shall maintain clear communication at all times.
3. Appropriate measures shall be taken to protect **workers** and the public in the event of a sudden loss of tension during stringing and sagging operations.
4. When stringing or removing **conductors** and the possibility of induced voltage or contact with

energized apparatus exists, **workers** shall work in an **equipotential zone**. **Workers** working in areas not protected by **equipotential** grounding and **bonding** shall wear rubber gloves when handling the **conductor**.

5. When stringing or removing **conductors** crossing **energized lines**, or over roads (public thoroughfares) where the flow of traffic cannot be interrupted, only **approved** tension stringing techniques, including suitable safeguards at all crossing points, shall be used.

139 Hoists

1. Web hoists/nylon ratchet tensioners suitable for use on **energized conductors** shall be cared for as live line tools.
2. Web hoists/nylon ratchet tensioners used on voltages in excess of 750 V phase-to-phase shall be used, in conjunction with link sticks or other **approved** live line tools, when connected to an anchor point at a different potential than the phase being worked on.
3. Unless otherwise prescribed by an **approved work procedure**, web hoists/nylon ratchet tensioners shall be used whenever work requiring a hoist is performed within the Restricted Zone to exposed electrical **apparatus energized** at 750 V **nominal** or greater (see Rule 129 "**Safe Limits of Approach**").

140 Confined Spaces

1. All electrical work in **confined spaces** shall be performed by an **authorized worker(s)** in accordance with a documented **confined space** program and appropriate documented work procedure(s) as required by legislation.
2. All **confined space** entrants shall wear an **approved** full-body harness at all times. Where no additional

hazard is created through its use, a rescue rope or lifeline shall be attached to the harness and its other end to an anchor point or rescue/retrieval device outside of the **confined space**.

3. Where the system is so designed, switching operations on underground equipment shall be performed outside of the **confined space**.
4. **Workers**, other than those involved in authorized testing and switching, shall not be present in **confined spaces** when equipment is being **energized/de-energized**.

141 Working on Cables and Associated Equipment Rev 01/19

All work where exposed **energized apparatus** exists, a formal risk assessment shall be conducted and written procedures shall be established and implemented to adequately protect a worker from electrical shock and burn.

1. Work on underground **cables** normally **energized** in excess of 750 V nominal, unless the **cables** are **de-energized**, shall be limited to,
 - a) **approved** switching and testing procedures while using live line tools; or
 - b) moving **energized cables** while wearing rubber gloves of the appropriate Class.
2. Entry into enclosures, containing **energized apparatus**, shall be restricted to those enclosures of adequate size to permit the establishment of a **safe work area**.
3. Moving **energized cables** over 750 V shall be carried out with a **hold-off** in effect where the electrical equipment exists.

4. **Energized cables** shall be moved only by an **authorized worker** or an **unauthorized worker** under the continual direction of an **authorized worker**, and with extreme care to avoid damage to **cable** insulation.
5. **Energized cables** shall be inspected by an **authorized worker** prior to moving to ensure the **cables** and any splices will not create an electrical **hazard** during the move. If the inspection determines the condition of the **cable** poses a **hazard**, the **cable** must be **isolated** and **de-energized** prior to moving.
6. Other than **approved** switching procedures, no physical pressure shall be applied to a **cable** or separable connector that may cause any movement, distortion or dislocation of the connector.
7. Underground **cables** shall be adequately supported to prevent undue stress to the **cables** during any work activity.
8. When re-energizing spliced **cables** that have been moved, **workers** shall remain clear of the immediate work zone.
9. **Approved** procedures shall be followed to ensure positive identification of **cables** or **apparatus** on which work is to be performed.
10. When spiking underground **cables**, **approved** spiking tools shall be used to ensure positive identification. Activation of the spiking tool shall take place from outside the immediate work zone.

142 Pulling Cable

1. **Cables** shall not be pulled into **vaults** or **maintenance**

chambers containing **energized apparatus** until a **safe work area** has been established.

2. Where a possibility exists that a “fish tape” could contact **energized apparatus**, the fish tape shall be made from non-conductive materials.
3. When pulling **cables** into a duct already occupied by **energized cables**, the pulling unit shall be **grounded** and the operator shall be within an **equipotential zone**.

143 Portable Ladders

Only **approved** non-conductive portable ladders shall be used when working on or in **proximity** to **energized apparatus**.

144 Scaffolds

1. Scaffolding must adhere to all requirements prescribed in the current Ontario *Occupational Health and Safety Act* and Regulations.
2. Scaffolds may be built, moved or used in **proximity** to **energized apparatus** only when the minimum clearances for any section or part can be maintained as follows:
 - a) Clearances for Metal Scaffolding
 - i) Vertical clearance shall be at least 0.61 m (2 ft.) plus the distance specified in the appropriate table from Rule 129 “**Safe Limits of Approach**” for **authorized workers**;
 - ii) Horizontal clearance shall be at least 2.5 m (8 ft.) plus the distance specified in the appropriate table from Rule 129 “**Safe Limits of Approach**” for **authorized workers**;
 - iii) **Authorized workers** on a scaffold must maintain a safe distance from all **energized apparatus** as specified in the appropriate table from Rule 129

- “Safe Limits of Approach”**; and
- iv) Metal scaffolds must be continuously **bonded** and **grounded** when used in **proximity** to exposed energized apparatus.

 - b) Clearances for Non-Conductive Scaffolding
 - i) **Authorized workers** may build, move or use non-conductive scaffolding up to the limits in Rule 129 **“Safe Limits of Approach”** for **authorized workers**.

145 Overhead Conductor Insulation

All covered/jacketed/insulated overhead **conductors energized** at voltages greater than 750 V shall be treated as bare **conductors**.

146 Temporary Power Cables

1. Electrical power **cables** used for temporary service, which are on the ground or exposed to vehicular traffic, must be clearly identified and have barriers installed to prevent accidental contact.

2. Temporary power **cable** installations must be inspected for potential **hazards**, on a regular basis by a **competent worker**.

147 Cord-Connected Electrical Equipment

Cord-connected electrical equipment shall not be used where the tool and/or cord cannot be secured to prevent its falling or reaching closer than the **“Safe Limits of Approach”** for **authorized workers** (see Rule 129), unless a **safe work area** has been created through the use of **approved** barriers.

148 Mobile Transformers

Mobile transformers shall be connected and disconnected in accordance with documented policies and procedures.

149 Backfeed

1. Before starting work, backfeed **hazards** must be identified and,
 - a) eliminated where possible; or
 - b) controlled using **approved** temporary grounding procedures.
2. Due to the **hazard** of backfeed, work is not to be performed on transformers connected in parallel/banked (except for replacing fuses using live line tools) until all sources of electrical energy have been removed from both the secondary and primary sides of the transformer to be worked on.