QULLIQ ENERGY CORPORATION

SAFETY RULE BOOK

INTRODUCTION

EMERGENCY CONTACT INFORMATION

Hospital/Nursing Station:

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Fire:

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RCMP:

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Work Contact:

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Other:

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INTRODUCTION

Qulliq Energy Corporation, March, 2020
Journey to Zero

"Powering Nunavummiut into the Future…Today"

QEC Safety Rulebook

Welcome to the Qulliq Energy Corporation (QEC) Safety Rule Book.
This booklet supersedes the QEC Safety Rule Book, November 2015.

This booklet is your guide and reference for minimum health and safety rules and standards at QEC worksites. It is an integral part of QEC's Health and Safety Management System.

In issuing this document, QEC makes no warranties, expressed or implied, that compliance with all or any documents published by QEC is sufficient on its own to ensure "on the job safety".

Each user is reminded that it is their own responsibility to ensure that all reasonable precautions for their own health and safety and that of their coworkers has been taken. This is also an individual's duty as stated in the Nunavut Safety Act.

Compliance with such rules and standards is a condition of employment for QEC employees and contractors. It is extremely important that each task is performed in a safe manner. If you do not know, **stop** – ask your supervisor before you begin work.

INTRODUCTION

President's message

Qulliq Energy Corporation is committed to protecting both people and property. In accordance with industry standards, and in compliance with legislative requirements, QEC management continues to provide and maintain a healthy and safe work environment. With a proactive approach, we aim to eliminate any health and safety hazards which may result in property damage, incidents, or physical injury/illness.

Safety is everyone's responsibility. Participation by employees, every day, is necessary for the health and safety excellence that the company strives for and expects.

Our ultimate goal at QEC is to have an injury and incident free workplace. Together, through continuous health and safety efforts by all employees, we will accomplish this goal.

Please take the time to read this Safety Rule Book. Ask questions. Think about safety before performing each task on every job site.

Bruno Pereira

President & CEO

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1.1 POLICY STATEMENT

Qulliq Energy Corporation (QEC) is committed to providing a healthy and safe work environment that prevents or minimizes the risk of occupational injury or illness. Corporate and individual accountability assists in protecting the wellbeing of all persons in the workplace.

APPLICATION

This policy applies to all QEC employees, as well as individuals or companies contracted to do work on behalf of the Corporation.

DEFINITIONS

Standard Operating Procedures (SOPs): are detailed written instructions outlining the preferred method of performing a task or activity that emphasizes methods of minimizing any undue risk or harm.

Safe Work Procedures (SWPs): are the general "dos and don'ts" of common work activities, such as operating equipment or completing tasks.

PROVISIONS

1. Priority of Safety

Safety is a primary consideration in any workplace decision and QEC will take all reasonable precautions to prevent harm to employees. The Corporation will establish and maintain effective programs and procedures in accordance with the *Nunavut Safety Act and Regulations* that will support and promote the health and safety of staff.

2. Joint Occupational Health and Safety Committee

QEC shall establish and cooperate with the Joint Occupational Health and Safety Committee (JOHSC) to promote the health and safety of employees and identify areas of improvement that support the Corporation's health and safety initiatives.

JOSHC also participates in the identification and investigation of health and safety hazards, including circumstances that have resulted in work refusals.

3. Training for Staff

Employees are to have a clear understanding of safe work practices through training and education provided by the Corporation. This includes an understanding of their rights and responsibilities to participate in addressing issues that have an impact on their health and safety.

4. Role of Health, Safety, and Environment Division

The Health, Safety, and Environment (HSE) Division is responsible for:

- Overseeing the delivery of a health and safety program at the Corporation's work sites, training and providing direction and support to QEC departments as and when required or requested;
- Auditing the health and safety program on a continuous basis in response to new legislation, technology, and industry standards;
- Updating the "QEC Health and Safety Manual" and the "QEC Safety Rule Book" as required;
- Completing an annual review of the "Health and Safety in the Workplace" policy;
- Maintaining records and statistics related to workplace incidents and injuries; and
- Communicating any changes to safety regulations to employees.

5. Responsibility of QEC's President

The President of QEC will provide overall leadership and accountability for the health and safety of the Corporation. The President is responsible for ensuring departments and employees work together to maintain a healthy and safe work environment.

Serious incidents will be personally reviewed by the President to confirm that contributing factors have been identified and appropriate remediation has occurred.

6. Responsibility of Directors and Managers

Directors and managers of QEC are accountable and responsible for the health and safety of employees in their area of responsibility.

This also includes ensuring contractors under their direction comply with all legislative and corporate health and safety requirements.

Directors and managers must provide the necessary resources to support the health and safety program which ensures appropriate systems, guidelines, and procedures are in place.

7. Responsibility of Supervisors

Supervisors with direct reports must ensure and promote health and safety in their area of responsibility.

Supervisors are accountable for confirming that employees use safe work practices and receive training to protect their health and safety. They also have a general responsibility for ensuring the safety of the equipment being used.

8. Responsibility of Employees

All employees are responsible for reviewing and abiding by the Corporation's health and safety standards as outlined in the "QEC Health and Safety Manual". Employees must work in accordance with Safe Work Practices (SWPs) and Standard Operating Procedures (SOPs). Furthermore, employees shall participate in health and safety training at the first opportunity provided.

Employees shall take all reasonable precautions to ensure their own safety and the safety of other persons at any of the Corporation's work sites, report any unsafe behaviours or conditions, as well as any workplace injury or incident.

9. Legislative and Policy Compliance

Employees and those working on behalf of QEC shall be bound by the *Nunavut Safety Act and Regulations*. Copies of this legislation can be located at each facility, on QEC's Intranet, or provided by the HSE Division to employees upon request.

For further information related to health and safety in the workplace, consult the "QEC Health and Safety Manual".

CONTACT

For further information or clarification, please contact QEC's Director of Health, Safety, Environment, and Facilities.

1.2 RIGHT TO REFUSE UNSAFE WORK

The *Nunavut Safety Act* gives workers the right to refuse to perform any work which the worker believes is imminent danger to life and health. The Act provides specific procedures which are to be followed in the event of a work refusal. This procedure has been developed to ensure that the appropriate steps have been taken to deal with Health and Safety concerns which may lead to a work refusal.

Supervisors need to understand their obligations as outlined in the Act and follow the QEC procedure for dealing with work refusals given here. Ideally, the employee and the supervisor can resolve any work refusal without it having to progress to the next step.

QEC WORK REFUSAL PROCEDURE

Introduction

The purpose of this procedure is to ensure that all QEC employees and contractors are working in an environment that does not pose a risk to their health or safety. If a worker believes that a specific task that has been assigned to them poses imminent danger to life and health of themselves or others, then that worker has the right to refuse the work.

Procedure

1. A work refusal is initiated by an individual employee. The worker reports the work refusal to the supervisor, indicating the reasons why the work is being refused, and remains in a safe place. This is done on a Work Refusal Report – Form 1-01.

2. The worker's supervisor assesses the work refusal conditions.

3. The Supervisor takes the necessary steps to control the hazard.

a. If the hazard has been controlled or eliminated then the worker feels that it is safe to return to work, the worker returns to work and no further steps to this procedure are required.

b. If the worker feels that that the task delegated still poses a danger to the worker, the worker continues to refuse the work and further investigation is required. Steps 4 thru 7 of this procedure must be followed.

4. The supervisor must report the work refusal to the QEC HSE Department who will then advise the JOHSC.

5. The supervisor will conduct an investigation of the work refusal with the worker and another union worker present. The information complied during the investigation is recorded on the Work Refusal Report that was initiated by the worker.

    a. If the investigation team agrees that an unsafe condition exists, and that the supervisor has resolved the problem, the worker is notified that it is safe to return to work and the worker returns to the task assigned.

    b. If the investigation team cannot agree that the situation is no longer unsafe and the employee continues to refuse the work, the worker will be provided with alternate work until a QEC Health and Safety Specialist and the JOHSC is contacted.

6. The JOHSC shall then meet to discuss the finding of the investigation. If it is not practical for either one to be present due to the location of the work refusal, then communication throughout the investigation will be maintained either by phone or electronically.

7. The QEC Health and Safety Specialist contacts the WSCC for further investigation. The worker will be assigned alternate work until the WSCC investigation has been completed and a decision has been made.

NOTE: Under no circumstances is an employee to be reprimanded for exercising the right to refuse unsafe work.

1.3 HAZARD ASSESSMENT AND CONTROL

Qulliq Energy Corporation (QEC) strives to eliminate the possibility of injury, illness or property damage due to hazards that have not been identified in the workplace. In order to keep the workplace a safe environment, our workers need to be able identify any danger that may cause risk to the employee.

QEC is committed to the implementation of a systematic process for the identification and control of hazards in the workplace. This will be accomplished by:

- Employees performing a comprehensive hazard assessment for all activities, equipment, processes and property under QEC's control;
- Reviewing the comprehensive hazard assessment annually to ensure its ongoing suitability for our operational needs;
- Performing task hazard assessments prior to the start of any job requiring activities which are new or unusual; and
- Ensuring that all workers required to conduct hazard assessments have received training in the assessment process.

1.4 SAFETY RULES

It is the policy of Qulliq Energy Corporation (QEC) to insist that contractors and employees understand and strictly adhere to the provisions of the Nunavut Safety Act and all applicable regulations.

The duties and responsibilities of the supervisor, worker and employer, legislated in the Safety Act, are of paramount importance. Below are some, but not a complete list, of the most fundamental Safety Rules; know them and adhere to them. Managers, Plant Superintendents, Operators, Assistant Operators and Supervisors are required to inform all employees of any additional safety rules and procedures as the need arises. A complete list would include the Nunavut Safety Act, OHS Regulations and the QEC Safety Rule Book.

Fundamental Safety Rules are as follows:

1. All incidents, injuries and property damage must be reported the supervisor and HSE Department immediately.

2. Unsafe acts or unsafe conditions, including “near miss” incidents must be reported to the worksite supervisor immediately.

3. Workers must maintain good housekeeping in the office, shop and worksite environments.

4. Seats belts are to be worn at all times by drivers and passengers in all QEC vehicles.

5. While operating a QEC vehicle the use of electronic communication devices is prohibited. If the driver must use a cell phone, Blackberry, or other electronic device for voice communications while the vehicle is in motion, the driver shall do one or all of the following:

    - Keep both hands on the wheel by using your vehicles hands-free or speaker phone feature, if installed.
    - Should allow the phone calls to go to voicemail.
    - Stop at a safe location to send and receive calls.

6. Workers will work in a safe and orderly manner referring to Hazard Assessments, Safe Work Practices, Standard Operating Procedures, Line Work Methods and Codes of Practices prior to commencing work.

7. Tailboard meetings must be held prior to commencing work, or if the need arises due to a change in the scope of the work.

8. Workers will only use tools and equipment in good repair and free of defects. Any tools or equipment that is not in good working order will be taken out of service and tagged out.

9. Work Protection Code must be used as per section 4 of the Health and Safety Manual for working on energized equipment.

10. Violence, fighting, horseplay, or practical jokes played on other workers will not be tolerated.

11. Smoking is permitted three meters away from any building entry, air intake or window. A no smoking rule will be enforced in QEC owned vehicles, plants and buildings.

12. CSA approved hard hat, safety boots, safety glasses, hearing protection along with other specialized Personal Protective Equipment shall be worn on the work site at all times as required. See Section 5 of the Health and Safety Manual.

13. Fall protection must be worn whenever working at a height of three meters or more.

14. High-visibility safety apparel is required when working where there is low light and poor visibility, especially if working around moving vehicles.

15. Respirators must be worn whenever there is the potential for exposure to airborne contaminant hazards such as dust, fumes or mists.

16. Consumption, distribution or possession of substances causing impairment (alcohol, cannabis, illegal or prescription drugs) while on the job or corporate property is strictly prohibited. If an employee is required to take prescription drugs in a safety sensitive position, this matter should be discussed with the supervisor.

17. All staff must attended regularly scheduled safety meeting as per Section 7 of the Health and Safety Manual.

PROGRESSIVE DISCIPLINE PROCESS FOR SAFETY INFRACTIONS

Disciplinary action resulting from a violation of occupational health and safety requirements shall be progressive and shall be appropriate to the nature of the contravention, the seriousness of the offence, previous violations, and any other extenuating circumstances.

In order to ensure that all QEC employees are treated fairly, Qulliq Energy Corporation will employ Progressive Discipline for safety violations as stated in HR Progressive Discipline Policy.

1.5 PERSONAL PROTECTIVE EQUIPMENT

It is a QEC requirement that all personnel must wear and/or use appropriate PPE when they are, or reasonably may be, exposed to workplace hazards.

Where elimination, substitution, engineering and administrative controls are not reasonably practicable, the PPE requirement is the last option to prevent worker exposure to hazards found in the workplace.

All PPE utilized by QEC employees must meet an approved standard, such as those of the Canadian Standards Association (CSA), the American National Standards Institute (ANSI) or the American Society for Testing and Materials (ASTM), as well as any applicable safety regulations. Employees will be supplied with specialty PPE such as respirators, fall protection, etc., by QEC. All PPE used by QEC employees will be maintained in accordance with manufacturer's specifications and instructions.

Contractors are responsible for providing their employees with PPE that complies with QEC standards. QEC Project Managers are responsible for verifying contractors PPE complies with QEC standards.

INSPECTION AND MAINTENANCE

Workers will:

- Inspect PPE for wear and defects before and after each use;
- Maintain their PPE properly; and
- Immediately remove from use any PPE that is damaged or defective and report the removal to their Supervisor.

Supervisor will:

- Ensure that all PPE that is of questionable reliability, damaged, or in need of service or repair will be removed from service immediately;
- Ensure that all PPE that has been removed from service will be tagged "OUT OF SERVICE." Any PPE tagged "OUT OF SERVICE" will not be returned to service until repaired and inspected by a qualified person;
- Maintain appropriate inspection and service logs for specialty PPE, and will ensure that all specialized PPE and associated equipment is used, tested, inspected and maintained in accordance with the manufacturer's specifications/recommendations and regulatory standards; and
- Ensure that no piece of PPE will be modified or changed contrary to manufacturer's instructions, the Nunavut Safety Act, and the Nunavut Occupational Health and Safety Regulations.

SPECIFIC REQUIREMENTS

The following are the minimum PPE requirements for all QEC employees and contractors.

Eye and Face Protection

The appropriate safety eyewear must be worn when there is a risk to the eyes of workers from physical impact, chemical exposure, foreign particles, intense light or heat, flame, or electrical arc flash. Non-conductive safety eyewear must be worn at all times in the power plants.

Certain operations require face protection in addition to eye protection. Face shields are always to be worn in conjunction with safety eyewear. Eye protection must also be worn when performing line work.

With written approval form their manager or supervisor, personnel may obtain prescription non-conductive safety eyewear through the formal requisition process or be reimbursed by QEC.

Note: Nunavut OHS Regulation 97(4) prohibits the wearing of contact lenses with industrial eye and face protectors. Prescription safety eyewear is strongly recommended.

Head Protection

Class E Type 1 (top impact protection) or Type 2 (top and side impact protection) CSA approved hard hats are to be worn in construction areas, power plants, and when personnel are exposed to working environments where they might be struck on the head or strike their head against an overhead hazard. Head protection must also be worn when performing line work.

Foot Protection

CSA Green Triangle protective footwear, including boots, shoes, or CSA overshoes providing Grade 1 protection, is required to be worn in the power plants and work areas where:

- Carrying or handling materials such as packages, objects, parts or heavy tools, which if dropped, could injure the feet; or
- Materials or equipment could potentially roll over a foot.

CSA Green Triangle protective footwear is required at all times in construction designated sites.

CSA Green Triangle protective footwear with the symbol for the Greek letter “omega” (Ω) is required to be worn when working with or near electrical equipment.

In work areas requiring arc-flash protection, only leather CSA Green Triangle protective footwear with the symbol for the Greek letter “omega” (Ω) shall be worn.

Hand Protection

Suitable gloves must be worn whenever there are hazards present from chemicals, sharp or abrasive objects, heat, cold, electrical shock, or any other condition which may pose a hazard to an unprotected hand. Glove selection is based on performance characteristics of the gloves, conditions, durations of use, and hazards present.

Hearing Protection

Disposable earplugs and earmuffs are available and must be worn when working in the power plants. Personnel may select either type of hearing protection, except in areas requiring arc-flash protection where only earplugs may be worn. With written approval form their manager or supervisor, personnel may obtain custom-molded earplugs through the formal requisition process or be reimbursed by QEC.

High Visibility Vests/Clothing

High-visibility safety apparel (HVSA) is required when there is low light and poor visibility, especially if working around moving vehicles (cars, trucks or other machinery traveling under their own power). All QEC employees that work specifically on utilities are required to wear ARC/FR clothing (vest, jacket, or coveralls) that meeting Class 2 or Class 3 HVSA. It is a mandatory requirement for all employees that perform meter reading and line work to wear Class 2 or Class 3 HVSA. Workers that are working near mobile equipment or construction can wear Class 1 HVSA.

Protective Clothing

Protective clothing is used to protect workers against hazards to which they may be exposed. On the job workers shall not wear:

- loose or ragged clothing or cuffs;
- greasy or oily clothing, gloves and boots;
- finger rings and other jewelry;
- short sleeve shirts in engine bays (arms must be covered)
- Long hair should be tied back.

Arc and Flame Resistant Clothing, Electrical Hazards

ARC/FR clothing is to be worn when working on or in proximity to energized apparatus, and in particular when working within the arc flash boundary.

Electrical workers at risk from arc flash are required to wear Arc-rated clothing, minimum arc rating of 8 cal/cm^2 (AR 2 - Category 2), which includes:

- Arc-rated long-sleeve shirt and pants, or arc-rated coverall and t-shirt;
- Heavy duty leather gloves are required.
- Arc-rated arc flash suit hood, or arc-rated faceshield and arc-rated balaclava; *and*
- *If working outdoors or in cold conditions,* Arc-rated jacket, parka, rainwear, or hard hat liner.

All Arc-rated clothing shall be worn with full length sleeves extending to the wrists and full length pants extending to the ankles. Only all cotton t-shirts and undergarments are to be worn beneath Arc-rated clothing. Screened t-shirts and synthetic clothing should not be worn beneath protective clothing because they burn easily and melt to the skin.

Arc and Flame-resistant (ARC/FR) clothing do not lose their flame-resistance when washed, provided they are laundered in accordance with the manufacturer's specifications and directions. ARC/FR clothing should be inspected periodically by the user for signs of damage. This clothing should never be washed with other clothes and never use bleach. Solvents should not be used to remove stains unless permitted by the manufacturer. Damaged ARC/FR clothing shall be repaired or replaced as necessary. It shall be the responsibility of the employee who wears this clothing to report damaged FR clothing to supervision.

Based on site specific arc flash studies, there are locations in QEC power generation facilities where Arc-rated clothing that meets the required minimum arc rating of 40 cal/cm^2 (AR 4 – Category 4) is required. Such an arc rated flash suit, including hood and gloves, will be provided when required.

High-visibility ARC/FR safety apparel (HVSA) is required when working when there is low light and poor visibility, especially if working around moving vehicles (cars, trucks or other machinery traveling under their own power).

Flame Resistant Clothing, Flammable Material Hazards

Due to the greater hazard dealing with highly flammable materials in QEC bulk fuel tank storage areas (tank farms), flame resistant (FR) clothing is required for maintenance, repair, and construction work in those areas. ARC/FR PPE can be worn for this application, but FR rated apparel is acceptable.

Note that FR rated PPE is not a substitute for Arc-rated clothing, as it is not tested to the higher arc flash testing standard.

SPECIALIZED PPE

Workers working in areas where electrical hazards are present shall be provided with and are required to use PPE that is designed and constructed for the specific part of the body to be protected and for the work performed.

Workers working at a height of 3 meters or more shall be provided with and use a fall protection system.

Any worker that is exposed to a respiratory hazard shall be provided with and be required to use respiratory protective equipment.

Protective equipment shall be maintained in a safe and reliable condition. PPE shall be visually inspected before each use and any defects shall be reported immediately to the supervisor.

Insulated Rubber Gloves and Protective Equipment

- Only rubber gloves that have received initial acceptance tests in accordance to ensure compliance to CSA Z462/ASTM 496 standards shall be used:
  - Class 3 (max. use 26.5 Kv)
  - Class 2 (max use 17Kv)
  - Class 1 (max use 7.5Kv)
  - Class 0 (max 1Kv, >750v primary)
  - Class 00 (max 500v, used by electricians for secondary work and meter work only)

- Rubber gloves shall be:
  - Stored and maintained in serviceable condition;
  - Never worn inside out or without leather protectors;
  - Laboratory tested a minimum of once every six months;
  - Exchanged any time they become damaged, or whenever the worker to whom they have be assigned has reason to doubt their serviceable condition;
  - Issued to individual workers only;
  - Air tested and visually inspected immediately prior to use, along with visually inspection of the leather protectors;
  - Worn with cloth gloves (liners) inside the insulating rubber gloves for warmth in cold weather and to absorb perspiration in hot weather.

ASTM Labeling Chart
Natural Rubber Electrical Insulating Gloves

Class Color	Proof Test Voltage AC/DC	Max. Use Voltage AC/DC	Insulating Rubber Glove Label
00 Beige	2,500 / 10,000	500 / 750	10 ASTM D120 CLASS 00 MAX USE VOLT 500V AC EN60903 TYPE I
0 Red	5,000 / 20,000	1,000 / 1,500	10 ASTM D120 CLASS 0 MAX USE VOLT 1000V AC EN60903 TYPE I
1 White	10,000 / 40,000	7,500 / 11,250	10 ASTM D120 CLASS 1 MAX USE VOLT 7500V AC EN60903 TYPE I
2 Yellow	20,000 / 50,000	17,000 / 25,500	10 ASTM D120 CLASS 2 MAX USE VOLT 17000V AC EN60903 TYPE I
3 Green	30,000 / 60,000	26,500 / 39,750	10 ASTM D120 CLASS 3 MAX USE VOLT 26500V AC EN60903 TYPE I
4 Orange	40,000 / 70,000	36,000 / 54,000	10 ASTM D120 CLASS 4 MAX USE VOLT 36000V AC EN60903 TYPE I

Fibre protective equipment shall be cleaned and visually inspected at least once a year or more often should the equipment become suspect.

To minimize corona and ozone damage, rubber protective equipment shall not be allowed to remain in place on an energized line longer than is absolutely necessary.

Issuing and Testing of Gloves:

- Each Powerline Technician, Electrician, Plant Superintendent and Operator are issued three pairs of the Class gloves required. They are responsible for the first pair of gloves for 180 days (6 months); the second pair is stored in the warehouse in the region that the person works. A third back-up pair is a back-up to the pair in use.
- Insulating rubber gloves are to be visually inspected (inside & out) for damage prior to use and after any incident suspected of causing damage. An air test inspection shall also be conducted (manually inflating the glove by rolling the cuff tightly to trap air inside then applying pressure to areas of the glove to listen for escaping air). The procedure is to be repeated with the glove turned inside out.
- If the person using the gloves identifies any concerns during their pre-use inspection, they should turn them into the warehouse for immediate replacement and use their back-up pair.
- The Warehouse person will exchange the gloves out on/before the 180th day (unless defects are identified earlier) and will make the arrangements to have gloves sent out for laboratory testing or replacement.

Personal Fall Protection Equipment

A worker must wear fall arrest equipment if they are:

- Working at heights of three meters or more above floor level;
- Over a pit, shaft, or operating machinery;
- Where a fall could result in drowning; or
- Where it is impracticable to provide adequate work platforms or guarding.

There are three key components of a Personal Fall Arrest System (PFAS): a full-body harness, a safety lanyard, and an anchorage connector. Individually, these components will not provide protection from a fall.

Used properly and in conjunction with each other, they form a PFAS, which becomes vitally important to safety on the job.

Only those trained to wear a PFAS and in the maintenance and inspection of the equipment are allowed to work at heights greater than three meters.

Equipment Components:

A – Full-Body Harnesses: is the only acceptable form of body wear for fall arrest. Full-body harnesses distribute fall forces throughout the body, substantially reducing the chance of injury. In addition, the full-body harness keeps the worker suspended upright in the event of a fall and supported while awaiting rescue.

The Canadian Standards Association (CSA) regulates the classifications for full body harnesses. A harness can have more than one classification, however, all full body harnesses must meet the *requirements for class A Fall Arrest.*


Class A Fall Arrest

Class A harnesses are designed to protect workers when they are six feet or more above the ground. They support the body during and after a fall. Dorsal (back) D-rings are used for fall protection. They slide on impact, keeping the worker in an upright position.


Class AD Suspension and Controlled Descent

Class AD harnesses are used to support and hold a worker while being raised and lowered. There is one sternal (front) D-ring and one dorsal (back) D-ring. The sternal D-ring is used for attachment to a descent device.


Class AE Limited Access

Class AE harnesses are designed to raise or lower a worker through a confined area. Shoulder D-rings serve as anchorage points for attaching an extraction yoke or other rescue device. The D-rings slide on the shoulder strap for optimal positioning of the worker.


Class AL Ladder Climbing

Class AL harnesses are designed for use with a certified fall arrester that travels on a vertical lifeline or a rail. Sternal (front) D-rings are used for attachment to the vertical system.


Class AP Work Positioning

Class AP harnesses will hold and sustain a worker at a specific location, allowing full use of the hands, while limiting any free fall to two feet or less. Side D-rings at waist level are used for positioning and restraint.

B – Safety Lanyards: includes safety harness lanyards, tie-off (Y) lanyards, retractable lanyards, positioning (restraint) lanyards, and lifelines:

- Shock absorbing lanyards are used when working at a height of more than six feet above the ground. The unique feature of a shock absorbing lanyard is that it has a built-in woven inner core that expands during the fall to ensure that the fall arrest force is significantly reduced;
- Y lanyards are designed with two legs so that the worker can navigate obstacles and be tied-off 100% of the time;
- Retractable lanyards are designed to arrest free falls within inches. The best place to use a self-retracting lanyard is overhead;

- Positioning lanyards are designed without shock absorbers, making them ideal for positioning or restraint applications;
- Lifelines are used to protect workers operating in the horizontal plane who may not have continuous access to suitable anchorage points. They are to be used with rope grabs, which utilize a cam lever, as well as a friction sensitive brake, to lock the rope grab onto the lifeline in case of a fall. Lifelines can either be wire cable or synthetic fibre rope.

The Personal Fall Arrest System devices are selected based on the work to be performed and the work environment. It is critical to consider potential fall distance when determining the type of connecting devices to be used.

C – Anchorage Connectors: commonly referred to as a tie-off point, anchor point, or anchor plate. It may be an I-beam, column, rebar, scaffolding, or other structural member meeting the requirements as laid out in Section 122 of the Nunavut Health and Safety Regulations. An anchorage connector is used to join the connecting device to the anchorage when a direct connection does not exist. It is important to select the proper anchorage/anchorage connector for ultimate safety. Permanent anchor points must have an ultimate load capacity of not less than 22.5 kN per worker attached in any direction that a load could be applied. Temporary anchor points must have an ultimate load capacity of not less than 8 kN per worker attached in any direction that a load could be applied. All anchor points must be located high enough for a worker to avoid contact with a lower level should a fall occur.

Note: After a fall occurs, all components of the fall arrest system must be removed from service immediately and an incident report must be completed.

Linemen's Body Belts

Are classified as WORK POSITIONING EQUIPMENT therefore the life span is indefinite as long as all load bearing attachment points are reinforced with manmade materials.

CAN/CSA Standards no longer permits the use of leather for load bearing components due to variances in strength and deterioration due to rot.

Leather can still be used in the construction of linemen's body belts if it is laminated with manmade materials connecting load bearing components and leather can still be used in no load bearing areas.

Procedure for Care of Equipment:

Proper storage of equipment after each use is important to ensure the reliability of the equipment.

- Storage area should be clean, dry and free of exposure to fumes or corrosive elements.
- Equipment must be kept clean of all dirt, corrosives or contaminants.
- Nylon or Polyester – Remove all surface dirt using a solution of water/soap on a damp sponge.

Inspection of Equipment:

Protective equipment shall be maintained in a safe and reliable condition.

- Fall protection must be inspected prior to each use and should be inspected before storage in order to maintain the highest level of reliability and to maintain the expected life span of each component. Any defects shall be reported immediately to the supervisor.
- Monthly inspection by the wearer shall be completed and documented on the inspection tag located on the equipment.
- Annual inspection by a competent worker shall be completed and documented. Any deficiency should be reported immediately to the supervisor; copies of documentation should be sent to the HSE Department.
    - While the life of fall protection equipment is totally dependent on the condition of the item, items older than 10 years old shall be replaced.
    - Anchorage devices must be inspected and replaced according to the manufacturer's specifications.

Respiratory Protective Equipment (RPE)

Respiratory hazards may include airborne contaminants such as dusts, mists, fumes, and gases, or oxygen-deficient atmospheres.

While there are many non-occupational sources of airborne contaminants, there are also many materials that become airborne in an occupational setting. Inhalation is generally viewed as the most significant route of entry for toxic materials in most workplaces. The specific airborne hazards that workers are exposed to will vary and depend upon their occupation.

Respirator selection is based upon a systematic review of the airborne contaminant hazards. Knowledge of standards, regulatory criteria, and manufacturer's information on the types of respirators and limitations must be reviewed to ensure that appropriate accepted respirators are selected for the intended conditions of use. All respiratory protective equipment must be NIOSH approved (National Institute for Occupational Safety and Health) and labeled as such.

NIOSH has classified air-purifying particulate filters as "N" (Not oil resistant), "R" (oil Resistant), or "P" (oil Proof). Filters can be obtained with filtering efficiencies of 95%, 99% or 99.97%. The most common filters used are N-95 and P-100, depending on the hazard and protection factor required.

Any worker required to wear a half mask respirator must ensure that an effective seal is maintained by the removal of scalp or facial hair that may affect the seal and that they have been fit tested to ensure the effectiveness of the seal.

Welding PPE

Welding and cutting can produce hazards such as sparks, spatter, radiation (infrared, ultraviolet, and blue light), slag, heat, hot metal, fumes and gases, and even electric shock. Since these hazards may cause burns, injury, or death, it is important to wear proper PPE at all times.

Eye and Face Protection: Welding helmet, hand shield, or goggles with appropriate filter shade lens. Always use the suggested shade numbers for the welding or cutting process instead of the minimum shade numbers. Shade numbers can be referenced from CSA Standard W117.2-12. Always wear safety glasses or safety goggles when chippings or grinding a work piece when not wearing a welding helmet.

Head and Ear Protection: Fire resistant welder's cap under the welding helmet. Ear muffs are required for noise protection and when doing overhead work to prevent sparks, splatter, and hot metal from entering the ears.

Foot Protection: all-leather CSA Green Triangle 6" (15cm) high protective footwear with the symbol for the Greek letter "omega" (Ω) shall be worn. Do not wear pants with cuffs. Pant legs are to be worn over the tops of work boots to keep out sparks and flying metal.

Hand Protection: Gloves appropriate to the hazard. For welding, this means protective flame-resistant gloves, such as leather welding gloves.

Body Protection: Fire/Flame resistant clothing and aprons made of heavy cotton, wool, or leather. Long sleeve shirts and pants without cuffs. All flaps and pockets should be buttoned or taped shut so as not to catch flying sparks. Clothing should be free of oil, grease, and solvents. Synthetic fabrics should not be worn beneath protective clothing because they burn easily and melt to the skin.

Breathing Protection: Appropriate respiratory protective equipment may be required to protect against fumes and oxides if sufficient mechanical or natural ventilation is not available.

TRAINING

General

When workers are required to use PPE, their supervisor will ensure that they receive training specific to the PPE and the conditions under which that particular PPE would be used.

On-the-Job

If the general training is not sufficient, the individual supervisor will make arrangements to for on-the-job training for any specialized PPE use. The immediate supervisor must document that the worker has been trained.

At a minimum, personnel must know:

- When PPE is necessary;
- What type of PPE is necessary;
- The limitation of PPE ability to protect against hazards;
- How to don, remove, adjust, and wear PPE;

- How to properly care for, maintain, and store PPE;
- The life expectancy of each PPE item; and
- How to dispose of deteriorating or defective PPE equipment.

If trained personnel fail to demonstrate an understanding of proper PPE use, they must be retrained. Circumstances where retraining is required include, but are not limited to, the following situations:

- Changes in the workplace render previous training obsolete;
- Changes in the type of PPE used render previous training obsolete; or
- Personnel demonstrate a lack of skill or knowledge while using PPE, indicating that they have not retained the required understanding or skill level.

1.6 PREVENTATIVE MAINTENANCE PROGRAM

It is a requirement of QEC to maintain vehicles, tools, and equipment in a condition that will maximize the safety of all company personnel in the workplace. To achieve this goal, QEC will maintain a territory wide Computerized Maintenance Management System (CMMS) for all major equipment that is based on documentation and record keeping of maintenance and services of QEC equipment and facilities.

Attention must be paid to all applicable regulations, standards and codes with emphasis on Manufacture's Specifications for use, care, limitations, maintenance and training. (Read the Original Equipment Manufacturers Manual before operation of all equipment to ensure safe operation).

The qualifications of maintenance personnel are important to the success of a maintenance program. All individuals who perform maintenance work will have the appropriate skills, accreditation and/or certification. This certification applies both to company employees and to contracted maintenance services.

Scheduling and documentation of all services of company equipment will be the responsibility of Managers, Supervisors and Workers. Plant log books must also be used to document any maintenance occurring in the plants.

The supervisor shall be responsible for the application of the program in their area of the power plants and worksites. It will also be the responsibility of each supervisor to understand the legislation that applies to the service and maintenance of the company's tools and equipment.

In addition to ensuring that workers use the tools and equipment properly, it is vital that tools and equipment be properly inspected, maintained, and kept in good repair. Our maintenance program will reduce the risk of injury and damage and will enable QEC to continue to provide safe, reliable and efficient electricity.

1.7 TAILBOARD MEETINGS

Communication is critical in completing job tasks safely. One of the best methods to ensure effective communications on the job is by conducting effective tailboard meetings before the start of any job or when there are changes to the process.

Who should conduct the meetings?

- The person with direct supervision over the workers; or
- By the person with responsibility of the work place.

Who should participate?

- All QEC employees and contractors who are expected to have a role in the job task to be completed.

When to hold a Tailboard?

- When people are performing work in the plant or at the job site that do not work there on a daily basis. This includes any work involving construction, installation, repair, or similar services under a contract for QEC or by a QEC employee;
- Before any work is being performed in any power plant by operators;
- Prior to any line work, especially before any emergency service calls;
- Before the start of a project; and
- Additional briefings if there are significant changes that occur during the course of the work or a work interruption.

How long should a tailboard meeting be?

- Short (approximately 15 minutes) informal “safety pep talks”.
- Brief discussion if work is routine.
- More extensive if:
  - Work is complicated or particularly hazardous; or
  - Worker cannot be expected to recognize / avoid hazards on job.

Tailboards are intended to keep you and your follow workers alert and aware of accident potentials, hazards and safe working procedures.

Topics to be covered during the tailboard:

- Each Worker’s Role/Responsibilities;
- Work to be completed/procedures involved;
- Hazards associated with the job/work site/job site hazards and the controls required to eliminate the hazards;
- Special precautions required;
- Personal protective equipment requirements;
- Energy source controls (i.e. Work Protection Code, Lockout/Tag-out);
- Permit requirements (i.e. Work Protection Code, Confined Space, Hot Work);
- Site safety, public safety, isolation;
- Emergency action plan;
- Fall Protection Plan,
- Rescue Plans (i.e. Fall rescue, Confined Space Rescue); and/or
- CPR/First Aid.

Documenting the job briefing:

- Tailboard form complete;
- All participants sign off;
- Document is displayed where all workers can review;
- Keep form on file on site; and
- Forward copy to Area Supervisor HSE if requested. This may be required as a result of an incident investigation or WSCC inspection.

1.8 SCHEDULED SAFETY MEETINGS

Regularly scheduled safety meetings demonstrate QEC’s concern for the lives and well-being of its employees. They help to build a cooperative environment, providing the employees an opportunity to contribute ideas

and suggestions to improve the health and safety program. They are an excellent tool for communicating hazards that are encountered on a regular basis.

Monthly safety meetings shall be held regionally, either in person or via teleconference, for all operations and maintenance employees. The Area or Department Supervisor needs to coordinate and/or chair the meetings and ensure that minutes of each meeting are documented and forwarded to the HSE Department as well as all the meeting attendees. The minutes must also be posted on the HSE Board.

Quarterly safety meetings shall be held in the Baker Lake and Iqaluit Corporate Offices as there are far less hazards that employees working in an office environment are exposed to. Managers and worker needs to coordinate and/or chair the meetings and ensure that minutes of each meeting are documented and forwarded to the HSE Department as well as all the meeting attendees. The minutes must also be posted on the HSE Board.

Meetings should not be rushed so that everyone has an opportunity to provide input.

1.9 HEALTH, SAFETY AND ENVIRONENT BOARDS

QEC Health, Safety and Environment boards shall be posted in a prominent location that all workers have unrestricted access to. All bulletin boards will be easily identifiable and standard throughout the Corporation. All boards are to be coloured/painted orange over the entire surface or have a solid orange boarder. All HSE boards will also have wording indicating that it is a “Health, Safety and Environment” or “HSE” board.

Items that must be posted to all boards:

- Most recent Workers’ Safety & Compensation Commission (WSCC) Inspection Report;
- Most recent Fire Marshall Inspection Report;
- Most recent Health, Safety & Environment (HSE) Department Inspection Report;
- Safety Meeting Minutes (for jurisdiction);
- JOHSC Meeting Minutes and Committee member names;

- HSE Memos and Alerts;
- Worksite safety diagram; and
- Fire Orders (which includes communities emergency contact numbers).

The following materials must be printed and placed on a shelf located underneath or directly beside the HSE Board (this material can also be located on the intranet):

- Emergency Plan (site specific);
- Spill Contingency Plan (plant specific);
- Safety Rule Book;
- Health and Safety Program Manual;
- Nunavut Safety Act and Regulations; and
- Bulk Fuel Storage System Plans (plant specific).

Additional items relating to HSE are permitted to be posted on this dedicated board. Documents/items that are not applicable to HSE are not permitted to be posted/placed on this board or corresponding shelf.

1.10 JOINT OCCUPATIONAL HEALTH AND SAFETY COMMITTEE (JOHSC)

A JOHSC is a joint worker-management team that assists the employer in creating and maintaining a safe workplace. The JOHSC provides advice on developing and maintaining a healthy and safe workplace, but is not responsible for enforcing legislation. The committee recommends actions to management who has the authority to implement actions required to meet specified goals and objectives. The following list illustrates some important activities of the JOHSC:

- Hold regular meetings on a quarterly basis. Additional meetings may be held as required;
- Identify workplace hazards and recommend corrective action(s);
- Respond to employee concerns regarding health and safety;
- Assist management in the development and implementation of safe work practices and emergency procedures;
- Participate in workplace inspections;
- Participate in incident investigations;

- Participate in resolving work refusals; and
- Promote education and training.

1.11 WORKPLACE INSPECTIONS

Documented monthly and annual HSE Inspection Reports serve as a valuable confirmation of due diligence, in that QEC is taking every precaution reasonable under the circumstances to protect employees and services. These Reports may be reviewed by the Joint Occupational Health and Safety Committee (JOHSC) and audited by the WSCC Safety Officers upon request.

The purpose of this requirement is to ensure that QEC complies with legislated health and safety requirements and to promote communication and develop procedures that improve workplace health and safety.

PROCEDURE FOR MONTHLY/QUARTERLY PLANNED INSPECTIONS

All employees of QEC shall be vigilant and shall exercise appropriate due diligence to minimize risks. All workplace hazards must be reported to the immediate Supervisor for appropriate corrective action.

Monthly inspections of all the power plants are to be carried out by the Plant Superintendent or Assistant Operator in each community utilizing the QEC Supervisory Power Plant Inspection form HS9-02.

Quarterly inspections of all buildings shall be carried out by a Joint Occupational Health and Safety Committee member utilizing the JOHSC Inspection form HS9-03.

Prior to the inspection the Inspector(s) should:

- Review incident reports for the worksite they are inspecting;
- Review previous inspection reports for the worksite they are inspecting;
- Obtain and review building and/or floor plans for the buildings they are inspecting;
- Ensure they use a QEC Monthly Plant Safety Inspection form;
- Plan and review the inspection route; and
- Inform the Area Supervisor when the inspection will take place.

During the inspection the Inspector(s) should:

- Speak with workers and supervisors to gather any information regarding hazardous conditions or actions they may have knowledge of;
- Have access to the Nunavut Safety Act and Regulations for reference purposes and to answer any questions that may arise out of the inspection;
- Examine areas where previous incidents or injuries have occurred and document conditions and any changes which have taken place since the incident or injury;
- Ensure that where chemicals are stored or used that they comply with WHMIS (Workplace Hazardous Material Information System) requirements (e.g. labeling, current SDS, etc.);
- Eliminate or remove the hazard if possible, keeping a written record of the hazard and any corrective actions taken and assign a rating for the hazards or potential hazard found as shown:

  1 – Low hazard
  2 – Medium hazard
  3 – High Hazard

- Make a note of successes during the inspection; positive feedback encourages safe work practice.

After the Inspection:

- The inspector(s) will review the finding of the inspection with the Manager or Supervisor to discuss the findings of the inspection;
- The inspector(s) will forward a copy of the Inspection report to the HSE Department;
- The Area Manager or Department Head will ensure items requiring corrective action which could not be addressed during the Inspection itself will be addressed;
- The inspector (s) will ensure that items listed on the Inspection report which could not be corrected at the time of inspection will have accompanying explanatory information as to the reasons why the item could not be addressed; and

- The inspector(s) will review the Inspection Report with the Manager or Area Supervisor who is responsible for the completion of corrective action items.

ANNUAL HSE INSPECTIONS

Annual HSE inspection shall be conducted at all QEC power plants and office areas by a QEC HSE Department representative. These are detailed inspections that require more time than the monthly inspections, however, the same procedure is applied. The form that is utilized by the HSE department is form HS9-01.

AREA OPERATIONS/MAINTENANCE SUPERVISORY INSPECTIONS

Area Operations/Maintenance Supervisors are required to perform a minimum of one HSE inspection per year. The form and procedure that is utilized for this inspection is the same one that is used in Section 1.20 Work Observation and Auditing System (form HS20-1).

UNPLANNED/INFORMAL INSPECTIONS

Unplanned/Informal inspections can be conducted without notice at any time in the workplace. They shall be conducted at random times throughout the year by the Plant Superintendent or Operator and/or the Area

Supervisor. An inspection checklist does not need to be completed; however, the time and date of the inspection shall be recorded in the plant log book along with any deficiencies identified and corrective action taken. Items of a more serious nature shall be reported to the Area Supervisor. The inspection shall include:

- Material handling and storage;
- Hazardous conditions;
- Compliance with housekeeping standards;
- Safety equipment condition;
- Compliance with relevant health and safety regulations;
- Fire extinguisher conditions; and
- First aid stations.

PRE-OPERATIONAL INSPECTIONS

Employees must be certain that no condition exists that might adversely affect their safety while working with tools and equipment, especially mobile equipment. One method of ensuring this prior to working with tools and equipment is by conducting a pre-operational inspection. If there are mechanical problems that could affect their safe operation, they must be reported and the equipment should be taken out of service immediately for repair. To prevent further use an "Out Of Service" Tag should be affixed to the equipment until the necessary repairs have been made as well as ones that are still required in the log book.

A pre-operational inspection checklist is required to be completed for mobile equipment that is used during field work. This includes boom and derrick trucks, bucket trucks, front end loaders, telehandlers, lift trucks and skid steers and any other equipment that could be in the field.

1.12 EMERGENCY PREPAREDNESS AND RESPONSE

Qulliq Energy Corporation (QEC) is committed to protecting its staff, facilities and property from the effects of spontaneous, unpredictable crisis situations by establishing specific guidelines, procedures and resources for coping with local critical incidents, community emergencies and large scale disasters.

The QEC Emergency plans are designed to ensure continuity of essential functions while also maintaining the health and safety of our employees' and the community. This strategy is aimed at managing and recovering from situations or events that have a direct adverse impact on the operations of QEC.

QEC Emergency Plan applies to emergencies and threats such as:

- Natural disasters;
- Technological or human caused hazards;
- Material and emergency shortages; and
- Infrastructure failure.

The objectives of an emergency plan include:

- Eliminating or reducing loss of life;
- Minimizing damage and losses;

- Protecting people, facilities, equipment and other assets;
- Ensuring the continuous operations of all essential functions/operations during an emergency;
- Reducing or mitigating disruptions to operations; and
- Achieving a timely and orderly recovery from an emergency and resumption of full service to customers.

There are many scenarios that could disrupt QEC operations and result in unavailability of power. A flexible approach is required to address the spectrum of threats shown on the following page.

- Winter storms (wind, snow);
- Fires;
- Equipment failures (prolonged power outages); and
- Hazardous materials spill

The events listed do not include all possible emergency situations. Emergency Plans should be reviewed by all parties to ensure that everyone understand their roles and responsibilities in the event of an emergency.

Emergency response plans include:

- Knowing what to do – including pre-loss and post-loss activities;
- First aid;
- Public protection;
- Notification of authorities;
- Availability communication with emergency responders; and
- Medical aid beyond first aid.

Five phases in responding to an Emergency:

- Sounding the alarm;
- Notifying the authorities;
- Evacuation;
- Building re-entry; and
- Resuming services.

Sounding the alarm: Depending on whether the building has a built in or manual alarm system, this is the initial phase in responding to an emergency.

It notifies other occupants of the building to evacuate the premises.

Notifying the authorities: Once the alarm has been sounded, emergency responders must be notified to ensure a quick emergency response.

Evacuation: Knowing when to evacuate is a personal choice but if you can no longer control the hazard and/or your safety is at risk, then evacuate. Reminder if it is not safe for you to stay in the area it is not safe for anyone else therefore alert others working in the area to leave immediately. Go to the emergency assembly area (muster station).

When an evacuation has been ordered:

- Everyone must leave;
- The Area Supervisor must be notified immediately;
- Follow action plan for building re-entry and resuming services.

Building re-entry: Only after the authorities have given the okay to re-enter. Area Supervisors and the Plant Superintendent will via phone identify what type of response is required to assist in the plant start-up.

Resuming Services: Area Supervisor and Plant Superintendent will work with the Director of Operations to ensure a safe and timely resumption of services. Each of the events that may impact QEC will vary by magnitude and severity and required different responses therefore the emergency response plans will vary from location to location and event to event.

FIRE PROTECTION: Fire Extinguisher

Making the “Right” Decision to use a portable fire extinguisher:

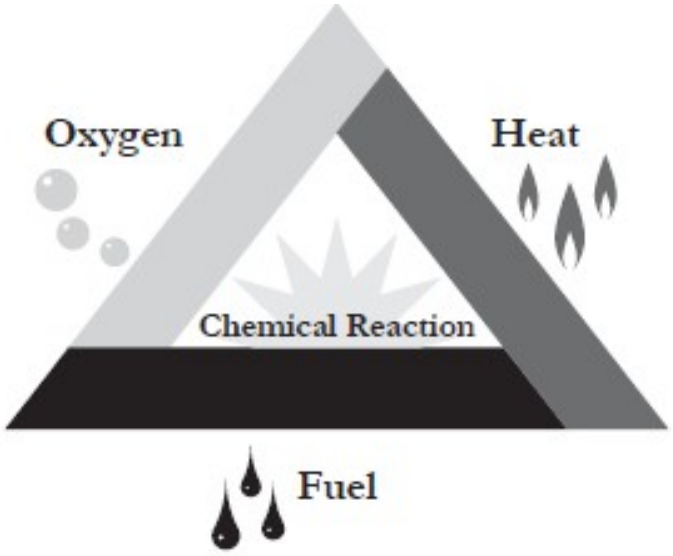
- You are trained in the use of an extinguishers;
- You know what is burning;
- Fire is not spreading rapidly;
- Smoke and heat has not filled the area; and
- You have a clear path of escape.

Fires can be very dangerous and you should always be certain that you will not endanger yourself or others when attempting to put out a fire. For this reason, when a fire is discovered:

- Assist any person in immediate danger to safety, if it can be accomplished without risk to you. Notify others close by.
- Notify the fire department (or designate someone else to notify them for you).
- Only after having done these two things, if the fire is small, you may attempt to use an extinguisher to put it out.

In order to understand how fire extinguishers work, you first need to know a little bit about fire; four things must be present at the same time in order to produce fire:

- Enough oxygen to sustain combustion,
- Enough heat to raise the material to its ignition temperature,
- Some sort of fuel or combustible material, and
- The chemical, exothermic reaction that is fire.



Essentially, fire extinguishers put out fire by taking away one or more elements of the fire triangle/tetrahedron.

Fire safety, at its most basic, is based upon the principle of keeping fuel sources and ignition sources separate.

Not all fuels are the same, and if you use the wrong type of fire extinguisher on the wrong type of fuel, you can, in fact, make matters worse.

It is therefore very important to understand the five different classifications of fires.

Class A - Wood, paper, cloth, trash, plastics, solid combustible materials that are not metals.

Class B - Flammable liquids: gasoline, oil, grease, acetone, any non-metal in a liquid state, on fire.

Class C - Electrical: energized electrical equipment As long as it's "plugged in," it would be considered a class C fire.

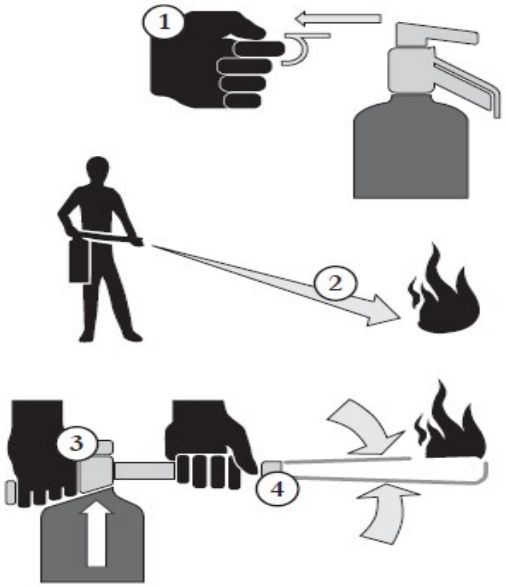
Class D - Metals: potassium, sodium, aluminum, magnesium

Class K – Kitchen: unsaturated cooking oils used in insulated cooking appliances in commercial kitchens.

Note: Typically we only have Classifications A, B, C hazards.

How to use a Fire Extinguisher

Review the manufacturer' instructions for minimum and maximum distances when using an extinguisher (front of the extinguisher). Use the **PASS** method – **P**ull the pin, **A**im the nozzle at the base of the fire, **S**queeze the handle and **S**weep side to side.



1.13 SPILL RESPONSE

When working with products that could cause damage to the environment if a spill were to occur, the first line of defense in the protection of the health and safety of employees, the community, and the environment, must be the prevention of accidental release of contaminants. To this end, QEC has developed and regularly updates operating procedures and trained personnel to properly handle, store and transport hazardous products and chemicals used during operation to minimize or avoid the potential for environmental incidents (e.g., fuel spill).

Always refer to the QEC Spill Contingency Plan and the Site Specific Information Plan for your community.

Spill Response Action Plan

STEP 1 – Shut Off Sources of Spill

Locate and shut off the source of the spill, only if safe to do so.

STEP 2 – Identify Product and Assess Hazards

- Identify the product, review the Safety Data Sheet.
- Secure the spill location, ask people to avoid the area.
- Eliminate all sources of ignition. NO SMOKING
- Allow only spill response and emergency response personnel on site.
- Inform all personnel of hazards and ensure that proper PPE is used.

STEP 3A – Initiate Spill Containment

- Locate the nearest spill response kit.
- Determine the direction the spill is moving and how quickly.
- Determine what is causing the spill to move (wind, gravity, water, etc.).
- Use available staff, equipment and materials (e.g., spill pads, socks, booms) to contain the spill.
- Determine where the spill can be contained with available staff and equipment. Initiate containment.
- Take all necessary steps to prevent the spill from contaminating any potable water sources or waterways.

STEP 3B – Report Spill

- Report the spill to your Supervisor and the Area Production Manager.
- Complete QEC Incident Report and include photographs.

STEP 4 – Clean-up and dispose

- Refer to the QEC Spill Contingency Plan for clean-up and disposal options
- If spilled material is known, consult Safety Data Sheet for clean-up and disposal options.

STEP 5 – Incident Review and Debrief

- Communicate all information regarding spill.
- Review and discuss the spill incident with the response team and the Health, Safety and Environment Department.
- Opportunities for process improvement, equipment maintenance, and / or training will be identified and communicated.

STEP 6 – Close spill file

- Update the QEC Incident Report with any additional information and photos once spill is cleaned up.

- The Health, Safety and Environment Department will prepare a Closing Spill Report.

1.14 INCIDENT REPORTING AND INVESTIGATION

Qulliq Energy Corporation (QEC) is committed to maintaining a workplace in which health and safety is part of everything the Corporation does and is as important as anything we do.

It is a QEC requirement that:

- Incidents that did or could have resulted in injury, damage or loss shall be reported and investigated in a timely manner;
- Anyone required to conduct an Incident Investigation shall receive training on QEC's Incident Investigation Procedure;

- The investigation shall identify root causes and contributing factors;
- The investigation shall determine corrective or preventive actions that shall be identified and implemented in order to prevent recurrence;
- All incidents shall be reviewed by the Joint Occupational Health and Safety Committee; and
- All incidents of a serious nature and work related injuries are reported to the appropriate department within the regulatory body.

Qulliq Energy Corporation recognizes its obligation to ensure that all incidents and injuries are investigated, recorded and reported. The Corporation is committed to identifying corrective and preventative actions and implementing and reviewing them for effectiveness.

REPORTING PROCEDURE

1. Once an incident has occurred, the person involved shall (if possible) take whatever steps are necessary to control the hazard to prevent further incidents/injuries and seek any first aid/medical aid assistance that they need.

2. The employee concerned shall notify their Manager or Supervisor as soon as possible after the event has occurred, keeping in mind the legal reporting requirements to WSCC as well. See table for WSCC Reporting Requirements (Note: visitors and contractors shall be told who to contact if an incident occurs during the induction process).

3. The Manager or Supervisor shall confirm that whatever reasonably practicable steps are necessary to control the hazard in order to prevent further incidents/injuries have been taken. The HSE Department shall be informed once they become aware of any incident that has occurred, to allow appropriate statutory reporting to occur and to enable early intervention and return to work processes to commence.

4. Where appropriate, the Manager or Supervisor shall secure the scene of an incident to ensure accurate information can be obtained for investigation purposes.

5. For immediately reportable work-related injuries or dangerous occurrences (see table for WSCC reporting requirements), the Manager or Supervisor shall ensure that:

a) The site where the injury occurred has not been altered;
b) Plant or equipment connected with the incident has not been reused, repaired or removed; and/or
c) Substances connected with the incident have not been reused or removed.

6. Once the scene has been secured and medical help provided, a QEC Incident Investigation Report must be filled out (form HS13-01) and submitted to the HSE Department and Area Supervisor or Department Manager. Refer to the QEC Safety Rule Book for investigation guidelines (p.41-43).

INCIDENTS INVOLVING CONTRACTORS

If a contractor working on a project for QEC is involved in an incident during the course of the project, the Area Operations Supervisor or Project Manager must be notified immediately and a completed investigation must be sent to the HSE Department within 24 hours, as per section 16A and 16B of the Health and Safety Manual.

INCIDENTS INVOLVING THE PUBLIC

If someone from the public is involved in an incident either on QEC property or with equipment owned by QEC (i.e. vehicle incident) the Supervisor must be notified immediately. A completed investigation must be sent to the HSE Department within 24 hours.

DEFINITIONS

A DANGEROUS OCCURANCE

"Dangerous occurrence" means an occurrence that does not result in, but could have resulted in an accident causing serious bodily injury, such as
(a) structural failure or collapse of
(i) a structure, scaffold, temporary falsework or concrete formwork, or
(ii) a tunnel, caisson, coffer dam, trench, excavated shaft or excavation,
(b) failure of a crane or hoist or the overturning of a crane or powered mobile equipment,
(c) accidental contact with an energized conductor,

(d) bursting of a grinding wheel,
(e) uncontrolled spill or escape of a toxic, corrosive or explosive substance,
(f) premature or accidental detonation of explosives,
(g) failure of an elevated or suspended platform, or
(h) failure of an atmosphere-supplying respirator.

ACCIDENT CAUSING SERIOUS BODILY INJURY

"serious bodily injury" means an accident at a work site that
(a) causes or could reasonably be expected to cause the death of an individual, or
(b) requires an individual to be admitted to a hospital as an in-patient for a period of 24 hours or more

Part 2 the Occupational Health and Safety Regulations states the following:

Accidents Causing Serious Bodily Injury

8. (1) An employer shall, as soon as is reasonably possible, give notice to the Chief Safety Officer of an accident causing serious bodily injury.
   (2) A notice given under subsection (1) must include
      (a) the name of each injured or deceased individual;
      (b) the name of the employer of each injured or deceased worker;
      (c) the date, time and location of the accident;
      (d) the circumstances of the accident;
      (e) the apparent injuries; and
      (f) the name, telephone number and facsimile number of the employer or an individual designated by the employer to be contacted for additional information.
   (3) An employer shall provide a copy of the notice required by subsection (1), without names of the injured or deceased individuals, to the Committee or representative.

Dangerous Occurrences

9. (1) An employer shall, as soon as is reasonably possible, give notice to the Chief Safety Officer of a dangerous occurrence that takes place at a work site, whether or not a worker sustains injury.
   (2) The notice given under subsection (1) must include
      (a) the name of each employer, principal contractor and owner at the work site;
      (b) the date, time and location of the dangerous occurrence;
      (c) the circumstances related to the dangerous occurrence; and

(d) the name, telephone number and facsimile number of the employer or a person designated by the employer to be contacted for additional information.

(3) An employer shall provide a copy of the notice required by subsection (1), without the names of the workers involved, to the Committee or representative.

Workers' Safety and Compensation Commission of the Northwest Territories and Nunavut (WSCC)
REPORTING REQUIREMENTS

Incident Type	**Workers' Compensation Act**	**Safety Act: General Safety Regulations**
Accident causing serious bodily injury or Death	As soon as is reasonably possible complete and submit ***WSCC Claim: Employers Report of Fatal Injury*** form.	An employer shall, as soon as is reasonably possible, give notice to the Chief Safety Officer of an **accident causing serious bodily injury**. 8(1)
Incident Involving Injury	Within 3 days complete and submit ***WSCC Claim: Employers Report of Injury*** form. Worker completes and submits ***WSCC Claim: Workers Report of Injury*** form.	
Dangerous Occurrence		An employer shall, as soon as is reasonably possible, give notice to the Chief Safety Officer of a **dangerous occurrence** that takes place at a work site, whether or not a worker sustains injury. 9(1)

INVESTIGATION PROCEDURE

Step 1: Take Immediate Action – 'Immediate action' may include:

- Calling for help (e.g. fire department, ambulance);
- Providing first aid/medical aid;
- Taking immediate action to prevent further injury or damage;
- Reassuring workers;
- Securing the incident scene until the investigation at the scene is finished; and/or
- Identifying potential information sources (people you can talk to, evidence you can look at).

Step 2: Gather Evidence. Gathering evidence helps you to gain a clear picture of what happens so that action can be taken to prevent similar incidents in the future.

When gathering evidence:

- Identify the final event of the incident (e.g. the accident itself);
- Gather data that fills in the complete picture of what happened from the beginning of the incident and determine what the contributing factors caused the incident to occur; and
- Ensure that the evidence is factual about actions that were seen, heard or done.

Ways to gather evidence:

- Look for clues from the scene of the incident;
- Take pictures;
- Make sketches;
- Take measurements;
- Note environmental conditions, housekeeping, lights, noise, signs, workspace;
- Collect foreign objects or broken pieces of equipment;
- Check procedures; and/or
- Collect information from people (e.g. injured worker, witnesses, supervisor).

Step 3: Put the Evidence in Order. To help you develop a mental picture of what happened, put all the facts that you have gathered together in the order in which they occurred. Make sure that you have enough evidence and no gaps and that the evidence makes sense – each event relates to or interacts with at least one other incident event.

Step 4: Analyze your Information. Analyze your findings and identify why the incidents occurred; the "whys" are the safety problems that must have existed for the incident to occur. Incidents generally occur because of a combination of "direct" and "indirect" causes.

Direct causes are obvious, immediately recognizable problems such as no guarding on machinery or water on the floor. Direct safety issues need to be analyzed to find out why they exist. Indirect causes are "behind the scenes" problems. They deal with such things such as a lack of, or poor policy, procedures, training and supervision.

Step 5: Recommend Corrective Action. Look to see how the risk of similar incidents can be reduced. Use your knowledge of what happened and why and consider how "people" and "things" work together. Based on this information, recommend changes that will improve health and safety in the workplace.

Recommendations may be related to:

- Policy/procedure revision or development;
- Training;
- Equipment repair, maintenance or replacement; and/or
- Supervision.

Recommendations must be:

- Specific for the identified safety problems – fix what doesn't work;
- Effective and sound – fix an existing problem without any new safety problem;
- Practical – they are appropriate, sensible, and likely to be effective;
- Affordable – are within available resources;
- Credible – can be trusted to work; and
- Ranked according to priority. If not all recommendations can be carried out at once, identify which ones are most important.

Step 6: Follow Up on Corrective Action. Follow up your recommendations for corrective action to determine whether they were implemented and if so, whether they were effective. This information will help you when making recommendations on subsequent incident investigations. Without this follow-up, the effort on investigating may be wasted.

Step 7: Write an Incident Investigation Report on QEC form 13-01. Write a report to tell "those who need to know" what happened, why it happened and what can be done to prevent similar incidents. Your report should:

- Be objective;
- Be descriptive (clearly state the sequence of events – who, what, when, where, and how, so a reader with no knowledge of the incident will be able to understand what happened);
- Identify safety problems – why the incident happened;
- Make some recommendations for corrective action;
- State planned follow-up dates; and
- Leave space for follow-up comments.

Step 8: Submit the completed Incident Investigation form to HSE via email allHSE@QEC.NU.CA.

1.15 RETURN TO WORK PROGRAM

Qulliq Energy Corporation (QEC) supports safe practices in the early and safe Return to Work (RTW) of our injured/ill employees through adherence to both legislative and corporate requirements.

QEC will:

- Make every reasonable effort to provide suitable and available employment to every worker who is unable to perform their duties following a work related injury/illness in a timely and safe manner;

- Offer in accordance with the legislative requirements suitable work in returning an injured/ill worker. Only work that is considered to be meaningful and productive shall be considered for use in the RTW program; and

- Meet its obligation to an injured/ill worker by having an authorized representative contact the worker as soon as possible after the injury/illness to jointly work on developing a return to work plan. The return to work plan will be based on the individual needs of each worker and will incorporate all relevant information.

If an employee is unable to return to their pre-injury/illness position as a result of a work related injury/illness, the Corporation will consider alternate options in accordance with the Worker's Compensation Act as well as Human Rights legislation.

All workers will be treated fairly and consistently and are expected to participate and cooperate in the RTW program. All managers/supervisors are expected to understand and value the importance of returning an injured/ill worker to work and must provide assistance where appropriate.

Any personal information received or collected that can lead to the identification of an injured/ill worker will be held in the strictest confidence. Information of a personal nature will be released only if required by law or with the approval of the worker who will specify the nature of the information to be released and to whom it can be released.

The HSE department follows RTW guidelines similar to the one developed by the WSCC to ensure that all injured workers are treated fairly and consistently.

RTW PLANNING

A RTW plan lays out the steps that are to be taken to return an employee to their pre-injury/illness job. In the ideal situation, the plan is developed jointly by the injured/ill Employee, the Employee's Supervisor, the Health and Safety Specialist, the Employee's health care provider (through the provision of restrictions) and the Union Representative (if applicable). Supervisors from other areas, a healthcare provider, or staff from the WSCC can assist in the process when the need arises.

The RTW planning process requires communication, advice and support, access to timely information, and the development, implementation and monitoring of a RTW plan. Any effective planning process sets goals, defines the actions to achieve the goals and develops a schedule to ensure that actions are goals are being met.

- Goals – the goals of the plan are to accommodate the worker so that he/she may perform duties that are as close as possible to their pre-injury/illness job. These goals are measurable, reviewed regularly and are set out as milestones for the worker to achieve until he/she reaches the final goal: a return to pre-injury/illness employment. If there is no goal there is no plan.

- Actions – the actions required to achieve a successful return to work plan includes the responsibilities of the worker, the supervisor or manager, and any co-workers who will be assisting the worker. Communication between all parties is essential.

- Schedule – time frames for achieving goals. It is important that the plan has a beginning and an end, as graduated work is a means to achieve a return to pre-injury/illness work, and is not an end in itself. Regular review of the employee's progress provides a means to measure their progress. A clear definition of what is considered progress (e.g., the employee can work five hours a day by week three, or the worker can assume specific tasks by week five) must be outlined in the plan and updated in the progress reports. Each injury/illness and length of time for medical treatment must be considered when reviewing the progress and receiving updated information. All parties must not lose sight of the end goal: return to pre-injury/illness employment.

RTW PROCEDURE

1. A QEC Employee who sustains a workplace injury shall verbally report the injury to their Supervisor as soon as possible.

2. If medical aid is required, the Employee shall proceed immediately to the closest medical facility and state that s/he was injured at work upon registration into the facility. If it is determined at this appointment that the injury requires work duties/hours to be modified, the Employee is to request a copy of their Current Functional Abilities (CFA) form completed by the medical professional to provide to QEC.

3. The Employee shall provide a copy of the CFA to their Supervisor and the Health and Safety Specialist who shall act as QEC's Return to Work Coordinator.

4. The Health and Safety Specialist shall provide the Employee a copy of the WSCC's Worker's Report of Injury Form and assist with completion if required. At this time the Employee will also be requested to complete or verbally provide information to complete QEC's Incident Investigation Form.

5. The Health and Safety Specialist shall work with the Supervisor to complete the Employer's Report of Injury Form.

6. The completed QEC Incident Investigation Report, WSCC Worker's Report of Injury Form and WSCC Employer's Report of Injury Form, will be submitted to the Health and Safety Specialist as soon as possible but no later than 2 working days after date of injury.

7. The Health and Safety Specialist will submit the completed WSCC Worker's Report of Injury and Employer's Report of Injury Forms to WSCC Nunavut Claims Services Department no later than 3 working days after date of injury. If extra time required to attain forms, the Health and Safety Specialist shall request an extension from the WSCC, otherwise a delayed reporting fine may ensue. The Supervisor and the Employee will also receive copies of the completed forms.

8. The RTW process cannot begin until medical clearance and a CFA is provided by the Employee to the Health and Safety Specialist. If a CFA is not provided by the Employee after the initial appointment the Employee will be requested to immediately attain a CFA from the original medical visit or book an additional medical appointment.

9. For significant injuries that could impact the performance of regular duties the Health & Safety Specialist will provide a Physical Demands Analysis (PDA) of the Pre-Injury duties or a job description for the Employee to provide to the Medical Practitioner at their appointment.

10. The Medical Practitioner reviews the PDA/job description and will complete the CFA which will act as a tool to advise the Supervisor and Health & Safety Specialist as to what duties the Employee is able to perform Post-Injury, and shift-length recommendations.

11. The Health & Safety Specialist begins to develop the RTW Plan with the Supervisor, unique to the Employee, which outlines work restrictions based on the PDA/job description and Medical Practitioner's review.

12. If the Medical Practitioner does not approve the Employee's participation in the RTW Program, the Employee will not return to work until clearance is given. A RTW Letter will be completed by the Health and Safety Specialist which will outline when a follow up meeting to discuss current medical restrictions will occur. Dates will in correlation to the next appointment date as identified on the most recent CFA. This letter shall be reviewed with the Employee and their Supervisor. A copy of this letter will be forwarded by the Health and Safety Specialist to the WSCC.

13. If the Medical Practitioner approves the Employee's participation in the RTW Program, then the Health & Safety Specialist initiates the process of assisting the Employee in returning to their regular duties.

14. The Health and Safety Specialist reviews the CFA, Physical Demands Analysis and job description with the Supervisor to determine whether there are any meaningful duties that can be completed by the Employee within the regular job duties, or within another department, without causing undue hardship to the Employer.

15. The Health & Safety Specialist will advise the Employee that a meeting will be scheduled to discuss the RTW Plan. If the Employee is in a unionized position, the Employee will be instructed they have a right to have union representation.

16. The Health and Safety Specialist will arrange a meeting with the Employee, Union Representation (if desired by the Employee) and their Supervisor to review the RTW Plan with the Employee to ensure they understand the work restrictions stated therein. This is the opportunity where the Employee can also have input on the proposed RTW Plan.

17. The Employee, Union Representative (if applicable) and the Supervisor will sign off on the RTW Plan as either agreed to or declined. If in agreement with the RTW Plan it shall mean agreeing to the terms and conditions as outlined in the letter. If RTW Letter is declined, another meeting will be arranged immediately to whereby the Health and Safety Specialist will request that a WSCC Claims Representative also review the existing plan and recommend any changes in order to meet legal requirements for accommodation.

18. The Health & Safety Specialist forwards a copy of the signed RTW Plan to their Supervisor and the Human Resources Department for the Employee's personnel file.

19. The Health & Safety Specialist and Supervisor monitor the progress of the Employee until clearance has been given for regular duties. Regular meetings will be scheduled as per next medical appointments identified on completed CFA's. Progress check-ins with the Supervisor shall also be required by the Employee.

20. Confidential injury material will be maintained in two locations. A RTW File will be created by the Health and Safety Specialist for HSE access. Additionally, all WSCC forms as well as RTW Letters will be sent to the Human Resources/Payroll Department for placement in the Employee's personnel file.

21. RTW Letters will be sent to the WSCC Nunavut Claims Services Department by the Health and Safety Specialist for insertion into the claim file as they occur.

22. Once the Employee has been cleared for full duties by the medical practitioner, they will return to their pre-injury position in their regular position with no more modifications to duties or hours. A final RTW letter will be created and forwarded to the WSCC and the claim will be closed.

1.16 WORKPLACE VIOLENCE PREVENTION PROGRAM

Qulliq Energy Corporation (QEC) values the health and safety of its employees and expects that its workplaces will be free of workplace violence. The Corporation will not tolerate incidents of workplace violence perpetrated against or by any employee, customer, contractor, member of

the public, visitor or any other person at a Corporation workplace or involved in Corporation business.

For the purposes of this program element, a Corporation workplace includes all places where Corporation business occurs and includes all:

- Corporation buildings (whether owned or leased), transients and surrounding perimeter including parking lots;
- Corporation vehicles;
- Off-site locations where Corporation business occurs; and
- Travel for Corporate business.

Buildings owned or leased for the purpose of providing a primary residence to employees are excluded in the application of this program element. Corporation business is not conducted at an employee's private residence.

Refer to Section 17 of the QEC Health and Safety Manual for more information.

PROCEDURE

1. All incidents of workplace violence or reprisal must be immediately reported to management and the HSE Department.

2. Any person subjected to workplace violence should, where appropriate, go to a safe location at the workplace and report the incident to their supervisor and the HSE Department, so that the incident can be investigated and addressed.

3. All complaints and incidents are to be recorded in writing (QEC Incident Investigation Form HS13-01) by the reporting person/employee, the supervisor receiving the report and the HSE Department. The date, time, location, potential witnesses and nature of the incident must be documented.

4. If the RCMP have not previously been summoned, management or the HSE Department will report all physical assaults to the RCMP. All other incidents or threats of workplace violence will be reported to the RCMP as appropriate.

5. If an incident of workplace violence involves a person who is not an employee of the Corporation but who is involved in business with the Corporation (e.g. contractor employee working on behalf of QEC), Corporation management or the HSE Department will report the incident to that person's employer and/or such other person as the Corporation determines is appropriate in the circumstances.

1.17 RECORDS AND STATISTICS

RECORDS

In order to recognize hazards and monitor the success of QEC's Health & Safety Program reports, records and other performance measures must be maintained and reviewed. Analysis of these reports will provide information regarding what elements of the entire program need attention and improvement, and will assist in the prevention of incidents and injuries. Maintaining records is also an essential component of ensuring that QEC is exercising due diligence.

Below is a list of some of the safety-related documents that are retained for a period of not less than seven (7) years. Many are maintained in the Health, Safety and Environment Management filing system. The appropriate personnel and regulatory agencies must be able to access them.

- First Aid Records (at the first aid locations)
- WSCC Inspection Reports
- WSCC Claim Reports
- Medical Assessments
- Fire Marshall Reports
- Incident Investigation Reports
- Hazard Assessments and Project Management Plans
- Material Safety Data Sheet (at every location)
- Joint Occupational Safety Committee Minutes
- Plant Log Books
- Work Protection Permits and Switching Orders
- Maintenance records (Maintenance Department/Regional Plant Offices)
- Training records (internal and third party)
- New Employee and Contractor Orientations

- Safe Work Practices and Standard Operating Procedures
- Inspection reports (Plants and equipment)
- Safety Audits

1.18 WHMIS

Workplace Hazardous Material Information System program is part of our Health and Safety Program and is in compliance with the WHMIS legislation.

Components of the program are:

- Safety Data Sheet (SDS)
  - Hazardous materials in the workplace shall have a current SDS provided by the supplier. SDS's are available for worker reference on every employee's desktop computer via "QEC MSDS Online" software program.
  - SDS's shall be organized by storage location

- An inventory of hazardous chemicals is prepared and updated as required but not less than yearly. The inventory list contains the following information:
  - Common name chemical name (major components);
  - Suppliers' name and address;
  - Location where used and or stored; and
  - All storage and shipping containers shall be labeled in accordance with WHMIS/TDG regulations.

- Training - All employees shall receive WHIMS training which covers:
  - Symbols and labels;
  - SDS's;
  - Storage and handling; and
  - Emergency response procedures

Training shall be provided to all new employees; retraining shall be conducted every three years. Records of all WHMIS training shall be kept by HSE Department.

	**Exploding bomb** (for explosion or reactivity hazards)		**Flame** (for fire hazards)		**Flame over circle** (for oxidizing hazards)
	**Gas cylinder** (for gases under pressure)		**Corrosion** (for corrosive damage to metals, as well as skin, eyes)		**Skull and Crossbones** (can cause death or toxicity with short exposure to small amounts)
	**Health hazard** (may cause or suspected of causing serious health effects)		**Exclamation mark** (may cause less serious health effects or damage the ozone layer*)		**Environment*** (may cause damage to the aquatic environment)
	**Biohazardous Infectious Materials** (for organisms or toxins that can cause diseases in people or animals)				

Reference: https://www.ccohs.ca/oshanswers/chemicals/whmis_ghs/pictograms.html

1.19 WORKING ALONE

Introduction

The Working Alone program and guidelines are intended to promote employee awareness and facilitate employee safety when they are working alone. The Corporation will ensure that there are safety plans in place for those who work alone. QEC will ensure, by applying all reasonable measures, the protection of all employees and contractors who are performing their duties in areas or under conditions where they are required to be on their own.

Purpose

Qulliq Energy Corporation (QEC) is committed to providing a healthy and safe work environment for its employees and contractors. Our belief is that workplace incidents, illnesses and injuries are unacceptable and preventable.

QEC will establish specific practices and procedures to minimize the risks of injury or violence to staff who, due to the nature of their work, are

required to work alone and may require emergency assistance during the course of working alone.

Scope

This program applies to all employees and contractors who work on QEC premises or those who may be required to work off site in a field capacity. Workers who are required to work alone may require assistance if they are exposed to conditions that may result in a job related injury, health impairment of any kind, victimization through criminal violence, or other adverse conditions.

Under no circumstances is a contractor to be left alone while performing work in a power plant.

DEFINITIONS

High Risk Activities: activities where the potential for the occurrence of incidents or injuries is deemed to be highly likely and where the severity of the injury or incident will bring serious consequences. High risk activities include but are not limited to the following:

- working from heights
- working in confined spaces
- working with electricity
- working with/on hazardous equipment
- working with hazardous substances or materials
- working with material under high pressure
- working where there is a possible threat of violence
- working in isolation from first aid services or immediate/ emergency assistance

Low Risk Activities: Activities where the potential for the occurrence of incidents and injuries is deemed to be highly unlikely and where the severity of an incident or injury is generally thought not to have serious consequences.

Hazard/Risk Assessment: Individually and collectively, supervisors and workers are required to assess the conditions or circumstances under

which an employee may be working alone to determine the risks, the level of risk, and prevention measures required to reduce those identified risks to acceptable levels. A critical part of the risk assessment is the determination of emergency assistance procedures.

Working Alone: A person is considered to be alone when they are on their own, when they cannot be seen or heard by another person or when they cannot expect a visit from another person.

Emergency Assistance: a means of communication to gain assistance in the event of an emergency involving an incident or serious injury, illness, or threat of violence.

After Hours: the period of time when “normal” weekday or shift operations cease.

Field Work: Field work consists of work activities conducted outside QEC property.

RESPONSIBILITES

In order for the Working Alone program, procedures and guidelines to be effective, they will be implemented with reason and diligence. To achieve this, respective responsibilities have been defined to ensure those who can positively impact on the potential risks of working alone are aware of their responsibilities and have the knowledge and skill to effectively implement working alone guidelines.

Supervisor/Plant Superintendents

- Identify risks or hazards associated with the work to be performed or the environment where the work is to be done;
- Conduct and document a risk/hazard assessment for each different (specific) type of work or work location that can be deemed to be a working alone situation. This can also be accomplished by documenting the hazards and control measures of working alone during a tailboard meeting;
- Communicate the results of the risk assessment/tailboard to all affected workers and others conducting similar work;
- Develop effective methods of communication for those who require emergency assistance, depending on the specific work, location of

the work, and nature of the work. (For example: cell phones and radio). When electronic devices are not feasible, an effective contact system must be established (For example: check-in procedures and periodic site visits requiring worker to check in after the completion of specific tasks). The length of time a worker may be out of contact with a supervisor (the frequency of regular communications) must be based on the result from the risk assessment;
- Schedule potentially hazardous work for times when supervisors and appropriate help will be available; and
- Provide adequate staffing (for example: buddy system) for hazardous tasks performed at off-hours or remote locations.

Workers

- Participate in the working alone risk assessment/tailboard and risk management decisions with the supervisor;
- Follow Safe Work Practices and Standard Operating Procedures; and
- Maintain regular communication as directed by supervisors/plant superintendents.

HSE Department

- Monitor applicable legislation to ensure the Working Alone policy is up to date and incorporates any new or revised regulatory requirements;
- Provide consultation to supervisory staff in the development of departmental and site-specific working alone plans;
- Coordinate the development of department and site-specific working alone plans; and
- Audit to determine the effectiveness of the Working Alone Policy and guidelines within the Corporation.

WORKING ALONE GUIDELINES

Working Alone Prohibited

There are certain situations where working alone will not be permitted. Working alone will be prohibited under the following circumstances:

- Confined space entry;
- Working on energized electrical conductor or equipment;

- Power line hazards: Use of a vehicle, crane, or similar equipment near a live power line where it is possible for any part or the equipment or its load to make contact with the live power line;
- View obstruction: A vehicle, crane, mobile equipment, or similar material handling equipment where the operator does not have full view of the intended path of travel;
- The use of fall arrest equipment, scaffolds and ladders;
- Quick-acting, acutely toxic material as described by the Safety Data Sheet;
- Risk of drowning;
- Welding cutting and burning operations where a fire watcher is required; or
- Tasks which, based on the risk assessment conducted by the supervisor in consultation with the employee, are deemed to require more than one person.

Communication

The Working Alone procedure shall include one or more of the following to ensure the most practical and effective means of communication:

- Portable, cell, or satellite telephone;
- Two-way radio;
- Buddy system;
- Periodic check-in system for updating an individual’s status while working alone;
- Initial check-in, either by phone or email, as well as an update as to when the work was completed; or
- Any other method that may be considered most effective to the specific department's safe operations.

Each working alone scenario shall use these communication options, either singularly or in combination in the development of a site-specific working alone communication plan.

Conducting Working Alone Risk Assessments

There are a number of scenarios within the work setting that call for jobs having working alone situations. It is essential that employees and their supervisors work together to develop Standard Operating Procedures. It is mandatory that the working conditions or circumstances that present high

safety risks be assessed and identified on the tailboard meeting form so the probability of incident or injury can be minimized. Supervisors and employees will evaluate working alone assignments on a case-by-case basis and will consider the following risk factors for working alone:

- Tasks and hazards involved in the work to be performed;
- Consequences resulting from a “worst case” scenario. This will be accomplished by asking the question, “What if?”;
- Likelihood for other persons to be in the area;
- Possibility that a critical injury or incident could prevent the employee from calling for help or leaving the workplace;
- Emergency response time;
- Worker’s training and experience;
- Worker’s physical handicaps or any preexisting medical conditions;
- Frequency of job supervision, if at all; and
- The time or shift when the job is to be done.

Supervisors/Plant Superintendents shall identify working alone requirements on the tailboard meeting document for the safety and security of person(s) working alone. Safety plans shall include:

- Identification of the risks or hazards associated with the work to be performed or the environment where the work is to be done;
- Procedures to eliminate or minimize the identified risks (e.g., buddy systems);
- Methods of communication by which the workers can secure emergency assistance and how emergency assistance will be provided in the event of incidents or accidents.
- The length of time a worker may be out of contact with a supervisor (i.e., the frequency of regular communications); and
- Confirmation where and when working alone is permitted.

Supervisors must review tailboards with affected employees with particular emphasis on Safe Work Practices and the provision of assistance to employees at risk due to infrequent supervision, intermittent communication, or physical isolation.

1.20 FITNESS FOR DUTY

Factors such as alcohol or other intoxicants, fatigue, stress and illness can impair an employee's ability to safely perform functions of their job and pose a safety risk to the workplace. Fit for duty means that an employee is physically and mentally fit to perform assigned duties in a safe and efficient manner.

All employees are expected to report to work fit for duty and remain fit for duty while engaged in corporate business, this includes whilst on standby and/or when assisting in an emergency situation.

Qulliq Energy Corporation (QEC) considers an employee unfit for duty if the employee is unable to safety and effectively perform the tasks associated with their position due to injury, illness, fatigue or due to the use of alcohol, drugs (illegal, prescription or otherwise) or other intoxicants.

If an employee has reasonable grounds to believe they or some else are unfit for duty, they should notify their supervisor immediately. The supervisor may contact health and safety and/or human resources dependent on the situation. If necessary, the employee may be sent home for the duration of their work day to protect the safety of all employees at QEC.

Medical Fitness (Non-work Related)

Employees deemed medically unfit for work are expected to notify their supervisor immediately of any restrictions they may have for the workplace. Employees that are provided work restrictions under the guidance of a medical professional, have a duty to disclose those restrictions to the employer.

A functional abilities form is to be completed by the medical professional indicating the impact, the injury or illness will have on the employee's ability to perform their job responsibilities and tasks.

For non-work related illnesses and injuries, employees requiring medical accommodation are to reach out to the human resources department.

1.21 SMOKE FREE WORKPLACE

Qulliq Energy Corporation is dedicated to providing a healthy, comfortable, and productive work environment for our employees.

Our Smoke Free Workplace policy covers the smoking of any product, vaping/e-cigarettes, and the use of smokeless (or spit) tobacco.

Smoking is prohibited within all QEC owned or leased buildings, properties and all company vehicles including rental vehicles used for company business.

- Smoking is prohibited within three meters of all building entrances, windows and ventilation systems.
- Additionally to discourage smoking around doorways, all ashtrays and garbage receptacles will be placed beyond the three meter limit.

Employees, visitors and customers will be informed of this policy through signs posted in buildings and vehicles.

The success of this program will depend on the thoughtfulness, consideration and cooperation of smokers and non-smokers. All of us share in the responsibility for adhering to and enforcing this requirement.

Conforming to the requirement will make our company compliant with Territorial Legislation. Any violations of this requirement will be handled through standard disciplinary procedures.

1.22 FIRST AID

QEC has a legal requirement to ensure that there are first aid services, supplies and plans in place in order to assist any worker that has sustained an injury at the worksite. These requirements can be found in the Nunavut Occupational Health and Safety Regulations.

First aid equipment, supplies and areas must be kept clean and dry, ready for use and readily accessible to any worker that sustains an injury at the worksite. Signs must be posted at all QEC workplaces identifying the location of the first aid kit if it is located in a cabinet or other concealed area. Each QEC vehicle that is utilized on any worksite site must be equipped with a first aid kit and the location of this kit must be discussed

during the tailboard meeting. The vehicular first aid kit must be kept in the interior of the cab to ensure a clean and dry environment for storage.

All first aid attendants will be trained and hold a current standard first aid certificate that must be recertified every three years. A designated first aid attendant must always be available to render first aid should the need arise. The first aid attendant has absolute charge of an injured worker until medical aid is available. A master list of current first aid attendants shall be maintained and posted on the HSE boards.

Once first aid has been provide to an injured worker and it has been determined that the worker requires further medical attention, the first aid attendant shall remain with the injured worker until medical transportation arrives. Under no circumstances is an injured worker to drive themselves to seek medical attention.

First aid records must be maintained for all first aid injuries. They are to be documented in the first aid book that is located inside the first aid kit. More serious injuries must be documented on QEC Incident Investigation Report.

1.23 CUSTOMER CARE

Customer care is a key part of everything we do. This includes internal customers, the people we work with at QEC who require your assistance to get their job done, and external customers who pay for electricity and electrical services QEC provides. How we answer the telephone, respond to emails, greet visitors and co-workers, or discuss our work effects how we are viewed as individuals and as a corporation. Internal customers have a direct impact on the external customer experience, so we should place as much effort on meeting the needs of our internal customers as our external ones.

Here are some useful tips in order to help facilitate a positive customer interaction:

Be Friendly

Customer service starts with a smile. When you are in a face-to-face situation, a warm greeting should be the first thing your customers see and hear when they ask for help. Even when handling customer service requests via telephone, a smile can come through in your voice, so make sure you're ready to be friendly.

Show Respect

Customer service can often involve emotions, so it's important to make sure you are always courteous and respectful. Never let your own emotions overtake your desire to see your customer walk away satisfied.

Listen

Listening is one of the simplest secrets of customer service. During face-to-face encounters, this means hearing what your customers are saying as well as what they are communicating non-verbally. Watch for signs that they are displeased while listening to what they say to you directly.

Be Responsive

There may be nothing worse than non-responsiveness to a customer who is trying to get help, resolve an issue, or find out more about a particular issue. It's important to respond quickly to all inquiries, even if it is only to say you are looking into the issue and will be back in touch. Some response is always better than none so the customer doesn't feel ignored.

Checklist to Bridging the Communication Barrier

1. Be Clear: What is Your Message?

Always start here. Before you speak, take a moment to consider what it is that you really want to communicate. Keep this in mind as you communicate.

2. Know Your Audience

This is a perfect place to consider cultural and situational differences. Who are you speaking to? What is their experience of the subject you’re talking about?

3. Keep It Simple

Avoid an information dump where your intended message gets confused by or lost in a lot of noise or unnecessary facts.

4. Choose Your Method Wisely

Many sensitive subjects are more easily addressed with face-to-face conversations. Some issues can be resolved faster via email or over the phone. Consider the situation before you choose your mode of communication.

5. Select Respectful Wording

Once you do communicate, ensure that how you speak or write is both appropriate and respectful.

6. While we're on it, Select Clear Wording

Are you explaining this in the most easy-to-absorb wording? Are you avoiding unnecessary jargon?

7. Edit, Edit, Edit…

This applies to written and verbal communication, although it's easier to do with written communication. Think about what you say before you say it and ask yourself if there's a better way to explain things, or respond to a comment.

8. Pause for Feedback

Don't assume anything – just because something is clear to you, it does not mean it will be for everyone. Leave room and an opportunity for questions.

9. Actually Listen to the Feedback!

Yes, active listening comes up time and time again as a key communication skill. So often we almost switch off when others speak. Stay engaged, listen attentively and ask questions. Repeat what others say to determine you have understood correctly.

10. Switch on your Receptiveness

You may find that a better solution or insight comes from the feedback you hear. Leave room to stray from your own agenda and be receptive to new ideas and perspectives.

11. Diffuse Your Emotional Charge

If things get heated, or you meet with criticism or objections, resist a knee-jerk emotional reaction. You'll achieve more by remaining calm, listening attentively to the objections, and working to resolve these obstacles.

12. Be Confident

Understand what you are talking about, and then trust your own ability to stand behind what you say. If you don't know the answer, admit you don't know and offer to find the information and get back to the person.

Dealing with Difficult Customers

In your dealing with customers, you can expect to encounter challenges at times. You will meet stubborn individuals who are tough to deal with. Some will appear unreasonable and, in all fairness, some will be unreasonable. Do not underestimate the people you meet. Appearance can sometimes be deceiving.

Learning how to deal with difficult customers is a lifelong skill, regardless of which part of the organization you are working for. Here are some guiding principles for dealing effectively with people.

Mindset Adjustment

Whenever you are facing a difficult customer, try to put yourself in their shoes. Attempt to understand their abrupt behaviour and language used. Try not to feel offended by their complaints as the source of their behaviour most likely is not coming from your personally. Imagine yourself facing the same problem as your customer; you may feel like responding the same way.

Listen Actively

Listening is not merely about hearing what is being said. It is about absorbing and interpreting your customer's message and trying to find out the main source of their concern, complaint, or anger. Whenever you hear some negative comments made, do not take them too personally because they are said in a temporary fit.

Let Them Speak

When it comes to complaints, the customer may have several complaints they wish to file. Instead of stopping them to listen to your explanation, let them talk. Remember that it is more about them than it about you or QEC. Do not argue with the customer. Arguments never get you anywhere except into trouble.

Follow through on your Promises

If you promise a customer that you will follow-up with them, let them know what to expect from you and approximately by when you will contact them. Whether in-person, by telephone or via email, follow through on your promise. If you promise to follow-up with a customer and then don't, it will only make things worse. Even though the person may not be happy with you at the present moment, you still have a chance of fixing the relationship in the future.

Zero Tolerance

It is important to note that QEC has ZERO TOLERANCE FOR VIOLENCE. This includes profanity, verbal threats, aggression, and physical assault. Anytime you have such a confrontation with a customer, report it to your supervisor immediately. Call the police if you are threatened with violence. The procedure for reporting and investigating incidents and threats of workplace violence are detailed in the *Workplace Violence Prevention Program*, Section 17 of the QEC Health and Safety Manual.

Refer to *SOP-020 Workplace Violence* for procedures on how to appropriately handle workplace violence related issues such as dealing with an abusive telephone call, ending a negative interaction, reacting to a physical altercation, and checking in when either working remotely or working alone.

Dealing with Aggressive Dogs

A recurring hazard for employees who perform meter reads or meter disconnects are aggressive dogs. Employees and their Regional Supervisor are to take the following steps when dealing with a dog situation:

Employee

If you are impeded in completing your job task by a dog:

- When the owner is present or available, courteously request them to restrain the dog when the work is to be done.
- If it is impractical to attempt to contact the owner, or if the owner is contacted and the dog remains unrestrained, make no further attempt to carry on with the work.
- For a meter read, complete a *Notification of missed meter read card* and hang on the doorknob of the main residence entrance. Record a reasonable estimate for the energy usage.
- Report the incident to your Regional Supervisor, including the owners' name, address, any actions you have taken, and whether the dog owner was cooperative or not on the initial encounter. All incidents are to be reported to the Regional Supervisor, and an incident report form is to be filled out.
- All Meter Readers shall carry a dog deterrent device (i.e. dog dazer) in the event of an unsuspected dog encounter. Refer to *SOP-024 Dog Dazer* to learn how and when to use the device to deter unknown or loose dogs.
- In the event of an actual dog attack and injury, regardless how minor the bite may be, you must have it attended to immediately at the health center in the community. Rabies is a common concern in Nunavut, and this potential risk must be addressed right away.

Regional Supervisor

When an employee reports that a dog is impeding or preventing work to be performed, you are to:

- Ensure the full particulars of the incident are recorded in an incident report form; and
- Notify the Customer Relations office in your region, who will send out a letter to the customer.

1.24 TRAVEL

Various modes of transportation are used to enable us to perform our jobs, including travel on foot, all-terrain vehicles (ATVs), snowmobiles, cars, trucks, and small aircraft/planes. Speak to your supervisor about safe work practices for different modes of transportation.

Vehicle Use

Before driving a QEC vehicle you must have a valid driver's license. Follow these good driving tips:

- Complete a documented pre-use inspection of the vehicle. *Refer to SWP-024 Daily Light Vehicle Pre-use Inspection*. Report any defects identified to your supervisor.
- Park so that you can drive away without backing up (pull through parking spots are best)
- Back-in parking is mandatory at all QEC facilities when possible
- Park in non-congested areas
- Wear your seatbelt
- Be aware of your surroundings
- Do not use your cell phone while driving
- Monitor weather/road conditions
- Watch for traffic (cars, trucks, snowmobiles, ATVs, pedestrians)
- Ensure that all vehicle passengers are seated and wear their seatbelts at all times

Vehicle Incidents

If you are driving a QEC vehicle and are involved in a vehicle incident, take the following steps:

- Stay calm
- If the vehicles are driveable and it is safe to do so, move them safely out of traffic
- Administer first aid
- Contact the police or municipal enforcement (depending on your community)
- If necessary, call for an ambulance or transportation for injured persons
- Complete the *Glove Box Accident Report Form*
- Contact your supervisor to let them know what happened
- Contact the insurance claims reporting line with the details of the incident

You will also be required to complete a *QEC Incident Investigation Form* (HS 13-01) within 24 hours and submit it to your supervisor. They will review and forward it to the HSE Dept.

Travel on Foot

Uneven ground covered in ice or snow can be challenging to walk on, requiring you to use caution and be aware of your surroundings. Use ice cleats in addition to appropriate winter footwear in icy conditions. Speak to your Supervisor to obtain a pair of ice cleats if your job duties require you to work outside.

All-Terrain Vehicles (ATVs)/Snowmobiles

ATVs/snowmobiles are designed to meet the challenge of travelling on rough or uneven ground/snow. The appropriate safety gear should always be worn including a helmet, gloves, goggles and sturdy boots. Never exceed the capacity of the manufacturer's recommendations for passengers. Drivers should be cognizant of other vehicles and pedestrians especially when entering onto roadways. Refer to *SWP-030 ATV and Snowmobile Safety* for requirements of using such vehicles for work related purposes.

Air Travel

Travel between communities in Nunavut requires planning to ensure that you arrive where you want to and when you need to. If you are traveling on regular scheduled commercial flights, you will need to make sure you have completed the required *Travel Request* prior to your departure.

Baggage

If you are traveling with tools or additional baggage, contact the airline to make sure they will be able to accommodate. Bags are not to exceed 50lbs, and having more than two bags will result in additional fees.

If you are carrying "Dangerous Goods" with you, it will need to be packaged and labelled correctly with the proper documentation.

Contact the Plant Superintendent of the community where you are traveling to arrange for pick-up at the airport. Also ask if you may need to bring additional required supplies.

Communication

When traveling, stay in touch with your supervisor so they are aware of any delays or changes in your travel plans. You should touch base with your supervisor daily while on duty travel.

Your supervisor or his/her relief is your contact in an emergency. It is best practice to make your itinerary and contact information available to your supervisor before leaving for duty travel.

1.25 ARC FLASH PROGRAM

PURPOSE

Qulliq Energy Corporation (QEC) is committed to establishing and maintaining an Arc Flash Program to protect workers from arc flash hazards while working on or near electrical apparatus. The purpose of this program element is to provide a framework for the management of arc flash hazards at QEC.

SCOPE

This program element applies to all employees and contractors working on or near electrical apparatus where the potential for an arc flash hazard exists. This program supports and augments Section 5 of the QEC Health and Safety Manual – *Personal Protective Equipment*.

DEFINITIONS

Apparatus: Equipment pertaining to the generation, distribution, and use of electrical energy (e.g., lines, transformers, breakers, motors).

Approach Boundaries (Shock Protection Boundaries): Defined zones surrounding exposed live electrical apparatus where shock hazard exists (Limited Approach Boundary and Restricted Approach Boundary).

Arc Flash: An unexpected and sudden release of heat and light energy produced by electricity travelling through air. It is caused by an electrical fault. The health hazards associated with arc flash relate to the energies that are expelled from the arc flash and the impact on the worker's body. These include:

i. Light: Light radiation is intense and can cause damage to unprotected eyes and skin.
ii. Heat energy: The temperature of an arc may exceed 15,000°C (four times the temperature of the Sun's surface). These high temperatures cause rapid heating of surrounding air.

iii. Fire: The high temperatures of the arc flash and the projectile molten metals can quickly ignite any flammable materials within striking distance. While these fires may cause extensive property damage and loss of production, the hazards to personnel are even greater.

iv. Toxic fumes: The vaporizing of metal and other materials releases toxic gases into the air.

v. Noise: The arc blast produces a very loud noise, sometimes exceeding 160 decibels, capable of damaging hearing.

vi. Flying debris: Material and molten metal are expelled away from the arc at speeds exceeding 313 m/sec - 1027 ft/sec. The molten metal will often ignite any flammable materials it reaches.

Arc Flash Boundary: An approach limit at a distance from exposed live parts within which a person could receive a second degree burn if an electrical arc flash were to occur.

Arc Flash Suit: A complete Category 4 flame resistant clothing and equipment system that covers the entire body, except for the hands and feet. This personal protective equipment (PPE) includes pants, jacket, and beekeeper-style hood fitted with a face shield.

Arc Flash Hazard: A dangerous condition associated with the potential release of an electric arc.

Arc Rating: The maximum incident energy resistance demonstrated by a material (or layered system of materials) prior to break open or at the onset of a second-degree skin burn. The arc rating is expressed in calories/cm^2.

ATPV: The arc thermal performance value (ATPV) indicated on the PPE label is the maximum incident energy in calories per square centimeter (cal/cm^2) the clothing is rated to withstand.

Calorie: A unit of heat energy required to raise one gram of water one degree Celsius at one atmosphere. The onset of second-degree burns occurs at 1.2 calories per centimeter squared (1.2 cal/cm^2).

Calories per Centimeter Squared (cal/cm^2): The amount of energy at a particular distance from an arc flash.

Flame Resistant (FR): 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.

Flame Retardant: A compound(s) added to manufactured material to inhibit, suppress, or delay the production of flames to prevent the spread of fire (i.e., to make it flame resistant).

Isolated: Physically disconnected or interrupted from all sources of dynamic energy with controls in place to prevent the change of position of the isolating devices (i.e., lock-out/tag-out).

Limited Approach Boundary: The distance from an exposed live electrical apparatus where a shock hazard exists.

- This is the minimum distance from the energized item where unqualified persons may safely stand.
- In order to cross the Limited Approach Boundary, workers shall be qualified to perform the required work and shall wear the appropriate personal protective equipment (PPE).
- The Limited Approach Boundary shall not be crossed by unqualified persons unless escorted by a Qualified Worker and wearing the appropriate PPE.

Qualified Worker: A worker with the training, knowledge, experience, and recognized certification to perform specific work

Restricted Approach Boundary: The distance from an exposed live electrical apparatus where an increased risk of shock exists due to the potential for inadvertent movement to result in electrical over-arc.

- The Restricted Approach Boundary shall only be crossed by Qualified Workers with the appropriate PPE, training on the work to be performed, and a written work plan that includes shock-protection techniques and equipment.

RESPONSIBILITES

QEC is responsible to:

- Ensure a process is in place to develop and implement the Arc Flash Program.
- Ensure the resources, time, money, and technology are available to support the Arc Flash Program.
- Ensure the performance and compliance of management and workers is measured relative to the Arc Flash Program.
- Ensure training is provided to workers on the Arc Flash Program.

Management is responsible to:

- Ensure development, implementation, communication, and use of the Arc Flash Program based on legislation, manufacturer recommendations, applicable industry standards including CAN-ULC S801 (Electric Utility Workplace Electrical Safety for Generation, Transmission and Distribution), NFPA 70E (Electrical Safety in the Workplace), CSA Z462 (Electrical Workplace Safety), IEEE 1548-2018 Guide for Arc-Flash Hazard Calculations, and industry best practice.
- Ensure that appropriate procedures, guidelines, and rules are developed and communicated for all work that could involve arc flash hazards.
- Ensure that all workers are appropriately trained.
- Ensure that authorized competent and/or Qualified Workers carry out all electrical work according to applicable standards, procedures, guidelines, and rules.
- Ensure workers are provided with appropriate tools, equipment, and special protective devices as may be required. This would include, where practicable, breaker racking tool extensions and remote racking devices.
- Ensure workers are provided with the appropriate arc rated (AR) PPE for the work being performed. Refer to *QEC Health and Safety Manual, Section 5 - PPE*.
- Take corrective action and use performance management to ensure compliance with standards, procedures, guidelines, rules, and practices.
- Measure the performance and compliance of workers relative to the Arc Flash Program.

Engineering Department is responsible to:

- Have appropriate arc flash surveys conducted in accordance with IEEE 1548-2018 Guide for Arc-Flash Hazard Calculations.
- Ensure an accurate inventory of all apparatus/equipment is created and maintained.
- Ensure an arc flash survey is completed any time there are changes to the electrical system that impact the arc flash energy level.
- Ensure appropriate labelling specifying approach boundaries, arc flash boundaries, and the category of arc rated PPE required is suitably applied to all apparatus to warn against possible arc flash hazards.

Health, Safety and Environment (HSE) Department is responsible to:

- Facilitate risk assessments in conjunction with competent workers on the application and requirements of the Arc Flash Program.
- Provide advice and assistance in the continued development and implementation of procedures relevant to the Arc Flash Program.
- Provide interpretation of generalized work processes, industry best practice, manufacturer recommendations, and legislation for the Arc Flash Program.
- Monitor applicable legislation related to the Arc Flash Program.
- Share information regarding arc rated PPE required to be worn by workers. Ensure adequate AR PPE is available at all power plants for work being performed.
- Assist with training workers in the Arc Flash Program as required.

Workers are responsible to:

- Participate in training pertaining to the Arc Flash Program.
- Comply with the Arc Flash Program.
- Use and care for arc rated PPE in accordance with training, manufacturers' specifications, and the QEC Arc Flash Program.

ARC FLASH SURVEYS

Arc Flash Surveys are engineering studies that determine the arc flash hazards associated with each apparatus. The studies take into account such aspects as the voltage present, the potential fault current, the time required for the circuit to be interrupted by the fuse or circuit breaker protection, and the type of apparatus associated with the flash or arc.

The QEC Engineering Department shall conduct appropriate arc flash surveys at all QEC locations in accordance with **IEEE 1548-2018 Guide for Arc-Flash Hazard Calculations.**

An Arc Flash Survey shall be completed for each power plant. The survey will identify arc flash hazards and the associated arc flash information including procedures for mitigating exposure to arc flash. Survey forms shall be kept at each location and maintained up-to-date.

Arc flash surveys shall specify, for each identified apparatus:

- Date of survey
- Apparatus identification, location, and description
- Nominal Voltage

- Equipment Voltage
- Arc flash incident energy in cal/cm^2
- Arc Flash Boundary
- Limited Approach Boundary
- Restricted Approach Boundary, and
- Required category of arc flash PPE.

LABELLING

Arc flash labels shall be applied to all apparatus where potential arc flash hazards exist.

Labels shall contain the following information, as identified in the arc flash surveys:

- Apparatus identification
- Arc flash – nominal system voltage
- Arc flash – working distance (metric and imperial)
- Arc flash – incident energy in cal/cm^2
- Arc flash – arc flash boundary (metric and imperial)
- Shock – voltage hazard when cover is removed
- Shock – limited approach boundary (metric and imperial)
- Shock – restricted approach boundary (metric and imperial)
- Shock – glove class
- Arc flash PPE – specify PPE requirements based on incident energy level
- Name of company that conducted the arc flash survey
- Date of survey

Labels shall be made of a durable material (e.g., vinyl).

Label size shall be suited to the label location to ensure visibility.

Labels shall be located in an unobstructed and readily visible location on the apparatus or near the access point to the apparatus.

Only one label is required per apparatus, even if it has multiple access points.

Signage shall be applied to the doors of buildings that contain arc flash hazards.

Signs shall indicate that arc flash hazards are present and to refer to the specific arc flash labels before conducting work on specific apparatus.

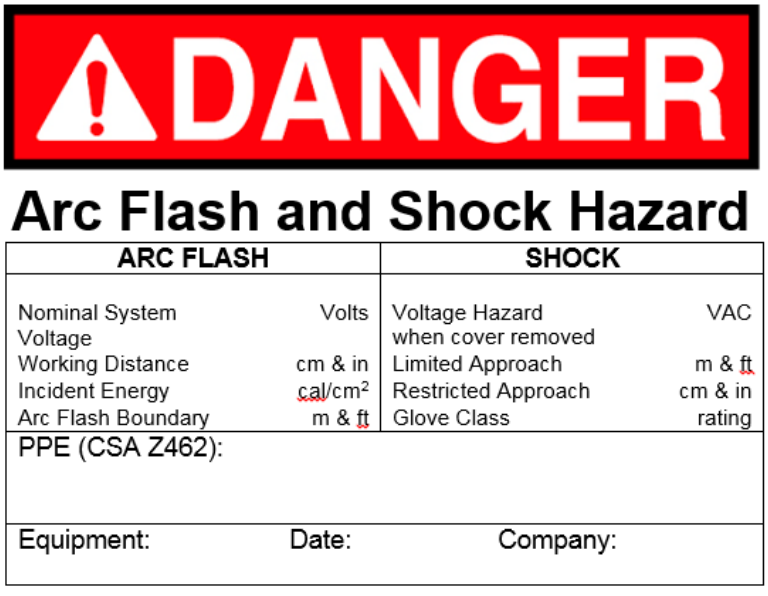
Dirty labels shall be cleaned immediately.

Damaged labels shall be replaced as soon as feasible.

Arc flash labels conform to ANSI Z535.4-2011 Product Safety Signs and Labels standard with the following information:

- The safety alert symbol (safety white triangle, red exclamation mark, safety red background) followed by the word “Danger” in white letters on a safety red background. The white lettering shall be twice the height of the message letters.
- Danger – Indicates a hazardous situation which, if not controlled or avoided, **will** result in death or serious injury.
- Warns of potential arc flash and shock hazard.
- Contains information as detailed in Section 19.5.2.
- Arc flash labels are to be available in all four territorial languages. Bilingual labels are permissible if they follow the recommended ANSI Z535.4-2011 format.
- Minimum label size is to be 4 inches by 4 inches (10.2 cm x 10.2 cm).

Example: QEC Arc Flash Label Layout



IMPLEMENTATION

Refer to HS 19-01 *Arc Flash Operator Awareness*, HS 19-02 *When Arc Flash PPE is Required*, HS 19-03 *Category 2 Arc Flash Requirements*, and HS 19-04 *Category 4 Arc Flash Requirements* for more information on arc flash (e.g., hazards, work methods, procedures, PPE).

Methods of isolation shall be used to mitigate arc flash hazards as per *the QEC Utility Work Protection Code*.

Communication and Training

- Any new arc flash hazard controls shall be communicated to all affected workers along with the reasons for the changes.
- Training needs relating to any arc flash hazard control changes shall be identified and the training shall be provided to affected workers as soon as practicable.
- Refer to *the QEC Health and Safety Manual, Section 7 – Training and Communication.*

Supervision and Review

- Once the training has been completed, managers shall check that the new arc flash hazard control measures are being implemented as required.
- Checks and reviews shall be more frequent immediately after the control measure has been introduced, with a reduction in frequency once satisfied the control measure is being implemented as planned.

MONITORING

Worksite Visits shall be conducted to review work processes and the application of the Arc Flash Program as per *QEC Health & Safety Manual, Section 9 - Workplace Inspections*.

The Arc Flash Program shall be reviewed a minimum of once every 3 years and revised as required.

- The Arc Flash Program may require review and revision prior to the allocated review date depending on changes to legislation, changes to applicable standards, review of procedures following incidents, or to ensure continuous improvement.
- Version tracking must be included on all documentation where changes are required.
- Minor changes may be made at any time and are not considered revisions.

An arc flash survey shall be completed any time there are changes to the electrical system that impact the arc flash energy level.

TRAINING

Arc Flash Program training shall be provided to workers according to their exposure and work capacity:

- All electrical workers shall receive general training in understanding arc flash.
- Workers exposed to arc flash hazards shall be trained in the Arc Flash Program a minimum of once every 3 years, or more often as required.

1.26 FALL PREVENTION

PURPOSE

To inform employees and contractors of the requirements and responsibilities when working at heights.

RESPONSIBILITES

Supervisors shall:

- Ensure that workers at a permanent work site are protected from falling by a guardrail or similar barrier if a worker could fall a vertical distance of between 1.2m / 4 feet and 3m / 10 feet, or that a travel restraint system or control zone is available and utilized.
- Ensure workers have received fall protection training prior to performing any work that requires fall protection
- Ensure a *Tailboard* risk assessment is completed for any work at a height over 3m / 10 feet to help determine what controls are required to prevent an incident
- Ensure a *Fall Protection Plan* is completed before work at height begins where guardrails or sufficient barriers are not present, and that a copy of the plan is kept at the worksite
- Relay potential and actual hazards associated with the work to be performed to the workers
- Apply and enforce the QEC *Fall Protection Code of Practice* for all affected personnel in the workplace
- Ensure that workers using a personal fall arrest system are using the appropriate equipment in the correct manner
- Provide QEC employees with fall protection equipment as required

Employees shall:

- Comply with the *Fall Protection Code of Practice*
- Participate is a tailboard risk assessment and a *Fall Protection Plan* before work at height begins
- Use the fall protection equipment required in the correct manner
- Inspect, maintain and store the fall protection equipment as required
- Notify their Supervisor of any questions or concerns with fall hazards or associated personal fall arrest system equipment

Contractors shall:

- Provide proof of fall protection training prior to performing any work that requires fall protection
- Provide a written *Fall Protection Plan* to their QEC contact person prior to the commencement of work
- Provide their own fall protection equipment in good working condition
- Use personal fall arrest system equipment required in the correct manner
- Inspect, maintain and store the fall protection equipment as required
- Notify their Supervisor of any questions or concerns with fall hazards or associated personal fall arrest system equipment

Training

QEC shall ensure that employees are trained in the safe use of a personal fall arrest system before workers are required or permitted to work at heights. Such training will include:

- Categories of falls
- Control measures
- Floors and openings
- Fixed barriers and guardrails
- Surface openings
- Harnesses / lifelines / lanyards / anchorage
- Specifications of a Fall Arrest System
- Horizontal and slope roof Fall Arrest System
- Retractable lifeline/lanyard Fall Arrest System
- Connection devices and tie-off points
- Inspection and maintenance
- Rescue Training Requirements

Guardrail Systems and Covers

A guardrail system or protective covering shall be used to prevent a worker from falling through an opening on a work surface.

A protective covering must:

- Completely cover the opening
- Be securely fastened
- Be adequately identified with a warning sign as covering an opening
- Be covered with a securely installed covering that is capable of supporting a distributed load of 360 kg/m²

A guardrail shall be used if a worker has access to the perimeter of an open side of a floor (including balcony and mezzanine), surface of a roof, a scaffold platform or other work platform, or ramp and is exposed to fall from a vertical distance between 1.2m / 4 feet and 3m / 10 feet. Otherwise, a travel restraint system is to be provided.

Personal Fall Arrest System

A worker must wear fall arrest equipment if they are:

- Working at heights of 3m / 10 feet or more above floor level;
- Over a pit, shaft, or operating machinery;
- Where a fall could result in drowning; or
- Where it is impracticable to provide adequate work platforms or guarding.

There are three key components of a Personal Fall Arrest System (PFAS). Individually, these components will not provide protection from a fall. Used properly and in conjunction with each other, they form a PFAS, which becomes vitally important to safety on the job. Only those trained to wear a PFAS and in the maintenance and inspection of the equipment are allowed to work at heights greater than 3m / 10 feet.

Equipment Components

Full-Body Harnesses: designed to distribute fall forces throughout the body, substantially reducing the chance of injury. In addition, the full-body harness keeps the worker suspended upright in the event of a fall and supported while awaiting rescue.

The Canadian Standards Association (CSA) regulates the classifications for full body harnesses. A harness can have more than one classification, however, all full body harnesses must meet the *requirements for class A Fall Arrest.*

Class A Fall Arrest

Class A harnesses are designed to protect workers when they are six feet or more above the ground. They support the body during and after a fall. Dorsal (back) D-rings are used for fall protection. They slide on impact, keeping the worker in an upright position.

Class AD Suspension and Controlled Descent

Class AD harnesses are used to support and hold a worker while being raised and lowered. There is one sternal (front) D-ring and one dorsal (back) D-ring. The sternal D-ring is used for attachment to a descent device.

Class AE Limited Access

Class AE harnesses are designed to raise or lower a worker through a confined area. Shoulder D-rings serve as anchorage points for attaching an extraction yoke or other rescue device. The D-rings slide on the shoulder strap for optimal positioning of the worker.


Class AL Ladder Climbing

Class AL harnesses are designed for use with a certified fall arrester that travels on a vertical lifeline or a rail. Sternal (front) D-rings are used for attachment to the vertical system.


Class AP Work Positioning

Class AP harnesses will hold and sustain a worker at a specific location, allowing full use of the hands, while limiting any free fall to two feet or less. Side D-rings at waist level are used for positioning and restraint. **Linemen's Body Belts** are classified as work positioning equipment with load bearing attachment points reinforced with manmade materials.

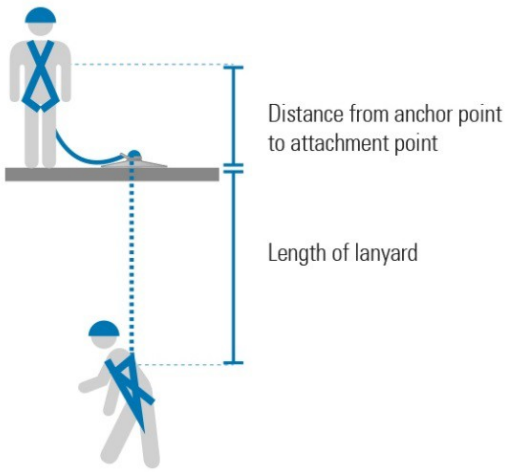
CSA Standards no longer permits the use of leather for load bearing components due to variances in strength and deterioration due to rot.

Lanyards and Lifelines: may be a shock-absorbing lanyard, tie-off (Y) lanyard, retractable lanyards, positioning (restraint) lanyards, rope grab and vertical lifeline, or similar device used to connect the harness to the anchorage/anchorage connector.

- Shock absorbing lanyards are used when working at a height of more than 10 feet above the ground. The unique feature of a shock absorbing lanyard is that it has a built-in woven inner core that expands during the fall to ensure that the fall arrest force is significantly reduced.
- Y lanyards are designed with two legs so that the worker can navigate obstacles and be tied-off 100% of the time.
- Retractable lanyards are designed to arrest free falls within inches. The best place to use a self-retracting lanyard is overhead.
- Positioning lanyards are designed without shock absorbers, making them ideal for positioning or restraint applications.

- Lifelines are used to protect workers operating in the horizontal plane who may not have continuous access to suitable anchorage points. They are to be used with rope grabs, which utilize a cam lever, as well as a friction sensitive brake, to lock the rope grab onto the lifeline in case of a fall. Lifelines can either be wire cable or synthetic fibre rope.

The Personal Fall Arrest System (PFAS) devices are to be selected based on the work to be performed and the work environment. It is critical to consider potential fall distance when determining the type of device to be used. A personal fall arrest system must be arranged so that a worker cannot hit the ground, an object which poses an unusual possibility of injury, or a level below the work area.



Lanyards and lifelines should not have any splices or knots, and should never be wrapped around sharp objects. Knots can reduce the strength of a lanyard by up to 50%.

Only those trained to wear a PFAS and in the maintenance and inspection of the equipment are allowed to work at heights greater than 3m / 10 feet.

Anchorage Connectors: used to attach to an I-beam, column, rebar, scaffolding, or other structural member being used as an anchor. An anchorage connector, such as a cross arm strap, is used to join the connecting device to the anchorage when a direct connection does not exist. It is important to select the proper anchorage/anchorage connector for ultimate safety. Anchorages and anchorage connectors must be easily accessible, capable of applying a peak fall arrest force not exceeding 8 kN to a worker, and if a fall occurs will prevent a worker from contacting the ground or a lower level.

A temporary anchor point used in a travel restraint system must have an ultimate load capacity of not less than 8.75 kN per worker attached. A permanent anchor point must an ultimate load capacity of not less than 22.5 kN per worker attached. Anchor points must be installed and used according to the manufacturer's specifications.

Connectors includes both snaphooks and rings which are used to attach the lanyard to the anchor and the harness. Snaphooks must be self-locking, meaning that they will automatically lock shut after they have been hooked. They can only be manually unlocked in order to be released.

Unless the snaphook is designed for the following uses, do not attach them:

- Directly to the harness webbing, lanyard, or a rope
- To another snaphook
- To a D-Ring that has another snaphook or connector attached to it
- To horizontal lifelines
- To an object that is non-compatible in shape or dimension, as it may depress the snaphook keeper

Note: After a fall occurs, all components of the fall arrest system must be removed from service immediately and an incident report must be completed.

Inspection of Equipment

Protective equipment shall be maintained in a safe and reliable condition.

- Fall protection equipment must be inspected prior to each use and before storage in order to ensure it is safe for use. Any defects shall be reported immediately to the supervisor and HSE Dept.
- Fall protection equipment shall be removed from service upon evidence of defects, damage or deterioration
- Annual inspection by a competent worker shall be completed and documented. Any deficiency should be reported immediately to the supervisor and the HSE Department.
- While the life of fall protection equipment is totally dependent on the condition of the item, items older than 10 years old shall be replaced.

Care of Equipment

Proper storage of equipment after each use is important to ensure the reliability of the equipment.

- Storage area should be clean, dry and free of exposure to fumes or corrosive elements

- Equipment must be kept clean of all dirt, corrosives and other contaminants.
- For nylon or polyester, remove all surface dirt using a solution of water/soap on a damp sponge.

Control Zone

Where practicable, if a worker could fall from a level surface at a worksite, QEC can ensure that the worker is protected from falling by the use of a control zone that is not less that 2m / 6 feet wide when measured from the unguarded edge of a working surface. A level surface, such as a roof or floor, should have no slope for this option to be considered.

Fall Protection Plan

A written fall protection plan must be completed if a worker could fall 3m / 10 feet or more and workers are not protected by a guardrail or similar barrier. The fall protection plan must describe the fall hazards at the work site, the fall protection system to be used at the work site, and the rescue procedures to be used if a worker falls or is left suspended by a personal fall arrest system and needs to be rescued.

A copy of the fall protection plan readily available to workers before work begins. Workers will review the fall protection plan and be trained in the safe use of the fall protection system before work begins at a work site where a fall protection system is used.

QEC has its own *Fall Prevention and Rescue Plan* that should be utilized by QEC workers. Contractors may use the *WSCC Written Fall Protection Plan template* or equivalent template to develop their own plan.
Basic means of rescue may include:

- Having access to a manlift or scissor-lift at the work site that is capable of reaching a suspended worker as well as someone able to competently operate the equipment
- Having ladders on-site that are capable of reaching a suspended worker
- Equipping workers in certain situations with self-rescue devices such as specialized descenders that allow the suspended worker to remove themselves from their lanyard and descend to safe ground using one of these devices

QULLIQ ENERGY CORPORATION FALL PREVENTION AND RESCUE PLAN		
Form HS 5-02	**Revision 1**	**Rev Date: May 29, 2017**

Department	Community	Area

Date		
Supervisor	**Print:**	**Sign:**

DETAILS OF WORK AND FALL HAZARDS
_____ _____ _____ _____ _____ _____

TYPE OF FALL PREVENTION THAT WILL BE USED		
□ Fall Restraint	□ Fall Arrest	□ Control Zone

PPE HAS BEEN INSPECTED		BY WHOM	
Harness #	**Lanyard ID #**	**Print Name**	**Sign**
Comments:			

RESCUE EQUIPMENT Description

RESCUE PROCEDURE
_____ _____ _____ _____ _____ _____ _____

Worker Sign-off: I acknowledge that I have reviewed the fall protection requirements and procedures for this site with my supervisor and understand my responsibilities, specifically the requirement to use personal fall protection.

PRINT	SIGN

THIS PLAN MUST BE MADE AVAILABLE AT THE WORKSITE

SECTION II WORK PROTECTION CODE

2.1 UTILITY WORK PROTECTION CODE

The Utility Work Protection Code (WPC) is a set of principles, definitions, rules and procedures which are designed to provide a safe workplace.

The WPC is to be applied in all work situations where devices (i.e. switches to turn off power or valves to drain tanks, etc.) are placed in a position that provides safe working conditions.

By using the procedures and safe work practices outlined in the WPC, workers can ensure that:

- All sources of energy are isolated and/or grounded; and
- Equipment is de-energized.

The WPC does not eliminate all job hazards. It is only one part of a safe work practice. The objective of the WPC is to establish conditions which, when combined with appropriate work practices, procedures and work methods will provide employees with safe working conditions.

All WPC documentation shall be kept on site for a minimum of three years.

To fully understand how the WPC works you must understand the definitions of the WPC.

2.2 DEFINITIONS

Alive – An object is alive when it can deliver energy. It can deliver energy when it is dynamically alive or charged.

> **Dynamically alive –** A dynamically alive object is connected to a source of energy (it is not isolated). Examples of energy sources are: an electrical generator, a storage battery, an oil or water pump or an air receiver (tank).
>
> **Charged** – A charged object is isolated but not de-energized. It contains stored energy. Examples of a charged object are: compressed spring (potential energy), charged electrical capacitor, suspended object (potential energy), object in motion (kinetic energy), electrical equipment not physically connected to a source of energy but near live electrical equipment (induction), or a tank or pipe containing substances at greater or less than atmospheric pressure.

Approved Isolation Procedure (AIP) – An approved written procedure used for work that requires de-energization and isolation and/or grounding of energy sources to provide worker protection.

Approved Practice – A trade skill or work procedure used in a situation where isolation of energy sources is not used. Skills are developed from a combination of education, training and experience. Approved practices are normally documented in training material, trade handbooks or work methods instruction. Examples: live line procedures and troubleshooting live equipment.

Canceling Authority – Supervisor of the Permit Holder/Working Group who, under extenuating circumstances or as a result of unsafe activities may cancel the Permit.

Controlling/Issuing Authority (CIA) – A Qualified Worker approved by the Corporation who has responsibilities for:

- Controls of specific equipment and devices. This includes the responsibility for performing, directing or authorizing changes in the condition or in the position of the equipment or devices;
- Conditions requested by the Prospective Holder and ensures that those conditions have been established;
- Preparing, checking and establishing the conditions for a Permit or supporting guarantee; and
- Making effective and terminating the Permit or supporting guarantee.

De-energized – De-energizing must meet three objectives: prove isolation, remove any residual charged or stored energy; and ensure the equipment remains de-energized during the work.

> **In the electrical sense this shall mean** when all of its electrical energy has been discharged through connection to an effective ground potential.
>
> **In the mechanical sense this shall mean** all spring tension, liquid or gaseous, pressures are released and sources are opened.

Foreign Organization – Any organization outside Qulliq Energy Corporation.

Grounded – A conducting object, such as a wire, that is connected to such a position of zero energy potential.

Guaranteed Device – A de-energized, isolating and/or grounding device that has been locked/tagged to ensure worker safety.

High Voltage – Energized conductors greater than 750 volts.

Holder's Check of Isolation – A visual inspection by the Prospective Holder (or any Qualified Worker of the Work Group) to confirm a guaranteed device(s) is: the correct device(s); in the appropriate position (when possible); appropriately locked/tagged in accordance with the Permit. Check must be completed prior to receiving the Permit from the CIA.

Isolated – When equipment is separated from all sources of dynamic energy.

> **In the electrical sense this shall mean** when separated by devices, the contacts of which are clearly visible. Electrical equipment is typically isolated by using devices such as: switches, whether three phase or single phase; draw out type breakers; disconnect jumpers or taps. Isolating devices shall be able to be locked and/or tagged.
>
> **In the mechanical sense this shall mean** when separated by devices, the conditions of which are clearly verifiable.

Live Line Permit – A form of protection guarantee used for high voltage work. Formerly referred to as a Hold Off.

Lock – A mechanical means of locking that uses a keyed lock to secure an energy-isolating device in a position that prevents energizing of a machine, equipment, or process (see Personal Protection).

Low Voltage – Alternating or direct current with a potential of less than 751 volts.

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

Permit – A written guarantee that a de-energized, isolated and/or grounded condition has been established and will continue to exist. It states that the WPC is in effect for the specific job and location outlined.

Permit Holder – The Qualified Worker who receives rights to work under the Permit. Is assigned responsibilities for ensuring that everyone in the Work Group is protected from the perspective of the WPC.

Permit Transfer – A Work Permit that is transferred to another Qualified Worker if in full concurrence with original Permit Holder's Work Group and the CIA. This transfer can be completed between two Qualified Workers however in extenuating situations must be authorized by the original Permit Holder's Supervisor, if original Permit Holder unavailable. Transfer must be documented on Permit Transfer Form WPC #4.

Personal Protection – A procedure where a worker identifies intent to work underneath an existing Permit and subsequently installs lock(s) used to ensure isolation of guaranteed devices to ensure individual worker safety.

Plant Control Room – For the purposes of this document, designated work space for completing Permits and filing of all WPC documentation.

Prospective Holder – A Qualified Worker responsible for requesting a Permit from the CIA and for providing all information required to complete the Permit application.

Qualified Worker – A person who has met and maintained all current WPC training and qualifications and is judged by their supervisor to have demonstrated competency and familiarity with rules, procedures, equipment and hazards associated with the work.

Apprentices are eligible to become Qualified Workers after successful completion of second year trades school. A competency evaluation shall be completed by the Supervisor who will approve or deny Qualified Worker designation. Apprentices are permitted as Work Group Members until Qualified Worker status achieved.

Safe Work Area – A specifically identified area for work where all known hazards have been eliminated and/or controlled. Note: The WPC is only one part of a safe work area. A complete job plan is required for workers' safety.

Safe Work Procedures – Written procedures for carrying out specific tasks which, when followed, will ensure that workers' exposure to hazardous situations are minimized.

Self Protection Permit – A protection guarantee issued to a Qualified Worker that allows operation of one point of isolation to establish a safe work area.

Shall – Mandatory compliance is required.

Surrender – The relinquishing of guaranteed conditions by a Holder.

Suspension – The temporary relinquishment of working rights underneath a Work Permit while a Test Permit is in effect.

Tag – The physical indicator of a device position or status which represent the application of the WPC.

Terminated – The end of guaranteed conditions after a Permit Holder has surrendered their rights to a specific Permit. To be completed by the CIA.

Test Permit – A protection guarantee issued to a Qualified Worker under which specific work is authorized on specific apparatus. A test is done to check, prove or facilitate the work process; it is used in conjunction with a Work Permit.

Work Groups – A designated independent group performing work and/or tests under a Permit. At any given time the group must have only one "Holder".

Work Group Member – A worker who has successfully completed WPC Training and will perform work under the authorization of a Holder; shall not start work until authorized to do so, and will follow all instructions from the Holder.

Work Permit – A protection guarantee issued to a Qualified Worker, under which specified work is authorized on specific equipment by a Controlling/Issuing Authority. A Work Permit guarantees that the equipment being worked on is de-energized, isolated and/or grounded.

Work Protection Log (Form # WPC 5) – A form whereby all Permits are logged for record reference. This is kept in the Work Protection Binder located in the Control Room. Permit numbers will be assigned to every Permit as follows: Community Number – Year – Number (the number shall start with 01 and follow in numerical sequence as Permits are assigned). Example: 605-2019-01. Test Permits shall be indicated by brackets. Example: 605-2019-01 (1).

WPC – The Utility Work Protection Code

2.3 TRAINING

WPC training shall be mandatory at time of hire for those who the WPC applies and will be reviewed with workers every three years thereafter.

In addition to successful completion of WPC Training, a worker must meet all criteria as defined to achieve Qualified Worker status. The Supervisor shall advise the Health, Safety and Environment (HSE) Department in writing when competency and familiarity with rules, procedures, equipment and hazards associated with the work has been successfully demonstrated. Once all criteria established and documentation received, Qualified Worker status which enables the worker to become a Holder or Issuer of Permits shall be granted.

A list of Qualified Workers and Work Group Members shall be maintained. Master lists will be kept and updated as required, by the HSE Department for distribution to all plants. The Controlling/Issuing Authority (CIA) will refer to the listing to ensure workers are qualified before a permit is issued.

2.4 SAFE WORK ENVIRONMENT USING THE WPC

Safe Work Conditions

The following methods can be combined to provide a safe working environment:

- Hazards are identified;
- Hazards are controlled and/or eliminated;
- Equipment is de-energized, isolated and/or grounded; and
- Permit(s) are in effect.

Boundaries of the Safe Work Area

The Permit Holder and the Work Group must have a clear understanding of the:

- Isolated zone;
- Location of the boundaries of the safe work area; and
- Proximity (and the potential hazard) of any live equipment adjacent to these boundaries.

It is critical that all parties understand the boundaries of the safe work area since the safety provided by a Permit only exists within the boundaries of the designated safe work area.

Creating a Safe Work Area Using the WPC

The WPC uses a written contract called a Permit and locks/tags which:

- Identify equipment that will remain de-energized, isolated and/or grounded for a period of time set out in the contract;
- Guarantee that a de-energized, isolated and/or grounded state will be maintained on specific equipment with the exception of a Test Permit; and
- Guarantee that protection is issued to Qualified Worker(s), under which specified work is authorized on specific apparatus.

2.5 TYPES OF PERMITS

There are specific types of Permits:

- Work Permits;
- Self Protection Permits;
- Test Permits; and
- Live Line Permits.

Standards

- A Permit must be obtained to work on any apparatus/equipment that requires the device to be de-energized, isolated and/or grounded to create a safe work area;
- A Permit must apply to specific work or equipment;
- A Permit is not in effect and work may not start until a permit number is issued;
- Communication must be available between the CIA and the Permit Holder and must be checked periodically;

- Permits may be held open for an extended period of time with the Permit Holder being able to sign on and off the Permit; and
- The Permit must be surrendered by the Permit Holder.

Note: In extenuating circumstances (illness, incident) the Permit may be surrendered by the Permit Holder's Supervisor in agreement with the Work Group and an incident report must be completed outlining the details of the occurrences. Also, in extreme circumstances the Permit may be transferred to another member of the Permit Holder's original work group if authorized by the original Permit Holder's Supervisor in agreement with the Work Group.

The Permit and supporting documentation must be logged in the Work Protection Code Log with the number and holders name.

2.6 CONTROLLING/ISSUING AUTHORITY

The CIA is a Qualified Worker who is responsible for the control of specific equipment and devices.

Examples of CIA would be:

- Plant Operator;
- Plant Superintendent; and
- Assistant Operators.

❖ When operational requirements dictate, and two or more Qualified Workers are present, one may act as the CIA.

The responsibilities of the CIA include:

- Ensuring that all aspects of WPC are adhered to;
- Giving permission to work on equipment and to issue a Permit, ensuring that:
    - All documentation is complete and that all locks/tags are in place for:
        - Permits;
        - Switching Authorization/Equipment Lockout Procedure.

  - The equipment will remain de-energized, isolated and/or grounded for the duration of the Permit.
- Communication with Permit Holder is in place.

A CIA can issue Permits as well as issue and hold another Permit at the same time for a different job function (i.e. Oil changes) while not affecting the safety and work of other Permits in place.

Test permits must be issued by the CIA.

2.7 PERMIT HOLDER

The Permit Holder is the Qualified Worker, who may also be responsible for a Work Group under his/her direction, who has received permission to perform work and/or testing on equipment from the CIA.

The Permit Holder is responsible for ensuring that all safety procedures have been followed and that everyone in their Work Group is protected as per the requirements set out in the WPC.

2.8 WORK PERMIT

A Work Permit is a protection guarantee issued to a Qualified Worker, under which specified work is authorized on specific equipment by a CIA.

A Work Permit guarantees that the equipment being worked on is de-energized, isolated and/or grounded.

Standards

- When a Work Permit is required for plant maintenance (i.e. Oil changes) the CIA shall be the Permit Holder.
- Any Work Group Member may become a member of a Permit Holder’s Work Group.
- Only one Work Permit will be assigned to specific equipment in an approved work area. Isolation points can be used under more than one Work Permit.
- A Work Permit must be obtained to work on any apparatus/ equipment that requires the device to be de-energized, isolated and/or grounded to create a safe work area.

- When preparing to take out a Work Permit the CIA must first determine the status of the equipment and whether there are any other Permits or supporting guarantees in effect on the equipment.
- A Work Permit must apply to specific work on specific apparatus.
    - Only one Permit is used to cover all guaranteed devices for a particular job task.
- A Work Permit is not in effect and work may not be started until a Work Permit number is issued. Before the Work Permit is issued, a Switching Authorization/Equipment Lockout Procedure must be completed.
- Each Permit Holder is responsible for the safety of all persons working under his/her Work Permit.
- Communications must be available between the CIA and the Permit Holder(s) and periodically checked.
- A Work Permit must be surrendered by the Permit Holder (except under extenuating circumstances).
    - The Work Permit only covers the members in the approved work group(s). Under no circumstances can a Work Permit be considered to protect anyone outside of the group.
- Work Permits must be logged in the Work Protection Log and all supporting documentation placed in the Work Protection Binder located in the Plant Control Room.

Procedures: Application for a Work Permit

- A Qualified Worker shall request a Work Permit from the CIA.
- The HSE Department shall provide master lists of Qualified Workers at all worksites which will require the use of the WPC. The CIA will refer to the listing to ensure workers are qualified before work is to commence.
- Upon requesting a Work Permit the following information must be supplied by the Qualified Worker:
    - Name of Prospective Holder;
    - Specific apparatus/equipment to be covered by the Permit;
    - Members of Working Group;
    - Nature and location of work;
    - Expected duration of work; and
    - Communication facilities, protocol and identification to be used.

- All above information is to be placed on the Application for Protection (Form # WPC 1A or Form # WPC 1A+1B).
- Prepare the Switching Authorization/Equipment Lockout Procedure (Form # WPC 1B or Form # WPC 1A+1B) for the Work Permit Application.

Making A Work Permit Effective

The CIA will make the Permit effective by:

- Notifying all other working groups which may be affected by the Permit being put into effect;
- Verifying the completed Switching Authorization/Equipment Lockout Procedure (Form # WPC 1B or Form # WPC 1A+1B). Once verified, the CIA will then physically lock/tag all devices as stated by the form and sign the completed by section.
- Completing the permit application and review the following with the Prospective Holder:
    - Verification of de-energization points;
    - Verification of isolation points;
    - Verification of grounding points; and
    - Verification of lock/tag points.
- Assigning a permit number and log the permit number in the Work Protection Log;
- Notifying the Prospective Holder that the permit requested is now in effect and issues the Permit to the Permit Holder.
- Before work commences, all Work Group Members involved (excluding switching operations) must review the permit for that specific work permit number and sign into the Personal Protection Log (Form # WPC 2) that references the Work Permit number. Once signed onto the Personal Protection Log, the worker will then proceed to apply his/her personal lock to lockbox.

Surrendering the Work Permit

When the Permit Holder wishes to surrender his/her Permit s/he shall:

- Ensure that all Personal Protection has been removed from lockbox and all workers have signed the Personal Protection Log as removed, with date and initials.
- Contact CIA and after identifying his/herself, surrender the Work Permit by signing and relinquishing the permit number.

When the Permit has been surrendered the CIA shall:

- Notify all other working groups which may be affected by the permit, that the permit is no longer in effect;
- The Permit Holder (where possible) completes Switching Authorization/Equipment Lockout Procedure (Form # WPC 1B or Form # WPC 1A+1B) for energizing and returning to service. The form is then to be verified by the CIA. Once verified, the CIA will then remove locks/tags on all devices as stated by the form and sign the completed by section.
- Record surrender of Work Permit in the Work Protection Log and file all original documentation associated with the permit in the Work Protection Binder located in the Plant Control Room.

2.9 SELF PROTECTION PERMIT

Self Protection is a permit that allows operation of one point of isolation to establish a safe work area. This permit shall only be used in distribution/transmission applications by Powerline Technicians.

Self Protection guarantees that the state of equipment the Self Protection Holder is working on will not be changed without the holder's express permission. Under a Self Protection Permit, the Permit Holder is also permitted to be the CIA.

Standards

- Unless working under another form of permit, Self Protection must be in effect on any equipment which serves a distribution or transmission function;
- Self Protection must apply to specific work on specific apparatus;
- There shall be no more than one Self Protection Permit on an isolation point at a time;
- A Qualified Worker invoking Self Protection is responsible for the safety of him/herself and members of his/her working group;
- Self Protection must be invoked and surrendered by the Self Protection Holder. No transfer of Self Protection is allowed.

- In extenuating circumstances, the Permit may be cancelled by the Cancelling Authority.
- Self Protection must be kept at the worksite;
- Once surrendered, Self Protection must be logged in the Work Protection Log and supporting documentation placed in the Work Protection Binder located in the Plant Control Room.

Procedures: Application for a Self Protection Permit

When a Self Protection Permit is required, the Permit Holder shall also be the CIA.

Qualified Workers (Powerline Technicians) invoking Self Protection must:

- Complete the Application for Protection which requires the following information:
    - Name of Prospective Holder invoking Self Protection;
    - Specific equipment to be covered by Self Protection;
    - Members of Working Group;
    - Isolation point;
    - Nature and location of work;
    - Expected duration of work; and
    - Communication facilities, protocol and identification to be used.

Making A Self Protection Permit Effective

The CIA will make the Self Protection Permit effective by:

- Contacting the Plant Control Room to retrieve permit number.
- Completing the Application for Protection while reviewing the location of all locks/tags and indicating the time that Self Protection is in effect to all work group members.
- Completing the necessary switching and grounding so as to de-energize, isolate and/or ground the required apparatus (no Switching Authorization/Equipment Lockout Procedure form is required for Self Protection);
- Attaching Self Protection tags to all appropriate devices (this tag must be applied to the apparatus with permit number);
- Keep the Self Protection Permit at the worksite.

Surrendering a Self Protection Permit

Before surrendering the Self Protection Permit, the CIA shall:

- Ensure working group which may be affected by the permit is clear of the apparatus;
- Ensure all equipment which may be affected by the permit is clear of the apparatus;
- Surrender the Self Protection Permit by removing all appropriate locks/tags, signing and relinquishing the permit number;
- Restore the system to normal operating configuration; and
- Record surrender of Self Protection Permit in the Work Protection Log and file all original documentation associated with the permit in the Work Protection Binder located in the Plant Control Room.

2.10 TEST PERMIT

A Test Permit is a protection guarantee issued to a Qualified Worker under which specific work is authorized on specific apparatus; it is used in conjunction with a Work Permit.

A Test Permit must be obtained to test any equipment with a generation, distribution or transmission function.

Standards

- Must apply to specific work on specific equipment(s);
- A Test Permit suspends the working rights underneath the Work Permit. No activity other than activity outlined in the Test Permit is permitted. This is to be communicated by the CIA to all workers within the Work Permit Working Group and the Test Permit Working Group;
- Test Permit is not in effect until a test permit number is issued;
- Test Permit Holder is responsible for the safety of persons working under his/her Test Permit;
- A Test Permit enables the Permit Holder to remove permit grounds and energize the apparatus in order to perform tests;
- No testing is allowed without the permission of the Test Permit Holder, Work Permit Holder and the CIA;
- Only one Test Permit may be taken out on the same apparatus at one time. Test Permit applications shall have a clear description of the guaranteed devices that may be energized for testing purposes. Test Permits may never overlap;

- **Once a Test Permit is in effect the equipment is no longer considered a guaranteed device;**
- No transfer of a Test Permit is allowed. In extenuating circumstances, the Permit may be cancelled by the Cancelling Authority.
- Communications must be available between the CIA and the Test Permit Holder; communications must be periodically checked;
- When the Permit Holder wishes to surrender the Test Permit, they shall inform the CIA that the test is complete and s/he can return the guaranteed devices to their previous state;
- While holding a Test Permit the Permit Holder shall remain at the work location;
- Test Permits must be logged in the Work Protection Log and all supporting documentation placed in the Work Protection Binder located in the Plant Control Room.

Procedures: Application for a Test Permit

- Qualified Workers shall request a Test Permit from the CIA.
- Upon requesting a Test Permit the following information must be supplied by the Qualified Worker:
    - Name of Prospective Holder;
    - Specific apparatus/equipment to be covered by the Permit;
    - Members of Working Group;
    - List of all devices removed from locked out state as per Switching Authorization/Equipment Lockout Procedure completed for corresponding Work Permit;
    - Nature and location of work.

- Before the Test Permit is in effect all activities under the adjacent Work Permit shall be suspended and to be communicated to all affected workers. All workers with Personal Protection on the devices stated under the Work Permit shall remove their lock(s) and sign as removed, with initial and date on the Personal Protection Log (Form WPC # 2).
- Once all locks have been removed the Test Permit can be issued to the Prospective Holder.

Making A Test Permit Effective

The CIA will make the Test Permit effective by:

- Notifying all other operating groups which may be affected by the Test Permit that a Test Permit is being put into effect;

- Ensure that Personal Protection associated with the Work Permit is removed and documented on Personal Protection Log (Form WPC #2);
- Removing his/her Personal Protection and energizing the equipment identified in the Test Permit;
- Logging the Test Permit in the Work Protection Log and assign a number;
- Completing the Test Permit Application and review the conditions of the Test Permit with the Prospective Holder;
- Notifying the Prospective Holder that the Test Permit requested is now in effect and issue the Test Permit number;
- The responsibilities of the Test Permit Holder now includes the responsibility for removing Permit grounds if so required for testing purposes (if applicable); and
- The Test Permit shall be kept with the corresponding Work Permit.

Surrendering a Test Permit

When the Test Permit Holder wishes to surrender their Test Permit they shall:

- Contact CIA and surrender the Test Permit by signing and relinquishing the Permit number.
- The Work Permit Holder may now surrender Work Permit if no other work is required.
- If work is to continue, the CIA shall re-establish conditions of the original Work Permit, as per completed Switching Authorization/Equipment Lockout Procedure (Form # WPC 1B or Form # WPC 1A+1B).
- Personal Protection guidelines shall be re-established.

When the Test Permit has been surrendered and no other work is required the CIA shall:

- Notify all other working groups which may be affected by the Permit, that Permit is no longer in effect;
- Record final surrender of Work Permit in the Work Protection Log and file all original documentation associated with the Permit in the Work Protection Binder located in the Plant Control Room.

2.11 PERSONAL PROTECTION

Personal protection (i.e. a lock on a lockbox) is a protection guarantee that a worker invokes for his/her own personal safety. Personal protection guarantees that the state of the equipment which may affect the apparatus the worker is working on will not be changed without his/her expressed permission. Under extenuating circumstances, Personal Protection removal may be completed by the worker's supervisor, if all reasonable attempts to contact the worker have been established.

Underneath a Work Permit, Personal Protection must be installed on the associated lockbox by all workers with the exception of switching operations. Underneath Work Permits involving switching operations and Live Line Permits, the Permit Holder must apply Personal Protection. If multiple Work Groups are working underneath the same Permit, each Lead Hand must also apply Personal Protection. Remaining Work Group Members can apply Personal Protection if they so choose.

Personal protection cannot be invoked underneath a Test Permit.

Before lock installation, workers must review the Work Permit or Live Line Permit and sign on to the Personal Protection Log (Form # WPC 2). The temporary removal of Personal Protection will be required for testing purposes (if required). Prior to Work Permit's or Live Line Permit's surrender, workers must remove Personal Protection and complete Form # WPC 2.

2.12 EQUIPMENT PROTECTION

There are procedures that are used that are for "operation restrictions" and must not be used to guarantee devices for workers' safety.

Live Line Permit

A Live Line Permit is a form of protection guarantee used for high voltage work. A Live Line Permit prevents the re-closing of breakers, re-closers, or others devices after an interruption.

Live Line Permit procedures restricts the operation of a device to its' previous state, except with the Live Line Permit Holder's consent. It is used to protect equipment only.

A Live Line Permit is never used in place of Work Protection.

Standards

- A Live Line Permit must be obtained to work on or near live apparatus.
- A Live Line Permit must apply to specific work on specific apparatus.
- A Live Line Permit is not in effect and work may not be started until a Live Line Permit number is issued.
- **Communications must be available between the CIA and Live Line Permit Holder and periodically checked.**
- Automatic reclosing devices must be turned off automatic and locked/tagged with a Live Line Permit tag indicating Live Line Permit number.
- Manual reclosing devices must be locked/tagged with a Live Line Permit tag indicating Live Line Permit number.
- No work is permitted on relays, control circuits, or other devices designed to trip apparatus covered by a Live Line Permit.
- Protection features must be in service on apparatus covered by a Live Line Permit.
- When a device is subject to a Live Line Permit it must never be re-energized without the expressed approval of the Live Line Permit Holder.
- While holding a Live Line Permit for a device, the Live Line Permit Holder must report any suspected loss of potential on that device or apparatus.
- A Live Line Permit does not prevent apparatus from being de-energized.
- A Live Line Permit must be surrendered by the Live Line Permit Holder. In extenuating circumstances and only with the full concurrence of all involved, may a Live Line Permit be cancelled by a Cancelling Authority.
- If more than one Work Group requires Live Line protection on the same device or apparatus, all workers shall work underneath one Live Line Permit Holder who shall ensure Personal Protection is invoked for all Work Groups underneath the Permit.
- Live Line Permits must be logged in the Work Protection Log and all supporting documentation placed in the Work Protection Binder located in the Plant Control Room.

Procedures: Application for a Live Line Permit

- Qualified Worker(s) request a Live Line Permit from the CIA.
- When requesting a Live Line Permit, the following information must be supplied:
    - Name of Prospective Holder;
    - Specific apparatus/equipment to be covered by the Permit;
    - Members of Working Group;
    - Nature and location of work;
    - Expected duration of work; and
    - Communication facilities, protocol and identification to be used.
- Prepare the Switching Authorization/Equipment Lockout Procedure (Form # WPC 1B or Form # WPC 1A+1B) for the Live Line Permit Application.
- Inform all Work Group Members that Personal Protection may be installed by any worker wishing to invoke their own protection for the prospective Permit.

Making a Live Line Permit Effective

The CIA will make the Live Line Permit effective by:

- Arranging to have automatic/manual reclosing blocked;
- Having Live Line Permit locks/tags attached to all appropriate breaker or recloser controls, sectionalizing devices, supervisory control points and/or control room boards and monitors as per the completed Switching Authorization/Equipment Lockout Procedure. This locking/ tagging will be installed by the CIA or his/her agent;
- Notifying all other working groups which may be affected by the Live Line Permit that a Live Line Permit is being put into effect;
- Logging the Live Line Permit in the Work Protection Log and assign a number;
- Completing the Live Line Permit Application and review the following with Live Line Permit Holder:
    - Devices which have had the reclosing turned OFF, and
    - Verification of lock/tag points.
- Notifying the Prospective Holder that the Live Line Permit requested is now in effect and issues the Live Line Permit number.
- Before work commences, the Live Line Permit Holder shall review the Permit for that specific Live Line Permit number and sign into the Personal Protection Log (Form # WPC 2) that references the Live

Line Permit number. Once signed onto the Personal Protection Log, the worker will then proceed to apply his/her personal lock to lockbox. If multiple Work Groups are working underneath the same Permit, each Lead Hand must also review the Permit and apply Personal Protection.

Surrendering the Live Line Permit

When the Live Line Permit Holder wishes to surrender their Live Line Permit they shall:

- Ensure that all Work Group Members and equipment involved in the work are clear of the apparatus;
- Ensure all Personal Protection has been removed from the lockbox;
- Contact the CIA and after identifying his/herself surrender the Live Line Permit by relinquishing the number, identifying the device and start time. The Permit Holder (where possible) completes Switching Authorization/Equipment Lockout Procedure (Form # WPC 1B or Form # WPC 1A+1B) for energizing and returning to service.

When the Live Line Permit has been surrendered the CIA shall:

- Verify the completed Switching Authorization/Equipment Lockout Procedure. Once verified, the CIA will then remove locks/tags on all devices as stated by the form and sign the completed by section;
- Arrange the necessary restoration of automatic/manual reclosing; and
- Record the surrender of Live Line Permit in the Work Protection Log and file all original documentation associated with the Live Line Permit in the Work Protection Binder located in the Plant Control Room.

Action to be taken if a device under a Live Line Permit trips

When a device under Live Line Permit trips the CIA shall contact the Live Line Permit Holder and advise him/her that the device under the Live Line Permit has tripped and request permission to re-energize the apparatus (only upon the express, specific approval of the Live Line Permit Holder) or leave the device de-energized until the Live Line Permit Holder gives their expressed, specific approval to do so**.**

Out of Service

An **Out of Service** Tag is used to tag devices for equipment protection and worker safety. This procedure is used to control the operation of equipment.

Out of Service Tags shall contain:

- Worker's name installing tag;
- Identify the reason for the placement on the tag itself and a brief description made in the plant log book; and
- Date and time the tag is in effect.

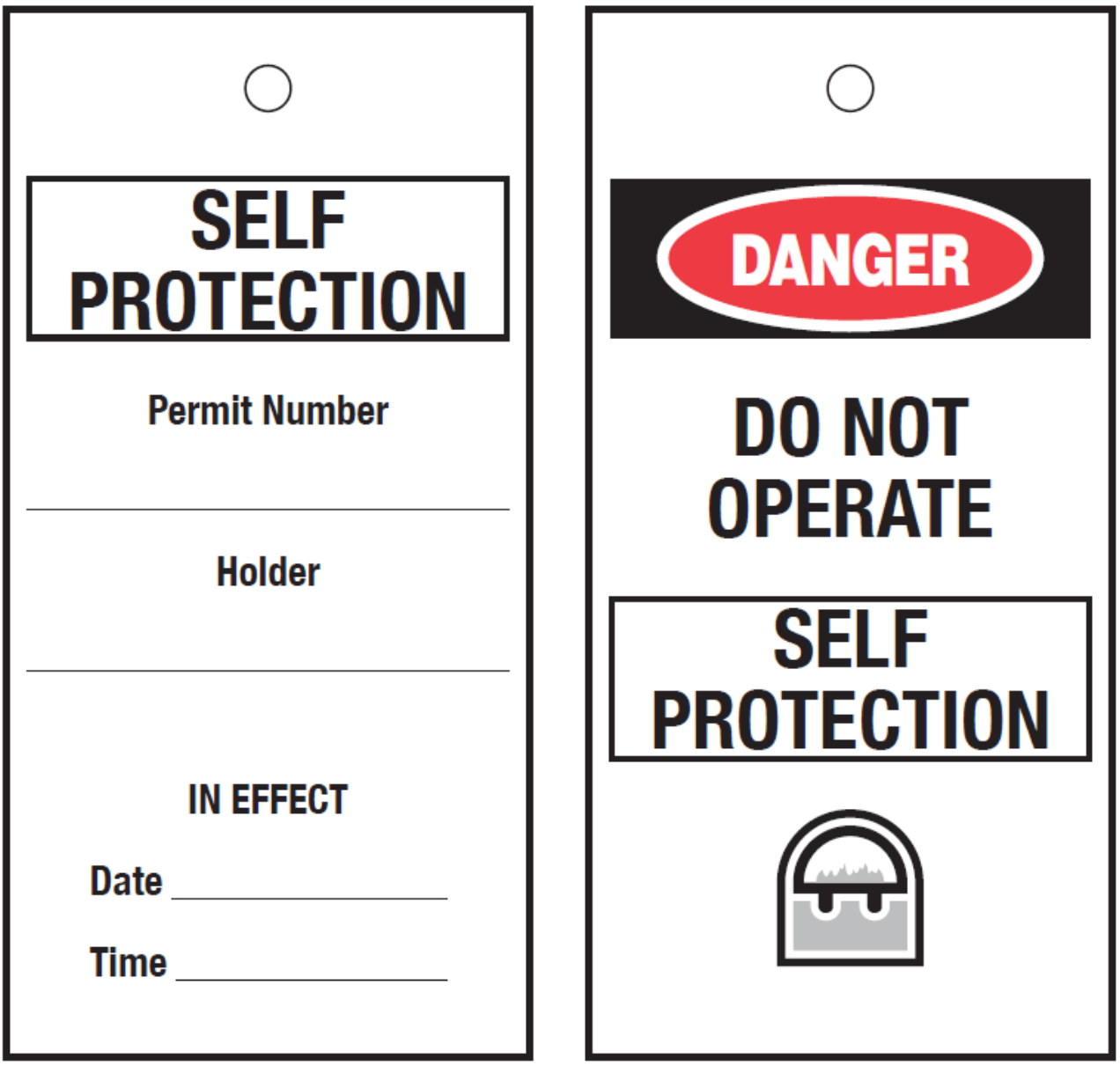
An **Out of Service** Tag can never be used in place of Work Protection.

A note shall also be placed in the plant log book stating information located on tag in addition to being logged in the Work Protection Log.

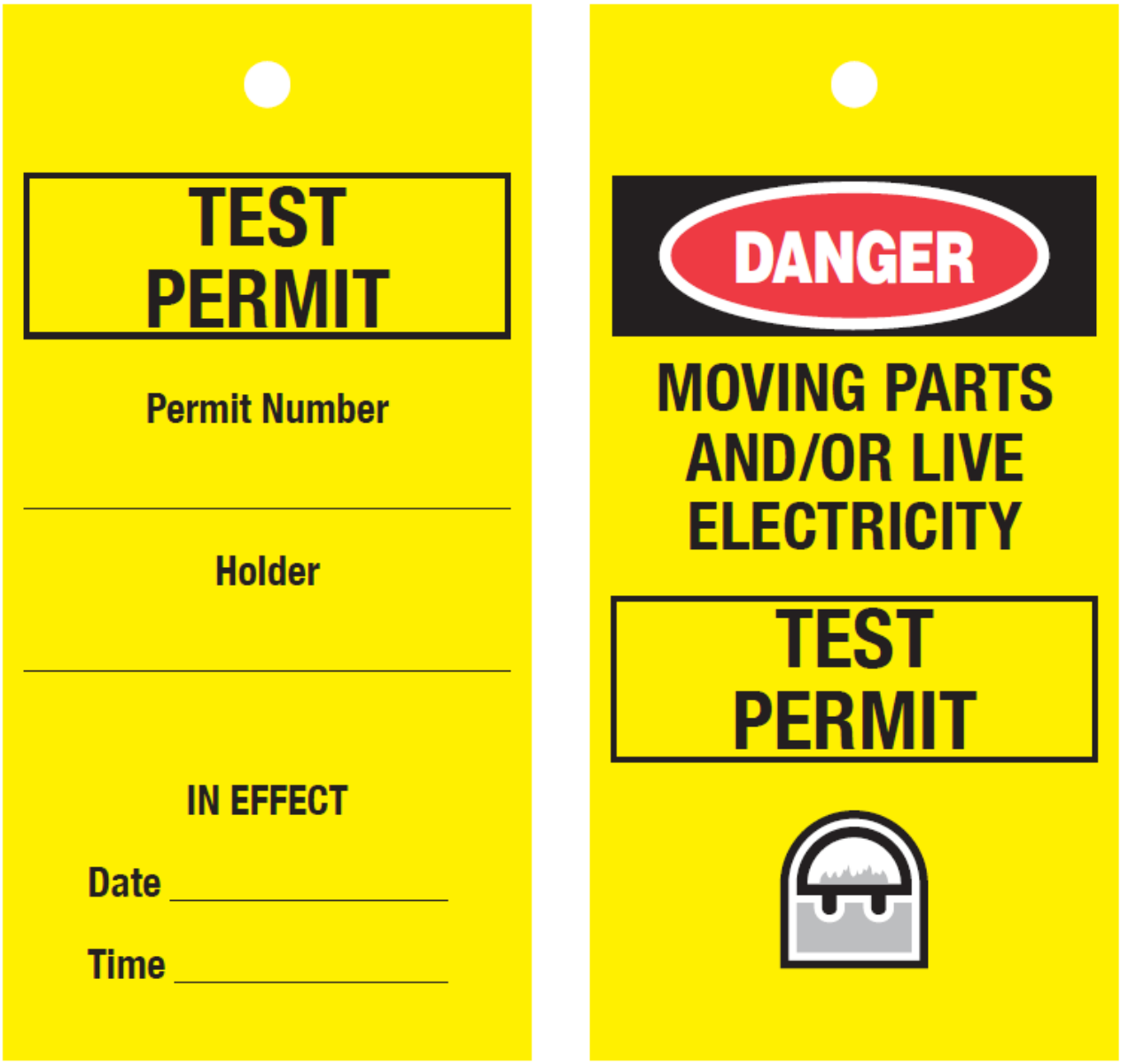
2.13 WPC TAGS

Work Permit Tag

Live Line Permit Tag



Self Protection Tag



Test Permit Tag

Out of Service Tag

2.14 APPLICABLE EXTERNAL REGULATIONS

NUNAVUT OHS REGULATIONS (2016)

Locking Out

147. (1) Subject to section 148, an employer shall, before a worker undertakes the maintenance, testing, repair or adjustment of a machine other than a power tool, ensure that the machine is locked out and remains locked out during that activity unless doing so puts a worker at risk.

(2) An employer shall, before a worker undertakes the maintenance, testing, repair or adjustment of a power tool, ensure that the energy source has been isolated from the power tool, any residual energy in the power tool has been dissipated and the energy source remains isolated during that activity.

(3) An employer shall

(a) provide a written lockout process to each worker who is required or permitted to work on a machine to which subsection (1) applies; and
(b) if the lockout process uses a lock and key, issue to that worker a lock that is operable only by that worker's key.

(4) If the lockout process does not use a lock and key, an employer shall designate an individual to coordinate and control the lock out process.

(5) If the lockout process uses a lock and key, an employer shall designate an individual to keep a duplicate key and ensure that

(a) the duplicate key is accessible only to the designated individual; and
(b) a log book is kept to record the use of the duplicate key and the reasons for that use.

(6) If it is not reasonably possible to use a worker's key to remove a lock, an employer may permit the individual designated under subsection (5) to remove the lock using the duplicate key if the designated individual

(a) has determined the reason that the worker's key is not available;
(b) has determined that it is safe to remove the lock and activate the machine; and
(c) has informed the Committee members or the representative of the proposed use of the duplicate key before it is used.

(7) An employer shall ensure that the designated individual who is permitted to use a duplicate key under subsection (6)

(a) records in the log book the removal of the lock including the reason for the use of the duplicate key and the date of its use; and

(b) signs the log book each time that the duplicate key is used.

(8) If a central automated system controls more than one machine, an employer shall ensure that the machine to be maintained, tested, repaired or adjusted is isolated from the central system before the lockout process required by subsection (3) is implemented.

(9) After a lockout process has been initiated, the worker who installed the device or initiated the process shall check the machine to ensure that the machine is inoperative.

(10) An individual shall not deactivate a lockout process that does not use a lock and key unless it is the individual designated under subsection (4).

(11) An individual shall not remove a device that is part of a lockout process unless the individual is

(a) the worker who installed the lockout device; or
(b) an individual designated under subsection (5).

Maintaining Machines in Motion

148. (1) This section applies if any of the following requires cleaning, lubrication or adjustment while in motion or under power:

(a) a machine or other piece of equipment;
(b) a part of the machine or other piece of equipment;
(c) any material on a machine or on the piece of equipment.

(2) An employer shall, in respect of a circumstance referred to in subsection (1),

(a) develop and implement written work practices and procedures to ensure that cleaning, lubrication or adjustment is carried out in a safe manner;
(b) ensure that workers who are required or permitted to perform cleaning, lubrication and adjustment are trained in the written work practices and procedures developed and implemented under paragraph (a); and
(c) ensure that the written work practices and procedures developed and implemented under paragraph (a) are readily available to workers.

Belts

149. (1) An employer shall ensure that a permanent belt shifter is

(a) provided for all loose pulleys on a machine; and
(b) constructed so that the belt cannot creep back on to the tight pulley.

(2) An employer shall ensure that a worker does not shift a belt on a machine by hand while the belt is in motion.

ADDITIONAL PROTECTION FOR ELECTRICAL WORKERS

445. (1) In this Part,

“electrical equipment” means electrical equipment as defined in subsection 1(1) of the Electrical Protection Act;

“electrical work” means electrical work as defined in subsection 1(1) of the Electrical Protection Act;

“guarded” means covered, shielded, fenced, enclosed or otherwise protected by suitable covers, casings, barriers, rails, screens, mats, platforms or other equally effective means;

“high voltage” means a voltage over 750 V;

“lamp” means an artificial source of electric light;

“luminaire” means a complete lighting unit that is designed to accommodate a lamp and to connect the lamp to an electrical power supply;

“qualified electrical worker” means a qualified electrical worker as defined in subsection 1(1) of the Electrical Protection Act;

“readily accessible” means capable of being reached quickly for operation, renewal, or inspection, without requiring a worker to climb over or remove obstacles or to resort to portable means of access.

(2) Nothing in this Part is to be construed as authorizing

(a) the performance of work by a person if it is unlawful for the person to perform that work under the Electrical Protection Act or any other enactment;
(b) the use of electrical equipment if it is unlawful to use that equipment under the Electrical Protection Act or any other enactment; or

(c) the performance of work in a particular manner if it is unlawful to perform the work in that manner under the Electrical Protection Act or any other enactment.

(3) This Part does not apply to electrical work carried on by a qualified electrical worker

(a) in power houses, substations or other facilities
  (i) in which electricity is produced or from which electricity is distributed, and
  (ii) from which some or all of the electricity referred to in paragraph (a) is sold;
(b) on railway cars or locomotives or street railway cars or locomotives; or
(c) on transmission lines or distribution systems of electric utilities.

Electrical Workers

446. (1) An employer shall not require or permit a worker to engage in electrical work unless he or she is a qualified electrical worker.

(2) An employer may require or permit a competent worker

(a) to operate powered mobile equipment and perform non-electrical work on or near de-energized electrical equipment;
(b) to extend a portable power cable for routine advancement by interconnection of approved cord connectors, cord caps or similar devices;
(c) to change light bulbs or tubes;
(d) to insert or replace an approved fuse, to a maximum of 750 V, that controls circuits or equipment; or
(e) to connect and use portable electrical equipment that operates at less than 750 V to supply circuits by means of attachment plug, without overloading the circuit conductors.

Electrical Equipment

447. (1) An employer shall ensure that electrical equipment used by workers is

(a) approved for its intended use and location;
(b) maintained; and
(c) tested in accordance with the manufacturer's specifications.

(2) If defects or unsafe conditions are identified in electrical equipment, an employer shall ensure that

(a) steps are taken without delay to inform and protect the health and safety of workers who could be endangered until the defects are repaired or the conditions are corrected; or
(b) the defects are repaired or the conditions are corrected as soon as is reasonably possible.

Covers for Switches, Receptacles and Connections

448. An employer shall ensure that

(a) switches, receptacles, luminaires and junction boxes are fitted with a covers that are approved for the intended use;
(b) wire joints or connections are
  (i) fitted with an approved caps or other approved covers,
  (ii) enclosed in approved boxes, or
  (iii) if the wire joints or connections are not permanently installed, protected from damage by another approved means; and
(c) dead, abandoned or disused conductors or equipment are removed or disconnected and secured to prevent inadvertent energization.

Electrical Equipment in Tunnel or Manhole

449. If electrical equipment is installed in a tunnel or manhole, an employer shall ensure that, if reasonably possible,

(a) the tunnel or manhole is kept clear of water; and
(b) the electrical equipment is protected from physical or mechanical damage.

Luminaires

450. An employer shall ensure that a luminaire that is located at a height of less than 2.1 m above a working or walking surface, is protected against physical or mechanical damage.

Extension and Power Supply Cords

451. An employer shall ensure that an electrical extension or power supply cord used for supplying energy to electrical equipment is

(a) approved for the intended use and location;

(b) fitted with an approved cord end attachment device that is installed in an approved manner;
(c) provided with a grounding conductor; and
(d) maintained and protected from physical or mechanical damage.

Portable Power Cables and Cable Couplers

452. (1) An employer shall ensure that portable power cables and cable couplers are

(a) protected from physical or mechanical damage; and
(b) inspected by a competent person at intervals that are sufficient to protect the health and safety of workers.

(2) An employer shall ensure that

(a) if an unsafe condition is identified in a portable power cable or cable coupler, the cable or coupler is repaired or taken out of service; and
(b) splices in a portable power cable are sufficiently strong and adequately insulated to retain the mechanical and dielectric strength of the original cable.

(3) A worker shall take reasonable steps not to drive equipment over, or otherwise damage, a portable power cable or cable coupler.

Portable Luminaires

453. (1) If a portable luminaire is used, an employer shall ensure that

(a) the electrical extension cord and fittings are approved for the intended use and are properly maintained; and
(b) the electrical extension cord is not used to supply power to equipment other than the portable luminaire, unless the cord meets the requirements of section 451.

(2) An employer shall ensure that a portable luminaire used in a damp location or in a metallic enclosure, including a drum, tank, vessel or boiler,

(a) is operated at a potential of not more than 12 V; or
(b) is supplied by a circuit that is protected by a Class A ground fault circuit interrupter.

Exposed Metal Parts

454. An employer shall ensure that exposed metal parts of portable electrical equipment that are not designed to carry electrical current are connected to ground unless

(a) the equipment is of an approved, double-insulated type and is clearly marked as such;
(b) power is supplied to the equipment through an isolating transformer having a non-grounded secondary of not more than 50 V potential;
(c) power is supplied to the equipment through a Class A ground fault circuit interrupter; or
(d) power is supplied to the equipment from a battery of not over 50 V potential.

Portable Electric Power Plants

455. (1) An employer or supplier shall ensure that

(a) a portable electric power plant that is operated at voltages exceeding 240 V to ground or is rated in excess of 12.0 kVA is connected to ground in a manner required by the Electrical Protection Act or its regulations; and
(b) electrical equipment connected to an ungrounded portable electric power plant is
    (i) of the double insulated type, and
    (ii) clearly marked as being of the double insulated type or is supplied from a Class A ground fault interrupting device.

(2) Subsection (1) does not apply if the electrical energy is used for electric arc welding.

Electrical Panels

456. An employer shall ensure that electrical panels are

(a) approved for their intended use and location;
(b) protected from physical or mechanical damage;
(c) readily accessible; and
(d) fitted with an approved cover that has an approved filler in an unused opening.

High Voltage Switchgear and Transformers

457. (1) An employer shall ensure that a place where electrical switchgear or transformers operating at high voltage are housed is

(a) guarded;
(b) kept free of extraneous material; and
(c) adequately ventilated.

(2) An employer shall post a warning sign where high voltage switchgear or transformers are housed.

(3) A warning sign required by subsection (2) must

(a) indicate the highest voltage in use; and
(b) state that access is restricted to authorized persons only.

Fire Extinguishers

458. An employer shall ensure that a fire extinguisher approved for Class C fires is readily available to workers working on or near energized high voltage electrical equipment.

Grounding of Equipment Before Work Begins

459. Before work, other than work referred to in subsection 460(7), begins on a conductor or electrical equipment and during the progress of that work, an employer shall ensure that

(a) the conductor or equipment is isolated, locked out and connected to ground; or
(b) other effective procedures are taken to ensure the safety of workers.

Proximity to Exposed Energized High Voltage Conductors

460. (1) In this section, “utility tree trimmer” means a worker who has successfully completed approved training in respect of trimming trees while working near energized high voltage conductors. (ébrancheur d’arbres de services publics)

(2) An employer shall ensure that a qualified electrical worker who will be exposed to energized high voltage conductors has received approved training in high voltage safety prior to exposure.

(3) A qualified electrical worker shall not undertake high voltage electrical work unless he or she has

(a) written proof of having received approved training in high voltage safety; and
(b) the written proof referred to in paragraph (a) readily accessible while working near energized high voltage conductors.

(4) An employer shall ensure that workers do not work, that material is not piled, stored or handled, that scaffolds are not erected or dismantled and that equipment or powered mobile equipment is not used or operated, within the minimum distance from an exposed energized conductor set out in column 1 of Schedule Y.

(5) Subsection (4) does not apply to a worker who undertakes a specific one-time activity under the direct supervision of a qualified electrical worker.

(6) An employer shall ensure that a worker at ground potential does not approach an exposed energized conductor closer than the minimum distance set out in column 2 of Schedule Y.

(7) An employer shall ensure that a worker does not work closer to an exposed energized conductor than the minimum distance set out in column 2 of Schedule Y, unless the worker is a qualified electrical worker.

(8) If a qualified electrical worker works closer to an exposed energized conductor than the minimum distance set out in column 2 of Schedule Y, the employer shall ensure that

(a) the qualified electrical worker
  (i) performs the work in accordance with written instructions for a safe work procedure that have been developed and signed by a competent person who has been appointed by the employer for that purpose,
  (ii) uses equipment that is approved for intended use, and
  (iii) uses personal protective equipment that meets the requirements of Part 7; or
(b) the conductor is operating at 25 kV or less and is fitted with rubber and rubber-like insulating barriers that meet the requirements of an approved standard.

(9) An employer shall ensure that

(a) no part of a vehicle is operated on a public road, highway, street, lane or alley within the minimum distance from an exposed energized conductor set out in column 3 of Schedule Y; and

(b) no part of a vehicle's load comes within the minimum distance referred to in paragraph (a).

(10) An employer shall ensure that utility tree trimmers do not work within the minimum distance from an exposed energized conductor set out in

(a) column 4 of Schedule Y, for utility tree trimmers using conducting objects exposed to energized parts;
(b) column 5 of Schedule Y, for utility tree trimmers using rated tools exposed to energized parts; and
(c) column 6 of Schedule Y, for utility tree trimmers using rated insulating booms.

Exposed Energized Conductors Operating at Certain Voltages

461. If work is carried out in proximity to exposed energized conductors operating at 31 to 750 V, an employer shall ensure that the work is carried out so that accidental contact with the energized conductor is prevented.

Emergency Program

462. (1) If an electrical worker could come in contact with an exposed energized conductor and that contact could endanger the worker, an employer shall develop and implement an emergency program that sets out the procedures to be followed in the event of that contact.

(2) An emergency program developed under subsection (1) must include procedures to

(a) rescue a worker who has come into contact with a live conductor;
(b) administer first aid to a worker who has sustained an electric shock; and
(c) obtain medical assistance.

(3) An employer shall ensure that workers are adequately trained to implement an emergency program developed and implemented under this section.

SCHEDULE Y

(*Subsections 460(4), (6), (7), (8), (9) and (10)*)

Minimum Distances from Exposed Energized High Voltage Conductors

(Power Transmission Lines)

Voltage Phase to Phase (kV)	Voltage to Ground (kV)	Column 1 Metres (m)	Column 2 Metres (m)	Column 3 Metres (m)	Column 4 Metres (m)	Column 5 Metres (m)	Column 6 Metres (m)
230	133	6.1	1.4	1.83	2.4	1.41	1.85
138	79.8	4.6	1	1.22	1.9	0.92	1.35
72	41.6	4.6	0.6	0.8	1.6	0.61	1.05
25	14.4	3	0.3	0.6	1.2	0.12	0.55
15	8.6	3	0.3	0.6	1.1	0.12	0.55
4.16	2.4	3	0.15	0.6	1.05	0.04	0.5
0.75	0.75	3	0.15	0.6	1.05	0.04	0.05

2.15 LIMITS OF APPROACH

LIMITS OF APPROACH

Maintain Maximum Clearances and Install Barriers Where Practical

	Personnel Zones			Mobile Work Equipment		
Voltages	O.H.S.A. Minimum	Qualified Worker	Restricted Zone	O.H.S.A.	Non-Insulated Booms	Certified Insulated A.D.
750 V to 15kV	> 3.0m (10 ft.)	> 0.9m (3 ft.)	0.9m to 0.3m (3 ft. to 1 ft.)	> 3.0m (10 ft.)	> 0.9m (3 ft.)	> 0.3m (1 ft.)
> 15 kV to 35 kV			0.9m to 0.45m (3 ft. to 1.5 ft.)			> 0.45m (1.5 ft.)
> 35 kV to 50 kV		> 1.2m (4 ft.)	1.2m to 0.6m (4 ft. to 2 ft.)		> 1.2m (4 ft.)	
> 50 kV to 150 kV		> 1.5m (5 ft.)	1.5m to 0.9m (5 ft. to 3 ft.)		> 2.4m (8 ft.)	> 0.9m (3 ft.)
> 150 kV to 250 kV	> 4.5m (15 ft.)	> 2.1m (7 ft.)	2.1m to 1.2m (7 ft. to 4 ft.)	> 4.5m (15 ft.)	>3.0m (10 ft.)	> 1.2m (4 ft.)
> 250 kV to 550 kV	> 6.0m (20 ft.)	> 3.7m (12 ft.)	3.7m to 2.75m (12 ft. to 9 ft.)	> 6.0m (20 ft.)	> 4.6m (15 ft.)	> 2.75m (9 ft.)
Symbols ≤ less than or equal to > greater than < less than *Limits Adapted from Infrastructure Health and Safety Association (IHSA)				Cranes, Power Shovels, Back Hoes, Mechanical Brush Cutter	RBD, Aerial Ladder, Work Platform, Uncertified Aerial Device	Certified and Tested by Certified Laboratory

SECTION III DIESEL POWER PLANTS

Diesel engines vary considerably from plant to plant, but the principles of operation are similar. The Plant Superintendent and Operators are expected to operate the generating plant machinery in the safest and most economic manner. This involves making regular checks on all equipment and doing the day to day maintenance as required.

For more information on the operation of Diesel Power Plants refer to the Plant Operator Training Program Binder which can be found in the office of all power plants.

3.1 ROLES AND RESPONSIBILTIES: PLANT SUPERINTENDENT/OPERATOR

The Plant Superintendent/Operator is in charge and responsible for the plant. Anyone visiting or working in the plant must obtain permission to do anything in the plant.

The Plant Superintendent/Operator is responsible for:

- The safe and proper starting, running and stopping of the generators and diesel engines.
- Keeping the plant clean and ensuring that regular housekeeping is being maintained.
- Completing the QEC Plant Duties Checklist of the power plant, equipment and safety equipment and submitting them weekly as required.
- Ensuring tailboards and other safety documentation are being completed before work starts.
- Act as the Controlling/Issuing Authority (CIA) under the Work Protection Code (WPC).
- Act as a designated project site monitor for contractors and sub-contractors.
- Ensuring all visitors and contractors are aware of site hazards and the safety procedures that must be followed.
- Ensuring that everyone is wearing the proper personal protective equipment.

When other workers (skilled trades) are working in the plant they must get approval from the Plant Superintendent or Operator before beginning any work.

3.2 PLANT VISITS

All workers, consultants, contractors and visitors upon entering QEC property shall report to the operator in charge to make their presence known.

- All workers, consultants, contractors and visitors while on QEC property shall comply with all applicable health and safety rules and regulations.
- No Visitors shall be permitted in the Control Room or Operating areas during periods of trouble or emergencies.

3.3 CONTRACTORS

All Contractors who will be working on site need to have approval from the Area Production Manager.

An initial meeting shall be held between the QEC Plant Superintendent, Project Manager and the contractor to review all contract requirements related to Health, Safety and Environment, including but not limited to:

- Rules and applicable regulations
- Special permit requirements such as WPC or confined space entry
- QEC safety and health policies, rules and procedures
- Work site logistics

All contractors will be given a copy of the QEC Safety Rule Book. After reading the booklet they are to remove and sign the last page of the booklet and return to the Plant Superintendent who will keep it on file for the duration of the project. When the project is completed all signed forms will be sent to the HSE Department for filing.

The contractor shall keep a copy of the QEC Safety Rule Book on the job site for reference at all times.

If a contractor refuses to follow QEC safety rules and procedures he/she will be asked to leave the work site immediately. The Plant Superintendent will immediately inform their Area Production Supervisor, Project Manager and complete an Incident Report.

The contractor will not be allowed back on the work site without the written permission of the Area Production Supervisor.

3.4 PLANT SECURITY

NO ONE is allowed access to the plant without permission from the Plant Superintendent or Operator and visitors must be accompanied by a QEC employee.

The plant, the yard, along with all storage areas, are to be locked at all times when unmanned. The plant yard should be kept well lit.

3.5 LOG BOOKS

It is crucial that all events that occur in a power plant are documented either electronically or manually. In addition to equipment rounds and automated data records, operators should also maintain other pertinent information in the form of a control room log book (See page 2 of the Operator Training Manual for a complete list).

This chronological account should record the important events occurring throughout every work shift. Considered to have the force of a legal record, the correctness and detail of the information contained therein should reflect such consideration. The control room logbook is a valuable resource tool for others who must later chronicle important event sequences and verify past performance.

Log entries should be clear and accurate written statements with their corresponding dates and times. When possible, log entries should be recorded as the event occurs. Major routine events should be logged along with abnormal events affecting equipment status. Any incident or emergency should also be logged, taking care to document the initial indication, remedy actions, the cause and subsequent status. Log books should be maintained and stored after their use for future reference for a period of seven years.

The Plant Superintendent/Operator is responsible for ensuring that the following information is recorded in the log book for each power plant:

- Daily outside temperatures - note extreme weather conditions;
- Daily adjustment for frequency – clock changes;
- Fuel transfers;
- Phone calls from customers;

- Every repair or maintenance activity performed, either by a QEC employee or contractor;
- Times that the tank farm is checked;
- Any communication with Area Supervisor, corporate office or local/territorial officials;
- Injury and incident investigations;
- Inspections and routine preventative maintenance such as filter changes and fluid top-ups;
- Unusual load readings and power outages; and
- Visitors on site and the purpose of the visit.

3.6 STATION BATTERIES

Batteries are used to store electrical energy. However, the larger batteries found in the power plants can be dangerous and explode if used incorrectly.

- Caution shall be exercised to prevent electrical sparks or open flames in the vicinity of lead acid batteries.
- Appropriate non-combustible covers shall be used at battery stations.
- Battery covers shall be kept clean and are not to be used as storage or work benches.
- Regular inspection of batteries and covers is to be done and noted in the plant log book.

3.7 CONFINED SPACES

A work area shall be treated as a confined space if it is an enclosed or partially enclosed space that is both not designed and constructed for continuous human occupancy, and in which atmospheric hazards may occur because of its construction, location or contents or because of work that is done in it.

- No worker shall enter or work in a confined space without proper training. Training records for contractors must be provided to QEC.

- Approved QEC procedures and the Confined Space Code of Practice shall be followed for all confined space entry and work.

3.8 FLOOR OPENINGS

- When working from catwalks, staging, open grates, or any elevated position, suitable covering shall be used over the work platform to prevent objects from dropping to a lower level.
- Danger areas shall be barricaded and signs posted.

3.9 CRANES

- No worker shall use a crane or hoist without proper training on that equipment.
- A log book shall be provided for each crane or hoist in a diesel plant.
- Overhead cranes and hoists shall be serviced annually. Service shall be done by a certified inspector. Cranes and hoists shall be recertified by a qualified inspector following any structural repairs (such as alterations to rails)
- Approved QEC procedures shall be used for all lifting operations.

3.10 COMPRESSED AIR

Compressors and air receivers shall have safety valves mounted on them and these shall be tested as per manufacturers' specifications.

Air compressors shall have moving parts guarded from both sides where practicable.

3.11 BURNING, CUTTING AND WELDING

Before approving any cutting, burning or welding permits, the work area shall be inspected to confirm that precautions have been taken to prevent fire.

Permit

- Prior to any cutting and welding, a permit must be obtained from the Operator in charge via the control room.
- Cutting and welding shall only be done by qualified persons.
- For any cutting and welding, a fire watch must be provided as per the rules of the permit.

Equipment

- Cylinders containing compressed gas shall be secured in an upright position.
- Proper welding curtains and blankets shall be used to prevent bystanders from receiving injuries.
- When cutting and welding equipment is not in use, cylinder valves shall be closed and the pressure released.
- Flashback arrestors shall be used on all oxygen/acetylene regulators to stop the flame or reverse flow of gas back up into the equipment. This protects the user and equipment from damage or explosions.
- Cylinders shall have the valve cap or valve protection device in place at all times except when in actual use.

Building

- If welding is to be done inside building, proper ventilation shall be in place to handle the fumes. If ventilation is insufficient, proper respiratory PPE shall be worn.

Fire Watch

- Work area and adjacent area in which sparks and heat might have spread (including floors and above and below and on opposite sides of walls) must be inspected for at least 30 minutes after work is completed and found to be fire safe.

Precautions

- Fire extinguishers are to be kept in the immediate area;
- Floors swept clean of combustibles;
- Wet down combustible floors prior to starting;
- Remove or cover with covers, guards, or metal shields all combustible material or flammable liquids;
- Cover all wall and floor openings; and
- Covers suspended beneath work to collect sparks.

3.12 TRANSFER OF DIESEL FUEL

Purpose

The purpose of these procedures is to document the tasks and responsibilities related to the transfer of diesel fuel on QEC properties to ensure they are handled in a manner which minimizes the potential for spills, leaks and environmental damage.

This procedure applies to the proper transfer of diesel fuel to and from bulk storage systems throughout QEC (operational areas, plants, bulk fuel storage areas). There are two distinct procedures; one to handle transfers from tank to tank and another to handle transfers from truck to tank.

Tank to Tank Fuel Transfer Procedures

- Employees shall carry radio communication equipment that is fully operational and be in communication with each other during the transfer.
- Ensure both tank (dead storage and live tank) vents are fully opened. *Live tank is the tank being filled*
- Take opening dip reading from the live tank and record them first on paper then using the appropriate electronic tank dip sheet form. The tank dip sheet header names the Plant #, the tank #, and whether it is horizontal or vertical.
- Determine the amount of fuel in the live tank and how much fuel is required for a proper fill.
- Open the fill valve to the live tank.
- Walk the above ground fuel pipe line (in winter it may be buried in snow) between the tank farm and the live tank and check for leaks.
- Inspect the pump house for leaks.
- Dip the tank from which the fuel will be pumped – record tank number and readings again using the appropriate electronic tank dip form.
- Station one employee at the pump house and one at the live tank.
- Open valves at the tank farm and pumping station and proceed to pump.
- Never leave your station during fuel transfer procedures. If you have to leave, stop pumping and shut the valves off accordingly.
- Dip each tank every hour and record readings.
- Should the high level alarm sound at the live tank, or it be filled to within 90%, stop the pump.
- Shut off the valve at the pump house to the live tank.
- Shut off the valve to the tank farm at the pump(s).
- Shut off the valve at the tank farm tank.

- Dip the tank farm tank and record the readings.
- Dip the live tank and record the readings.
- Ensure the dip hatches on both tanks are closed.
- Walk the above ground pipeline. Check for leaks and check all valve positions.
- Submit opening and closing dip reading to the Area Supervisor. Ensure the EC-00000xxx number of your fuel system is recorded on all documentation.
- If possible, have a third person with radio communication walking the above ground fuel line during the fuel transfer to observe any leaks while the line is pressurized

Important* It is a requirement to be in constant attendance of the transfer equipment at all times.

Truck to Tank Fuel Transfer Procedures

- Walk the line from the truck fill point to the open fill valve at the tank.
- Ensure the valve at the fill point is closed; open the fill valve at the tank.
- Inspect the tank vent line, ensure there are no blockages.
- Check that the drip tray under the truck fill connection is fully drained and empty and the drain valve is closed securely.
- Take opening dip reading from the live tank and record them first on paper then using the appropriate electronic tank dip sheet form. The tank dip sheet header names the Plant #, the tank #, and whether it is horizontal or vertical.
- Determine the amount of fuel in the tank and the amount required to fill it.
- Ensure that the truck retractable bonding/grounding wire is properly connected to the fill point piping. This is necessary to dissipate the static electricity generated during the transfer of flammable liquids.
- Ensure that the hose is properly connected to the truck fill point and locked. The truck fill point and hose connection shall be of the Camlock ‘Quick Coupling’ type with a dry disconnect.
- If there are any issues with the bonding/grounding wire, the hoses, or the fuel transfer connections, stop the transfer and report to supervisor before proceeding.

Note* It is illegal to truck fill the storage tank from the top of the tank due to potential static electricity hazards. Proper grounding/bonding is required.

- Establish visual communication signals by hand with the driver for the start and stop of the pump and make sure you understand each other.
- Open the fill valve at the truck fill point.
- Authorize the truck driver to start pumping.
- During the pumping stage, walk the line to determine if there are any leaks in the filling system under pressure.
- Be in constant communication with the truck driver either visually or by radio at all times.
- Ensure that the tank is filled not more than 90% from the tank top to allow for volume expansion, or until the high level alarm is sounded if the tank is so equipped.
- Signal the truck driver to stop pumping.
- Shut off the truck fill point valve and the tank fill valve.
- Ensure the EC-00000xxx number of your fuel system is recorded on all documentation including the fuel delivery slip. Sign the fuel delivery slip for the fuel received and obtain a copy.
- Remove the static line.
- Empty the drip tray and clean it out.
- Dip the fuel and record (closing).
- Close the gauging hatch.
- Carry out the final inspection of the tank and the fuel pipe line. Ensure the proper valves are open and closed.

Important* It is a requirement to be in constant attendance to the transfer equipment at all times.

4.1 QUALIFIED WORKERS

- Only qualified workers, or workers in training under the continuous direction of a journeyman powerline technician, shall be assigned to work on energized conductors or apparatus of the distribution system.
- Only qualified workers shall be permitted access to any enclosure, compartment or vault which contains energized cables or apparatus. Other workers requiring access to an energized area must be accompanied by an authorized person.

4.2 LIMITS OF APPROACH

- Limits of approach were developed to allow workers to work safely in close proximity to electrical apparatus.
- 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	O.H.S.A. Minimum	Qualified Worker	Restricted Zone	O.H.S.A.	Non-Insulated Booms	Certified Insulated A.D.
750 V to 15kV	> 3.0m (10 ft.)	> 0.9m (3 ft.)	0.9m to 0.3m (3 ft. to 1 ft.)	> 3.0m (10 ft.)	> 0.9m (3 ft.)	> 0.3m (1 ft.)
> 15 kV to 35 kV			0.9m to 0.45m (3 ft. to 1.5 ft.)			> 0.45m (1.5 ft.)
> 35 kV to 50 kV		> 1.2m (4 ft.)	1.2m to 0.6m (4 ft. to 2 ft.)		> 1.2m (4 ft.)	
> 50 kV to 150 kV		> 1.5m (5 ft.)	1.5m to 0.9m (5 ft. to 3 ft.)		> 2.4m (8 ft.)	> 0.9m (3 ft.)
> 150 kV to 250 kV	> 4.5m (15 ft.)	> 2.1m (7 ft.)	2.1m to 1.2m (7 ft. to 4 ft.)	> 4.5m (15 ft.)	>3.0m (10 ft.)	> 1.2m (4 ft.)
> 250 kV to 550 kV	> 6.0m (20 ft.)	> 3.7m (12 ft.)	3.7m to 2.75m (12 ft. to 9 ft.)	> 6.0m (20 ft.)	> 4.6m (15 ft.)	> 2.75m (9 ft.)
Symbols ≤ less than or equal to > greater than < less than *Limits Adapted from Infrastructure Health and Safety Association (IHSA)				Cranes, Power Shovels, Back Hoes, Mechanical Brush Cutter	RBD, Aerial Ladder, Work Platform, Uncertified Aerial Device	Certified and Tested by Certified Laboratory

4.3 HANDLING ENERGIZED CONDUCTORS

- Only qualified workers using appropriate Personal Protective Equipment and following proper procedures shall handle live conductors.
- Workers shall not handle energized conductors which are part of an overhead system unless they use adequate protective equipment and are suitably insulated from other conductors or grounded components such as cross arms, guy wires, lighting standards, etc.

4.4 EQUIPMENT CONSIDERED LIVE

- Electrical equipment and lines shall always be considered as live unless they are known to be DE-ENERGIZED, ISOLATED and GROUNDED.
- Before starting any work, complete an inspection of adjacent structures.
- Conductors designed to operate at ground potential may become energized by reason of faulty or inadequate connections, and therefore shall be handled with similar caution as exercised when handling energized conductors.

4.5 RUBBER GLOVE WORK OVERHEAD – up to and including 25kV

- All protective equipment including rubber insulating gloves used in work performed on voltages up to and including 25kV phase shall have a Class 3 rating. Class 2 rated rubber gloves can be used for up to 5kV. Leather protectors shall be worn over rubber insulating gloves.
- A live line permit must be issued under the WPC prior to performing any work.
- In rubber insulating glove live line work, all conductors or attachments that could create an electrical hazard shall be covered with protective equipment of the proper voltage rating.
- Wherever practical work from below rather than from above.

4.6 RUBBER GLOVE WORK UNDERGROUND – TO 25kV

- Rubber insulating gloves with a Class 3 rating and with appropriate leather protectors 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.
- Rubber gloves shall be worn continuously while work is being performed in the enclosures or compartments until:
  - The covers or panels have been replaced and the gates or doors closed and locked; or
  - The conductors are DE-ENERGIZED and the work made safe.

4.7 WORKING ON CABLES AND APPARATUS – TO 25kV

- Rubber protective equipment and or approved barriers shall be placed to eliminate the possibility of unintentional contact with exposed conductors.
- Protective equipment installed directly on energized apparatus greater than 750 volts shall be placed in position of cables or apparatus on which work is to be performed.
- Approved procedures shall be followed to ensure positive identification of cables or apparatus on which work is to be performed.
- No work shall be carried out on de-energized underground conductors until the work area has been made safe using adequate barriers or protective covering to prevent accidental contact with adjacent energized conductors.
- Moving energized cables:
  - Energized cables shall be moved by qualified workers with extreme care to avoid damage to cable insulation.
  - When moving cables energized up to and including 25kV phase to phase, rubber gloves with a minimum Class 3 rating shall be worn.
  - During work at locations where energized separable connectors are installed, workers shall ensure that except for approved switching operations, no physical pressure is applied to a cable or separable connector that will cause any movement, distortion or dislocation of the connector.

4.8 FERRORESONANCE

- In a circuit inductive reactance and capacitive reactance are matched (equal), an abnormally high voltage may result.
- This situation may exist where a three phase wye system, feeding an unloaded three phase transformer through shielded cable, is switched at a riser pole.
- With one phase open, this cable constitutes a capacitor in series with the unloaded transformer coils.
- If this combination of capacitive and inductive reactance is capable of series resonance, ferroresonance may take place. A violent arc could develop at the switch point during switching operations due to the abnormally high voltage rise which could be well in excess of the Basic Impulse Level of the switch gear.

- When ferroresonance occurs in a transformer, high voltages three to five times the rated primary can appear on the primary, in the core and on the secondary. Oil in the transformer heats to temperature extremes that can be reached in minutes, blowing out of vents and bubbling paint on top of the transformer. Surge arrestors – not designed to clamp sustained over-voltages – can cook to destruction, sometimes fragmenting during failure.
- Protective equipment is a must during all switching operations and would prove even more beneficial if/when exposed to the preceding situation.

4.9 PULLING CABLE

- Cables shall not be pulled into vaults or maintenance holes containing energized apparatus until a safe work area has been established.
- Ducts shall be fished or cables pulled in the direction which presents the least hazard.
- Precautions shall be taken when compressed air or other mechanical means are used.
- Workers shall remain outside maintenance holes for vaults when cables are being pulled by mechanical means from outside the enclosure and tension is applied to the pulling rope or cable, except for training cables into position.

4.10 CARE OF PROTECTIVE EQUIPMENT

- Rubber and fiber protective equipment shall be laboratory tested as required (every 6 months, 12 months, or two years) or should this equipment become suspect. Refer to *SWP 028: Inspection and Testing of Rubber Insulating Gloves and Electrical Protective Devices.*
- Rubber insulating gloves are to be visually inspected (inside & out) for damage daily prior to use and after any incident suspected of causing damage. S*ee SOP-22, Internal Inspection, Care and Use of Protective Rubber Insulating Gloves* for detailed test procedures.
- To minimize corona and ozone damage, rubber protective equipment shall not be allowed to remain in place on energized lines any longer than absolutely necessary.
- Booms of aerial devices, jibs, buckets and lines used on or in the vicinity of live lines shall be electrically insulated.

Switching Operation

- Workers shall wear rubber insulating gloves with leather protectors during switching operations (except when opening cutout switches while using an approved live line switch stick).
- Approved live line switch sticks or live line clamp sticks of sufficient length to maintain a safe working distance from live apparatus shall be used in switching operations.
- Portable ground gradient control mats shall be used when performing the following operations:
  - Operating air break switches, load interrupters, load break switches;
  - Operating motor operated switches by hand.

4.11 LIVE LINE WORK

- Live line work shall only be performed where practical and when deemed necessary.
- Live line operations shall be carried out under the protection of a Live Line Permit.
- The supervisor or person in charge shall:
  - Hold documented tailboards and advise of any hazards.
  - Ensure that the work is carried out under the supervision of a person competent in the work being performed.
  - Be responsible for ensuring that live line tools and equipment are electrically tested at least every two years and for keeping the records on file.
- Workers shall not use live line tools on energized lines or equipment unless they have been instructed in the proper use of these tools.
- At least two qualified workers are required to perform work on energized lines or equipment using live line tools.
- When two journey persons are working on energized high voltage lines or apparatus, they shall both work from the same pole boom structure or aerial lift and confine themselves to working on the same phase conductor or task at hand.
- When live line tool work is in progress, no other work shall be carried out on the pole structure or adjacent structures.
- Live line tools shall:
  - Be regularly maintained and cared for in a manner to preserve their insulating qualities. Refer to *SWP-029: Live Line Tool Inspection, Storage and Handling*.
  - Not be altered or repaired except by those authorized.

- Be kept free from dust/moisture and under no circumstances be laid directly on the ground.
- Always be raised and lowered by means of a hand line.

4.12 COVERED CONDUCTORS – INSULATION

- Workers shall not depend on conductor covering for personal protection. All conductors shall be considered as bare conductors as far as personal protection is concerned.

4.13 CLIMBING AND WORKING ALOFT

- Workers shall not wear climbing spurs while:
  - Driving vehicles;
  - Doing work on the ground;
  - On ladders;
  - In aerial buckets; or
  - On platforms
- The length of the gaffs on climbing spurs shall not be less than 2.17cm (1 ¼ inches) measured on the inside of the gaff.
- Workers shall not climb or work aloft on poles or structures or in an aerial device without first being secured through the use of a suitable fall arresting device (belt on ground to ground) with pole choker device.
- The pole strap snaps must be checked for full engagement with the belt in the “D” rings before entrusting the strap.
- Suitable work clothes, including a long sleeved shirt or jacket extending to the wrists shall be worn when working aloft (ARC/FR Rated).
- All tools and materials shall be passed to workers working aloft by means of tool bags or hand lines and under no circumstances shall anything be thrown from the structure to the ground or from workers. Tools and materials shall not be laid on cross arms or ladder or in other places or positions from which they may fall.
- All poles shall be carefully inspected before climbing to ensure the poles are in safe condition for the work to be performed.
- If the condition of the pole is in doubt or if mechanical stresses or strains on the pole are to be changed it shall be adequately guyed or supported by a radial boom derrick or other suitable means before climbing.
- Under no circumstances shall pike poles be used to support a pole where workers are required to work above them.
- Care shall be exercised to avoid standing or placing weight on pole attachments.

- When two workers are to work in the same pole the second person must not begin to climb until the first person is in position. Extreme care shall be taken when working above or climbing past another worker.
- Every precaution shall be taken to avoid weather cracks, knots, metal signs, ground wires, etc. which could cause spurs to kick out. Both hands must be available for climbing. The use of the pins, brackets, cross arm braces or other attachments for hand holds should be avoided.
- Handlines shall be kept clean and dry to prevent leakage currents which could cause a shock hazard when working in the proximity of energized equipment and apparatus.
- Never perform live line rubber glove work while working from the pole.
- Handlines must be able to pull clear of a climber's belt in the event of an unusual down pull. Accordingly, handlines shall never be attached to the climber's body belt by the use of the snap hooks or tied knots, etc. Upon reaching the working position a worker shall remove the handline from the belt and attach it to the structure in an approved manner. Workers on the ground must be constantly on the alert to keep handlines clear of any snagging situations especially in the vicinity of vehicular traffic.

4.14 GROUND WORK

- Work shall not be carried out on the ground that would present a hazard to workers working aloft e.g. installation of ground rods, ground wire molding use of tamping bars, pulling of guy wires, etc.
- No work, other than those necessary to carrying out of the work aloft shall be permitted in the immediate vicinity of a pole or structure due to the hazard of falling objects.
- It is the responsibility of the person working on the ground to remain alert at all times.

4.15 POTENTIAL TESTING

- Only approved devices shall be used to test for electrical potential. Refer to *SOP-039: De-Energized Isolated System Confirmation Prior to Temporary Ground Installation*.
- All voltmeters, multimeters and phase rotation indicators rated to 750 volts A.C. shall be equipped with fused leads (CAT III or better), or be otherwise suitably protected.

4.16 GROUNDING

- For work on overhead lines, approved equipment bonding and grounding methods shall be used.
- Grounding devices of adequate current carrying capacity shall be placed on conductors between the work locations and all possible sources of electrical energy.
- Grounding devices shall be installed with a live line tool only after potential tests have been completed.

4.17 BACKFEEDS

- In a three phase system with three phase transformers, or single phase transformers banked together should one or two of the phases be opened for whatever reason, a backfeed on the open phase or phases may be encountered.
- This backfeed voltage under certain conditions maybe considerable higher than normal phase to ground voltage.
- In the case of the two phase system, a similar situation could exist when a single phase is opened.
- It is imperative that personnel who could be exposed to a backfeed hazard are made fully aware of the possibility as well as the procedures and protective equipment to be used to ensure a safe work environment.

4.18 BOOMS, CABLES AND CONDUCTIVE MATERIAL

- Steel cable slings or metal booms shall not be used to raise transformers, poles or material in the proximity of high voltage lines.
- Boom trucks used for hoisting shall be operated within the manufacturer's safe load limits and limits of approach.
- Metal ratchet hoist shall not be used on or near energized conductors.

4.19 STRINGING AND REMOVING CONDUCTORS

- During stringing operations in proximity to energized conductors, proper ground techniques shall be employed.
- When conductors are strung or removed over streets or thoroughfares where there is danger of the conductors interfering with or falling into traffic, workers equipped with warning devices and or barricades shall be stationed at suitable locations.

- When stringing or removing conductors from above, below or beside unattached circuits or circuits supported on poles or tower, precautions shall be taken to adequately protect workers. Rubber protective equipment is used when conductors are being handled so that no harm will occur if the conductor should accidently contact energized conductors. Workers attending the reel shall wear rubber gloves and keep all parts of their body free from contact with the conductor.
- Unless radio equipment is used, a sufficient number of workers shall be stationed so hand signals can be read, relayed and understood clearly.
- When stringing or removing conductors crossing energized lines suitable guard structures or insulated guards shall be installed at the point of crossing in order to eliminate the possibility of accidental contact.
- Workers involved in stringing operations shall stay clear of the bright ropes of conductors under tension.

4.20 TENSION STRINGING

- Workers operating tensioning equipment shall be familiar with the equipment and competent in its operations.
- During tension stringing operations in proximity to energized conductors, tensioning equipment shall be properly grounded and completely surrounded by a bonded ground gradient control mat and protected by a full barricade.
- In addition to the above, bare conductors being strung under tension shall be grounded at various locations along the length of the conductor by the use of traveling ground.

4.21 POLE HANDLING AND TRANSPORTATION

- Only approved methods, tools and equipment shall be employed during pole handling operations.
- Workers and equipment shall be positioned to minimize danger of injury or damage should control of a pole or poles be lost.
- When handling preservative treated poles, take precautions to avoid skin contact; take particular care not to rub the eyes or wipe perspiration from your eyes or face with your hands or with your shirt sleeves that have been exposed to preservative.
- Rubber gloves with leather protectors shall be used when handling poles that will be coming within the proximity of either energized or isolated conductors or apparatus at 750 volts or more.

- Pole piles shall be made stable by the use of the chocks or secure ties on each layer of poles.
- Workers shall not ride on piles of poles, trailers or dollies.
- Any load which overhangs the rear of the vehicle to the extent of 1.5 metres or more shall display at the extreme rear end of the overhanging load a red flag during daylight and a red light between dusk and dawn.

The person in charge shall direct the handling of poles:

- One worker will give the standard signals.
- Poles shall be handled from the end of the pile.
- Workers shall not needlessly climb on the pole pile.
- Poles shall be rolled away from the workers using ropers or cant hooks. Do not catch poles with cant hooks while the poles are in motion.
- Web hoists and rope blocks suitable for use on energized conductors shall be maintained as live line tools.
- Web hoists and rope blocks shall not be considered as fully insulated on voltages in excess of 750 volts phase to phase and shall be used in conjunction with link sticks or other approved live line tools.

4.22 AERIAL DEVICES

- Aerial devices shall be operated with the limitations of the manufactures' specifications.
- The truck shall not be moved while the ladder or aerial device is aloft. In the case of aerial ladders, the position of the ladder shall not be changed while the worker is aloft.
- Only one worker shall work from an aerial ladder.
- When a worker is aloft in an aerial device, a second worker competent to effect a rescue shall be available on the ground as well as having a controlled descent device available in the bucket.
- When working from an aerial ladder or other aerial device, the worker shall wear a suitable fall arresting device and lanyard securely fastened to the ladder or to an approved attachment on the aerial device.
- When a worker is aloft in an aerial device a rope of sufficient length shall be carried to raise a rescue rope or controlled descent device if required.
- Only dielectrically tested insulated aerial devices shall be used for live line work at 750 volts or more phase to phase.
- Prior to commencing live line work booms shall be cleaned and inspected.

- Aerial devices shall be dielectrically tested at least every 12 months or whenever any electrically insulated component is altered, changed or repaired.
- The electrical testing of aerial ladder devices shall be in accordance with
- *CSA Standard C225-10 Vehicle Mounted Aerial Devices*.
- Aerial devices used to raise workers aloft for live line work at more than 750 volts phase to phase shall be equipped with upper and lower controls. Lower controls shall be capable of positively over riding upper controls.
- During live line work from an aerial device (other than switching) on circuits energized at more than 750 volts phase to phase a second worker shall be available to render assistance from the ground.
- Bucket liners shall be used in buckets of an aerial device when engaged in rubber glove live line work at more than 750 volts phase to phase.
- During rubber glove live line work, the booms of radial booms derricks with boom and bucket attachments shall be extended to such distance that will eliminate possibility of shunting out (bridging) the insulated portion of the boom (preferably full extended).
- 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.
- Workers shall not ride in the bucket while the truck is traveling.
  - Exception: if the bucket is always returned to the cradled position for each move, workers may ride in the bucket for short moves at the work location.
- All aerial device vehicles shall be equipped with wheel chocks or outriggers. When aerial devices are in use wheel chocks or outriggers shall be used/deployed to prevent inadvertent vehicle movement.

4.23 SAFE WORK DE-ENERGZED vs ENERGIZED DECISION TREE

Using the Decision Tree

The decision tree is a guideline to help decide when to plan an outage. Our goal is to perform the work safely, provide a satisfactory level of service, while minimizing cost. It is not to have the fewest number of customer interruptions.

We should give customers advance notice of outages whenever practical. Customer Notification is to be according to the policies.

Use the Decision Tree to determine if an outage is required.

Priority Considerations

1. First consideration should always be given to doing the Work De-energized.
2. Plan to work de-energized unless a Highly Sensitive Customer involved as per definition.
3. A Safe Work Plan and tailboard safety conference is required at all times.

Other Considerations

There may be other considerations such as:

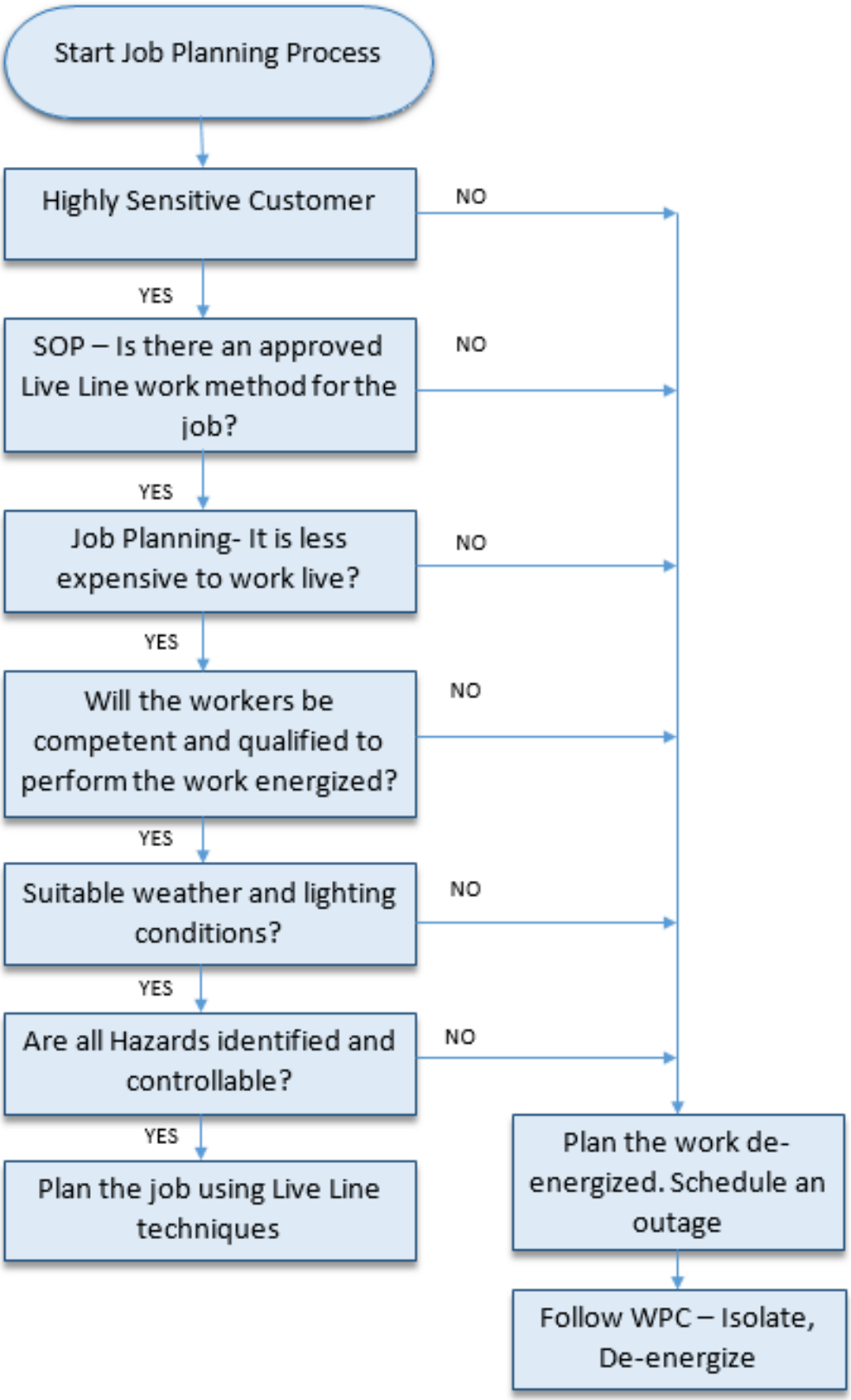
- serious customer complaints
- changing weather conditions (Bad Weather)
- changing system conditions
- equipment problems
- Complex Jobs
- inability to use notification and job scheduling

The above considerations will influence whether or not a job should be done live.

Definitions

Bad Weather	This includes very cold (-30°C), very hot (30°C), very windy (over 25 km/hr) or wet conditions.
Complex Job	A job that requires work on a cluttered structure or a number of coordinated steps to complete.
De-energized Work	Is work performed on an electrical system that is isolated, grounded and tested to verify it is at a zero
Extra Cost	The extra of doing the job de-energized vs live. This includes the cost of labour, materials, switching, and customer notifications.
Highly-Sensitive Customer	A customer whose life or long-term health would be threatened, or would suffer a major loss of revenue and/or inventory resulting from a power interruption.
Live Line Techniques	The use of insulating barriers while following an approved work method to safely perform work on an energized system.

Decision Tree



5.1 STORES AND WAREHOUSE AREAS

A safe, orderly and efficient stores/warehouse is an essential part of the way goods are sent, received, stored and circulated throughout the corporation.

General Hazards

Consider some of the general types of hazards that may be encountered in a warehouse:

- Slips, trips, and falls.
  - When you carry and move materials on different levels, and on different types of floor surfaces, it's easy to lose your balance or stumble over an out-of-place item.

- Hit by falling objects.
  - Items that aren't carefully stacked on floors, shelves, and other surfaces can fall on a head, a body, or a foot.

- Placing items in storage—or removing them.
  - A slip or fumble can send those items flying.

- Warehouse equipment can also pose hazards.
  - Motor vehicles, hand trucks, and ladders can all cause incidents or injuries.

- Skids, pallets, rope, and strapping can be dangerous to workers who aren't wearing gloves; they may be hurt by splinters or loose nails.

- Carelessly placed empty skids or pallets can be hazardous too — especially if you're the one who bumps into or trips over them. Multiple pallets should be stored in piles. Single pallets should be stored on their side where they won't fall over.

- A rope can be hazardous if it breaks while in use. Another potential hazard is an extended rope that's pulled too tight. A break or sudden release can whip anyone in the vicinity quite painfully.

- Materials stored in a warehouse can also pose dangers.
  - Hazardous substances or flammable or combustible materials can be both physically harmful as well as affect health. Refer to the product SDS for proper storage information.

- Manual lifting is a major potential source of back injuries.
  - If you don't lift properly, you will struggle with a load that's too high or unbalanced to move easily. Then you're at risk not just of back injuries but of tripping or bumping into things.

Safe Storage Practices

Safe storage is more than keeping everything in its proper place, it includes checking what you're storing to determine if it needs certain conditions — dry, dark, ventilated, etc. It also means placing items safely so people won't bump into them causing the item to come tumbling down and landing on someone. We also have to be able to remove stored items easily when we need them. Here are some general guidelines to keep in mind when placing any materials in storage:

- Check that shelves and racks are sturdy and in good condition.
- Stack all materials on a flat base.
- Place heavier objects close to the floor, lighter/smaller objects higher.
- Don't stack items so high that they could block sprinklers or come in contact with overhead lights or pipes.
- Use material handling equipment or stand on a ladder to place or remove items above your head. Never stand on a shelf or rack or on boxes or chairs.
- If you have to stack empty skids or pallets, use equipment or get a helper. Don't drop or walk on empty skids or pallets; it could weaken them. In addition:
  - Stack empties flat, not on end.
  - Don't let them jut out into aisles.
  - Stack them no more than four feet high.
  - Watch out for splinters or nails.

Packing and Unpacking

Be aware of hazards and safety procedures when you pack and unpack containers. All cutting tools demand caution. Hold and use in a manner

that won't cut you or someone else. Don't leave blades on the floor or any surface. Refer to *SWP-032 Utility Knife Safety* regarding the safe use of utility knives and disposal of blades.

Always wear heavy gloves and safety glasses when you attach or remove strapping. Use cutting tools that don't leave sharp edges. If you're packing, be sure to put the straps on with just the right tension—not too loose or too tight. Don't lift by the strap unless it's designed for that purpose.

When you remove the straps, use one hand to hold down the strapping and one to cut. Make sure that the sharp strapping end will go away from you when you cut. Once the straps are cut, place them immediately in a trash container for disposal.

Preventing Falling Objects

One of the biggest hazards in a high-ceilinged warehouse is getting hit by falling objects. An object doesn't have to fall far to cause an injury. To avoid such incidents, keep these safe work practices in mind:

- When working at heights, use signs and barricades to alert people on the ground level.
- When working on the ground, pay attention to warning signs and don't stand under people or materials.
- Don't keep tools and materials on the edge of a platform, ladder, railing, etc.
- Don't let tools stick out of your pocket when you are working at height; they could fall out when you bend or lean over.
- Don't stand or walk underneath a crane, forklift, etc.

Safe Lifting

- Stand close to the load and squat down to it; don't bend over. Grip the load firmly with your hands and bring it close to your body, with your weight centered**.**
- Tuck in your chin, and then let your legs push your body up.
- Be sure you can see over the load.
- As you move, take small steps and don't twist. Move your feet to change direction.
- To unload, face the spot and lower the load slowly, bending your knees.

- Place the load on the edge of the surface, with your fingers away from the bottom. Then slide the load forward.

Ladders

Material handling is not, of course, the only potential source of hazards in the warehouse. To make effective use of warehouse space, materials are often stacked. That means climbing ladders to get to the top shelves or racks in high places. To prevent falls, we use our knowledge of ladder design and ladder safety.

Ladders come in different types and lengths, designed for different uses and rated to hold different weights. When you select a ladder for a job, be sure it's taller than the point you want to reach and rated to hold you and anything you might carry. Inspect a ladder carefully before use; don't use one that has any missing or broken parts. In addition, keep these ladder safe work practices in mind:

- Never use a metal ladder around live electricity. Only fiberglass ladders are permitted on QEC power plant sites.
- Set an extension ladder on a firm level surface, with its feet parallel to the firm surface it leans against.
- Angle the ladder so its feet are a distance from the wall that equals ¼ its length. In other words, set the bottom of a 12-foot ladder 3 feet from the wall.
- Don't place a ladder against a window, window sash, unlocked door, or anything unstable like loose boxes.
- Secure the bottom of the ladder—or have someone hold it.
- Never allow more than one person on a ladder.
- Face the ladder and hold the side rails as you climb up or down. Always maintain a three point contact when using a ladder.
- Carry tools and materials with a rope or belt—not your hand.
- Stand centered on the ladder; don't stretch or lean to the side.
- Stand no higher than four steps or rungs from the ladder top—two for a stepladder.

5.2 WORKSHOP AND GARAGE AREAS

Machine repairs, welding, electrical work, carpentry, are just four of the jobs that could be associated with workshops at QEC. Good housekeeping and regular cleaning will reduce/eliminate injuries such as cuts and pulled muscles within the work area. A lack of protection when welding could result in “arc eye” or respiratory problems; oil on a floor could result in slipping; permanent or temporary deafness can result from a lack of hearing protection when running equipment.

Housekeeping

- Workshops must be kept clean and tidy.
- Combustible materials must not be allowed to accumulate in workshop areas.
- Spillages and waste materials must be cleaned up immediately.
- Broken glass, metal shavings and other sharp objects must be disposed of appropriately.
- Oily rags and cotton waste must be placed in an enclosed metal container separated from other waste materials.
- Do not store heavy or bulky items on high shelves.

Workshop equipment

- All tools, equipment, and machinery, must be visually inspected for defects before use and must be maintained in a safe, clean, and efficient working condition.
- Cutting tools must be sharp and the cutting edges must be covered when not in use.
- Tools must be returned to designated storage cupboards after use.
- All machinery must be retrofitted with guards and appropriate safety devices.
- Adjustable guards must be in place at all times when machinery is operating.
- Access to bump switches and other safety devices must not be restricted. Interlocks and emergency ‘off’ switches must be regularly tested.
- Machinery must be electrically isolated prior to cleaning, maintenance, or repair.
- Lifting equipment must be tested annually.
- Ladders must be inspected prior to use and must be secured when not in use.

Workshop Practice

- Every person who works in a workshop has a duty to ensure that work is carried out in a safe manner without foreseeable risk to the safety of themselves or others.
- Great care must be exercised when using mechanical equipment to avoid personal injury or injury to others.
- Eating and drinking are not permitted in any workshop.
- Long hair, jewelry, and items of clothing, MUST NOT be allowed to hang loose when machinery is operated. Rings must not be worn.

SECTION VI OFFICES

6.1 GENERAL

When we think of workplace hazards, we most often think of a worker working in the plant surrounded by generators and other equipment, or outside working around heavy equipment and all of their associated hazards. It is often thought that workplace hazards automatically disappear at the office door.

Unfortunately, this is not true. It is not unusual to hear of an office employee tripping over a computer cord or straining his/her back while moving a piece of office furniture.

An office setting has its share of safety hazards, but many can be eliminated.

Office Traffic

- Keep floors clean and free of spills such as beverages, melting snow and rainwater.
- Always walk, never run.
- Keep aisles and hallways clear of clutter, debris and tripping hazards such as wastebaskets, electrical and computer cords, foot stools and open drawers.
- Keep accesses and egresses clear and never store materials in stairways.
- Wear footwear. Never walk around barefoot or in sock feet.
- Report torn or loose carpets, curled walk off mats, loose tile, uneven floor surfaces or any other condition that could lead to a slip, trip or fall to a supervisor immediately.

File Cabinets

- Close file, desk and cabinet drawers when not in use.
- Put file cabinets and other storage cabinets far enough away from doors and aisles as to not interfere with exit routes or high traffic areas.
- Place the heaviest files or items in the lower drawers of file cabinets.
- Open only one drawer at a time.
- Use only the handle to open and close drawers to avoid finger injuries.

SECTION VI OFFICES

Documents

- Use caution when handling paper to avoid cuts.
- Fully close staples. Use a staple remover to remove staples.
- Utilize thumb guards if handling multiple pieces of paper.

Electrical Equipment

- Locate electrical outlets so that cords do not cross passageways.
- Secure loose cords to the floor if unable to locate an outlet close by.
- Use only properly grounded outlets and equipment.
- Avoid using extension cords when possible.
- Replace damaged or worn cords immediately.
- Unplug equipment before servicing or working on them.

Machines and equipment

- Place guards on machines with exposed moving parts before operating.
- Do not operate a machine until you are properly trained.
- Do not override safety devices. When in doubt, get help.
- Use common sense when using paper cutters. Keep fingers away from knife and cutting edges. Keep knife in down position and locked when not in use. Replace loose guards, knife locks and springs immediately.

Storage

- Use a ladder, step-stool or portable stair for reaching high objects. Never use a chair, carton or other objects not designed for the task.
- Store heavy objects at ground level.
- Cover or sheath knives and scrapers before storing. Use only for intended purpose.
- Do not store flammable liquids and paint in an office area. If flammable or hazardous materials are needed for office machines, keep it in limited quantities and store according to manufacturer's recommendations.

Other

- Turn on lights before entering dark rooms or hallways.
- Report burnt out or inadequate lighting to your supervisor.
- Do not lift beyond your capability. Get help with heavy or awkward loads.

- Do not remain at your desk or workstation if overhead work is being performed.
- If your job requires you to enter power plant or warehouse area, wear the required personal protective equipment.

6.2 OFFICE ERGONOMICS

We rely heavily on computers to help us perform our daily work. For some, dedicated computer work is necessary, while others multi-task throughout the day. No two people are the same, and ergonomics strives to fit the task to the person doing it.

Use the following information as a guideline to help make your work station more comfortable and ergonomically friendly.

Task Chair

An ergonomic chair will not function as designed unless you know how to operate the adjustable features correctly. To adjust your task chair, follow the steps:

- Sitting in the chair, raise or lower the seat so that your feet rest comfortably on the floor. Your knees should be slightly lower than your hips.
- Sit as far back in the chair as possible, and adjust the backrest height or lumbar support so that it fits into the curve in your lower back.
- If you have a seat slider, adjust the seat pan depth so that a closed fist fits between your knee and the edge of the seat.
- Adjust the backrest angle to achieve a torso-to-thigh angle of 93 degrees to 113 degrees (have someone else look at you from the side).
- Adjust the seat pan tilt angle to a comfortable position.
- Adjust the armrest so that it is at your elbow height. If the armrests swivel, place the armrests in line with your forearm when you are using the mouse.
- Once you have adjusted the rest of your workstation, if your feet do not reach the floor, use a footrest.
- Remember to adjust your chair throughout the day to help relieve muscle tension in specific muscle groups.

Keyboard & Mouse

There are numerous keyboard and mouse configurations and models available, however it is important to correctly position these tools to prevent repetitive strain injuries.

To properly position your keyboard and mouse, follow these steps:

- Sit close to the keyboard and mouse so that your upper arms hang in a relaxed position.
- Center yourself so that you are aligned with both the keyboard and mouse, depending on what is most frequently used. Position the mouse as close as possible to the keyboard to avoid rotating the shoulder.
- Adjust the height of the keyboard platform (or chair if there is not an adjustable platform), so that your shoulders are relaxed and elbow angle is 90 degrees or slightly greater.
- Adjust the angle of the keyboard platform slightly downward in a negative tilt, if able. This will help to keep your wrists straight.
- Do not put the mouse where you must stretch to the desk or out to the side of a keyboard to reach it.
- Your wrist should be straight while mousing, not angled toward your thumb or little finger.

Some other important tips to limit overuse and awkward postures:

- Move the mouse from the elbow, rather than from the wrist down.
- Alternate mousing between left and right hands. Mouse buttons can be reconfigured to allow either hand to be used.
- Rest your finger lightly on the mouse button; do not hold it hovering above the mouse.
- Do not grip the mouse tightly - hold it gently and glide it over the surface.
- Choose a mouse that fits your hand, and that can be used with either hand.
- Use shortcut keys whenever possible to limit mouse use.
- If you are correctly positioned, a wrist rest should not be necessary. However, when a neutral wrist posture cannot be achieved or to reduce contact with hard surfaces, a wrist rest may be helpful. Do not plant your wrists on the pad while keying or mousing. Make sure the wrist rest is made of a soft gel or foam to minimize pressure on the underside of the wrist.

- Key with gentle, quick keystrokes. Do not pound on keys as this increases the force exerted.
- You can position the mouse over the numeric keypad with an articulating mouse platform or mouse “bridge”.
- When mousing is a constant requirement (e.g. CAD applications), the forearm should be supported on a surface or with an adjustable armrest to reduce static loading of the arm.
- Alternative keyboards and mousing devices are available to accommodate for specific needs.

Monitor

- Proper monitor positioning is important in avoiding vision and neck problems. Follow these steps:
- The monitor should be positioned so that the top of the monitor is at eye level. The eyes should naturally look at a 15 degree downward position.
- The distance should be about arm’s length (45 to 60 cm).
- Font size, specific applications and personal visual acuity and sensitivity will also determine the correct distance, however placing the monitor too far away can cause the user to lean forward and can lead to eyestrain.
- Bifocal users should lower the monitor so that text can be viewed through the proper prescription. Increasing the distance away from you also increases the field of vision available without moving the head.
- Tilting the screen upward slightly can also help. The monitor should be directly in front you, aligned with the area of the keyboard that you use most.
- Adjust contrast and brightness to your personal needs to reduce eyestrain.
- Look away from your screen periodically - focus on a distant object to exercise eye muscles.

Lighting

In a general office environment, the CSA recommended lighting level for computer work is 50 lux. These lighting levels can be adjusted for personal preference, and paper work may be augmented by task lighting.

Glare is the main lighting concern when working with computers. To help minimize glare:

- Position monitors parallel to overhead lights and perpendicular to the windows.
- Ensure wall color is neutral (not too bright).
- Remove or cover shiny surfaces and objects.
- Use blinds or curtains to minimize window glare.
- Install diffusers on overhead fluorescent lights.
- Adjust the angle of the monitor, so that the screen is vertical.
- Use LED lamps over source documents, but direct them away from monitor.

Telephone

The telephone needs special attention if you use it often. Cradling the phone between the shoulder and ear causing awkward neck and shoulder postures and can lead to injury if used for prolonged periods or frequently throughout the day.

If you use the telephone frequently, a headset should be used to allow for hands-free operation. This will eliminate cradling of the phone between shoulder and ear while writing, handling documents or using the computer.

Breaks

One of the best ways to prevent injury, discomfort and fatigue is to take an “Ergo Break” – a pause or change in activity that allows muscles, joints and tissues that have been working to recover and rest. Muscles that remain in a static posture will fatigue, circulation will decrease, and you will notice discomfort. This may mean taking a short pause in activity to focus on a different task, rest your eyes, and most of all, change position.

Prolonged sitting is one of the major risk factors for low back pain, so give your back a break and stand, walk and stretch. It may also mean switching to another task that requires the use of different muscle groups and postures.

SECTION VII SAFE WORK PRACTICES

7.1 HOUSEKEEPING

- Keep the work area clean, free of oil, grease, unnecessary tools/equipment, scrap metal and other materials. Ensure all slip and trip hazards have been eliminated.
- Keep access/egress clear at all times.
- Clean-up spills promptly with proper absorbing materials and agents.
- Place all garbage and waste materials in appropriate containers and emptied on a regular basis.
- Store all oily rags in appropriate fire-approved steel containers.
- Keep exterior walkways and stairways free of snow, ice and obstacles.
- Keep interior hallways, stairwells and other traffic areas clear.
- Never block fire extinguishers, first aid boxes, fire hoses, eyewash stations or electrical panels.
- Store all WHMIS controlled products in designated areas.
- Store all flammables in fireproof cabinets when not in use.
- Always wind up extension cords when not in use.

7.2 BENCH GRINDER

- Check the tool rest for the correct distance from the abrasive wheel, maximum 1/8” or 3 mm.
- The tool rest must be adjusted so that its upper edge is not below the center line of the abrasive wheel.
- Check to make sure that all guards are in place and that the power button and cords are not damaged. Replace the grindstone when adjustment of the rest cannot provide 1/8” or 3 mm clearance.
- If the wheel has been abused and ground to an angle or grooved, reface the wheel with the appropriate surfacing tool or replace the wheel.
- Protect your eyes with safety glasses and a face shield at all times when grinding.
- Wear CSA-approved hearing protection.
- Each time a grinding wheel is replaced, check the maximum approved speed (stamped on the wheel bladder) against the shaft rotation speed of the machine to ensure the safe operating speed (RPM) is not exceeded.
- A grinding wheel must not be operated at speeds exceeding the manufacturer's recommendation.

- The flanges supporting the grinding wheel should be a maximum of 1/3 the diameter of the wheel, and must fit the shaft rotating speed according to the manufacturer's recommendation.
- Bench grinders are designed for peripheral grinding. Do not grind on the side of the wheel.
- Do not stand directly in front of the grinding wheel when it is first started.
- Do not wear loose fitting clothing or jewelry that can be caught in the grinder.
- Ensure that long hair is tied back prior to operating a grinder.

7.3 PORTABLE GRINDER

- Familiarize yourself with the grinder operation before commencing work.
- Never use the grinder for jobs for which it is not designed.
- Inspect the tool and extension cord periodically.
- Always use the correct flange nuts and backing pads. The nut must center wheel on spindle
- Test run the machine before grinding, when mounting wire wheels, when mounting cut-off wheels on grinders or when mounting other wheels to grinders.
- Always use PPE - safety glasses and face shield, hearing protection, coveralls and gloves. Do not wear loose fitting clothing or jewelry that can be caught in the grinder.
- Ensure that long hair is tied back prior to operating a grinder.
- Remove adjusting keys and wrenches prior to turning the grinder on.
- Ensure that work is secure prior to starting grinder.
- Never leave tool running unattended. Turn the power off when not in use.
- DO NOT USE TOOL IF SWITCH DOES NOT TURN IT ON AND OFF.
- Keep handles free from oil and grease.
- Compare the speed marked on the wheel and to the speed marked on the grinder.
- Never exceed the maximum wheel speed (RPM) that is marked on the grinding disc/wheel.
- When mounting the wheels, check them for cracks and defects, ensure that the mounting flanges are clean and the mounting blotters are used. Do not over tighten the mounting nut.
- Before grinding, run newly mounted wheels at operating speed to check for vibrations.

- Do not use grinders near flammable materials.
- When using a zip disk (cutting disk) do not use it as a grinder. (Do not use the face of disk to grind or for de-burring).
- Use the correct sized disk as per manufacturer's recommendation.
- Grinders are never to be used with handles or guards removed. Grinders with guards or handles removed are to be taken out of service as per *SWP-009 Defective Equipment*.

7.4 PROPANE TORCH

- When using a torch, workers must wear additional protective clothing (gloves, eye protection).
- Prior to use, ensure that torching equipment is in good working order and the cylinder valves are clean. Check that fittings, hoses and heads are secure.
- DO NOT USE defective equipment.
- Use soapy water to check connections for leaks.
- Only use a spark lighter or electronic starter to light torch.
- Protect the propane hose from damage by:
  - Keeping torch flame away from hose.
  - Keeping hose free of kinks.
  - Not running over hose with equipment.
  - Not using the hose to lift the cylinder.
- A torch flame is difficult to see in daylight, be aware of and keep away from the flame.
- NEVER LEAVE AN OPERATING TORCH UNATTENDED.
- Other than the operator, all workers should stay at least 1 meter away from the torch.
- Set torch units into support leg position when not in use.
- To shut off torch, close cylinder valve first, let gas burn out, close torch valve.
- At the end of the day, disconnect hoses and store properly.

7.5 GENERAL ELECTRICAL SAFETY

- All electrical tools and equipment must be grounded or double insulated.
- Only qualified and authorized electricians are allowed to service and repair electrical appliances, tools and equipment.
- Prior to operating electrical powered tools and equipment, ensure that you are working on a dry surface.

- Missing or damaged ground plugs of any appliance, tool or piece of equipment are to be repaired prior to use.
- Tools with damaged cords, grounds and housing units are to be tagged “Out of Service” and sent for repair. Defective electrical equipment must be reported to your Supervisor immediately.
- Damaged extension cords shall be tagged “Out of Service”, repaired or replaced as warranted.
- Disconnect power tools from power source before making adjustments. Defective equipment needs to be tagged “Out of Service” and removed.
- Tools with electrical arcing brushes should be removed when you feel any tingling during use.
- All electrical equipment, acquired or used on QEC premises shall be approved in accordance with the provisions of Part I of the Canadian Electrical Code, (Standard C22.1-12), and certified for use by the Canadian Standards Association (CSA), or other acceptable testing agency.
- Flammable material shall not be stored or placed in proximity to electrical equipment.
- Extension cords should only be used for temporary service and should be maintained in good condition at all times. They should be routinely inspected for frayed, torn or split cords and damaged plugs or connectors. All damaged cords must be repaired or replaced immediately.
- Jacketed electrical cords should be used with portable electric tools and with extension lamps in boilers, tanks or other grounded enclosures.
- Always make certain that plug connector configurations match - they are intentionally designed that way to prevent hazardous, or even fatal, electrical connections.
- Fire extinguishers of Class "BC" or "ABC" should be readily available in the event of an electrical fire. Class "A" which utilizes pressurized water shall not be used on electrical fires.

7.6 WELDING, CUTTING AND BURNING

- Always ensure that adequate ventilation is supplied since hazardous fumes can be created during welding, cutting or burning.
- Complete a welding, cutting and burning permit prior to starting any work and hand in the competed form to the plant operator.

- Where other workers may also be exposed to the hazards created by welding, cutting and burning, they must be alerted to these hazards and protected by the use of “screens”.
- Never start work without proper authorization.
- Always have firefighting equipment on hand before starting.
- Check the work area for combustible material and possible flammable vapours.
- A welder should never work alone. A fire or sparks watch should be maintained.
- Protect cables and hoses from slag or sparks.
- Never weld or cut lines, drums, tanks, etc. that have been in service without making sure that all have been purged or other necessary precautions are in place.
- Never enter, weld or cut in a confined space without proper air quality testing and a qualified safety watch in place.
- When working overhead, use fire resistant materials (blankets, tarps) to control or contain slag and sparks.
- Cutting and welding must not be performed where sparks and cutting slag will fall on cylinders. Move all cylinders away to one side.
- Open all cylinder valves slowly. The wrench used for opening the cylinder valves should remain on the valve spindle.
- Always ensure the regulator of a cutting torch has been removed and that the valve caps are secured to the cylinder valves prior to transport.

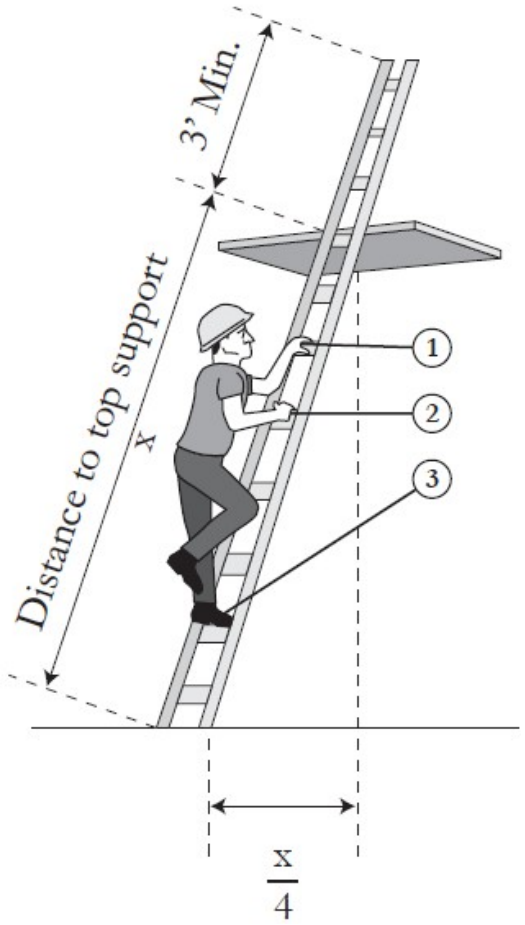
7.7 ACCESS/EGRESS

- Areas of access and egress must be adequately lit.
- If material may fall on a worker, overhead protection shall be provided.
- Access to and egress from a work area located above or below ground level shall be by stairs, runway, ramp or ladder.
- Areas of access and egress shall be kept clear of obstructions.
- Areas of access and egress shall be kept clear of snow, ice, or other slippery material.
- Areas of access and egress shall be treated with sand or similar material when necessary to ensure a firm footing.

7.8 LADDERS

- Only fiberglass ladders are to be used/stored in a power plant and on electrical sites.
- Always inspect the ladder prior to use. Check the integrity of the equipment is sound ensuring there is no damage to rungs, treads, braces, locking mechanisms, and uprights. Always ensure the feet are intact and in good condition. If the ladder is damaged, it must be removed from service and tagged out until repaired or discarded.
- Ensure the ladder is clean and dry prior to use.
- Set up the ladders on firm level ground. With self-supporting ladders (step ladders), ensure the locking mechanism is firmly locked to avoid collapse. Never place a ladder on boxes, barrels or other unstable bases to obtain additional height.
- Do not use a step ladder as a singular ladder or in a partially enclosed state.
- Do not move or shift a ladder while a person or equipment is on the ladder.
- Ensure straight or extension ladders are positioned at the correct angle of 75 degrees or a ratio of 1:4 (see diagram).
- Always check for proximity hazards such as electricity cables, equipment, vehicles and people.
- Ensure ladders are suitably secured /footed at the base and that all locks on an extension ladder are fully engaged.
- Always tie the ladder (wherever possible) at the top to avoid the potential of the ladder slipping.
- An extension or straight ladder used to access an elevated surface must extend at least 3 feet above the point of support (see diagram). Do not stand on the three top rungs of a straight, single or extension ladder.
- Always maintain 3 points (two hands and a foot or two feet and a hand) of contact. Keep your body near the middle of the step and always face the ladder while climbing. If this is not possible, another means of access must be considered. (see diagram)
- Never lean or stretch from a ladder. With stepladders, never work off the side and never more that two-steps from the top platform.
- Never have more than one person on the ladder/step ladder at any one time.
- Do not exceed the maximum load rating of a ladder. Be aware of that ladders load rating and of the weight it is supporting.

- Never work alone when using ladders. Always make sure there is standby person on site.
- No more than one person shall climb or work off a ladder at the same time.
- A ladder placed in any location where it can be displaced by other work activities must be secured to prevent displacement or a barricade must be erected to direct traffic away from the ladder.
- Ensure you are wearing suitable footwear and any laces are tightly tied to avoid tripping.
- When outside, observe weather conditions. Stop work if the weather turns inclement due to wind, rain, etc.
- All ladders shall be transported horizontally and below shoulder level. Ladders over three meters shall be carried by two people.
- When the job is done always store the ladders away in the correct manner keeping the ladders protected from the weather. Never hang ladders vertically from the rungs/steps



7.9 COMPRESSED AIR

- Compressed air must not be used to blow debris or to clear dirt from any worker's clothes.
- Ensure that the air pressure has been turned off and the line pressure relieved before disconnecting the hose or changing tools.
- All hose connectors must be of the quick disconnect pressure release type.
- Wear personal protective equipment such as eye protection and face shields. Restrict access to the area or ensure other workers in the area are aware of hazards.
- Hoses must be checked on a regular basis for cuts, bulges, or other damage. Ensure that defective hoses are repaired or replaced.
- A proper pressure regulator and relief device must be in the system to ensure that correct pressures are maintained.
- The proper air supply hoses must be used for the tool/equipment being used.
- The equipment must be properly maintained according to the manufacturer's requirements.

7.10 DEFECTIVE TOOLS

- When using hand tools be aware of problems like:
  - chisels and wedges with mushroomed heads;
  - split or cracked handles;
  - chipped or broken drill bits;
  - wrenches with worn out jaws; and
  - tools which are not complete, such as files without handles.

- To ensure safe use of hand tools, remember:
  - never use a defective tool;
  - double check all tools prior to use; and
  - ensure defective tools are repaired.

- Air, gasoline or electric power tools, require skill and the operators' complete attention, even when they are in good condition. Don't use power tools when they are defective in any way.

Watch for problems like:

- broken or inoperative guards;

- insufficient or improper grounding due to damage on double insulated tools;
- no ground wire (on plug) or cords of standard tools;
- the on/off switch not in good working order;
- tool blade is cracked; and
- the wrong grinder wheel is being used, or the guard has been wedged back on a power saw.

Remove all defective tools from the work area and place "OUT OF SERVICE TAG" with description until to repaired or replaced.

7.11 MOVING VEHICLES

- The Supervisor shall ensure that all workers, contractors and sub-contractors will be informed of this procedure before moving or using vehicles, machines and equipment.
- All workers, contractors, and sub-contractors will use this procedure when moving or using vehicles, machines and equipment.
- When using vehicles, machines or equipment near energized overhead electrical conductors, no part shall be brought closer than minimum distance listed below.

Nominal phase-to-phase voltage rating	Minimum distance
750 or more volts, but no more than 150,000 volts	3 metres
More than 150,000 volts, but no more than 250,000 volts	4.5 metres
More than 250,000 volts	6 metres

- Operators of vehicles, machines and equipment shall be assisted by signalers if the operator's view of the intended path of travel is obstructed and/or a person could be endangered by the vehicle, machine or equipment and its load.
- A competent worker shall be designated as a signaler. Both the operator and signaler shall jointly establish the procedures by which the signaler assists the operator and both will follow those procedures. A loud signaling device, such as a whistle should be used to indicate either "STOP" or "GO".
- The signaler should be walking with the vehicle, machine, or equipment in a manner that gives the signaler an unobstructed view of the intended path of travel and in full view of the operator.

- The signaler shall station themselves in such a position that they have a clear view of the equipment and the electrical conductor and be in full view of the operator. The signaler shall warn the operator by the agreed method if any part of the equipment or its load may approach the minimum distance as listed in the table.
- If it is possible that a part of the equipment or its load may encroach upon the minimum distance, a legible sign that is visible to the operator and warns of the potential electrical hazard shall be posted at the operator's station.

7.12 VEHICLE PARKING

- When parking a vehicle the best option is to drive forward into a parking space if that parking space allows you to drive forward when leaving. This is the safest way to park a vehicle as it never requires the driver to back up.
- QEC vehicles should be backed into parking spaces if driving into and out of the parking space is not an option. When approaching the parking spot, utilize the side view and rearview mirrors as well as performing a shoulder check to ensure that there is a clear view of obstacles, terrain, people and other vehicles. This way the driver is aware of the surroundings.
- Turn signals must be used to identify intention to park prior to backing into the parking space.
- If possible a spotter should be used to act as a guide. The spotter should be positioned at the rear of the vehicle on the driver's side and remain in the operators view throughout the maneuver. The guide will assist the driver through means of hand signals and must be able to clearly see the path the vehicle will follow.
- Backing into parking areas allows you to leave the parking area without having to back out. You have a clear view of the area ahead of the vehicle. Driving forward into traffic is much safer that backing out into traffic.

7.13 DRILL PRESS

- Do not use the tool in the presence of flammable fluids or gases.
- Don't overreach – Keep proper footing and balance at all times.
- Dress properly – do not wear loose clothing or jewelry; they can be caught in moving parts. Wear protective hair covering to contain long hair.

- Remove adjusting keys and wrenches and disconnect tools from power source when not in use, before servicing, when changing wheels, etc.
- Ensure the switch is in the "off" position before plugging in tool.
- Check for damaged parts before operating the tool.
- Keep handles dry, clean and free from oil and grease.
- Use the drill press in a well-lit area and on a level face, clean and smooth enough to reduce the risk of trips and falls.
- Never place your fingers in a position where they could contact the drill bit or other cutting tool parts.
- Always position backup material underneath the work piece.
- Before starting the operation, jog the motor switch to make sure the drill bit or other cutting tools do not wobble or cause vibration.
- If a work piece overhangs the table such that it will fall or tip if not held, clamp it to the table or provide auxiliary support.
- Use fixtures for unusual operations to adequately hold**,** guide and position the work piece.
- Use the spindle speed recommended for the specific operation and work piece material.
- Turn the motor switch off and unplug from the power source when not in operation.

7.14 COMPUTER USE

In order to minimize ergonomic injuries:

- Use an adjustable chair, comfort is important.
- Adjust your seat height so that your forearms are parallel to the floor, or sloping slightly downward when using the keyboard. Your shoulders should be relaxed and not hunched. Elbows and upper arms should be close to your body.
- Adjust the backrest angle of your chair to feel comfortable.
- Using a footrest if required, thighs should be parallel to the floor, or sloping slightly downward. There should be no pressure caused by the front edge of the seat under your thighs.
- Your monitor should be directly in front and items frequently utilized such as the phone should be within reaching distance.
- The screen should be located at a comfortable viewing distance - approximately an arm’s length away.
- The top of the screen should be at eye height and glare and reflections should be eliminated.
- Use a mouse mat, close to the keyboard, to prevent over-reaching.

- Use a straight wrist.
- Avoid crossing your legs or hugging the chair with your legs while using the computer. This inhibits blood flow, causing lower limb circulation problems, and increasing fatigue.

Have a break to relieve the fixed posture and fixed visual focus. Varying the task throughout the day is best. For extended computer work, short frequent breaks for say 2-3 minutes every 20-30 minutes is recommended. Moving is good. Keep your equipment is good working order. Screen flicker, sticking keys on keyboards, and a rough-running mouse should be adjusted or repaired.

7.15 WASTE MANAGEMENT

- All waste generated at projects and plants that can be classified as hazardous waste must be handled, stored and disposed of in accordance with QEC's Environmental Management System and Federal and Territorial government regulations.
- Non-hazardous waste generated during construction and maintenance must be recycled whenever possible.
- Equipment maintenance shall be restricted to designated and approved areas to prevent contamination of soils by accidental spills of toxic or hazardous materials.
- Walkways and exits shall be maintained in an orderly condition, free of waste products, debris and litter. All garbage and debris shall be disposed of at a landfill site.
- Hazardous materials such as used oil, paint, batteries, cleaning agents and water contaminated by freezing depressants will be collected and recycled or disposed of as hazardous waste.
- All hazardous, toxic, contaminated and dangerous waste shall be stored, transported and disposed of in accordance with the Hazardous Chemical Act, Nunavut WHMIS Regulations, Hazardous Waste Regulations and QEC HSE Policies and Procedures.
- Contaminated soils will be managed according to their concentrations of contaminants and their leach-ability. Appropriate disposal operations will be determined in consultation with relevant environmental protection agencies.

7.16 EXPLOSIVE ACTUATED TOOLS

- Always review the manufacturers' specifications prior to working with any tool that utilizes an explosive charge to drive fastenings.
- Always wear hearing protection, hardhat, safety boots, eye protection and a face shield whenever working with an explosive actuated tool.
- Do not keep tool or explosive charges unattended when not in use.
- Explosive actuated tools should always be stored in a locked box when not being used.
- Do not load the tool until just prior to use. Unload the tool immediately upon completion of the task.
- The tool should never be pointed at anyone, whether it is loaded or unloaded.
- Hands should be kept clear of the muzzle end at all times.
- Explosive/powder actuated tools must never be used in an explosive atmosphere.
- To prevent free-flying studs, ensure that the material being driven into will not allow the stud to completely pass through it.
- Manufacturers' recommendations should be consulted and followed whenever there is doubt about the material being driven into, maintenance procedures or load strength to be used.
- Always be aware of other workers. Where a hazard to other workers is created by this operation, signs and barricades identifying the hazard area are mandatory.

7.17 FORK MOUNTED WORK PLATFORM

- Any fork mounted elevated work platform must be inspected prior to use.
- The platform must be positively secured to the fork carriage or backrest in a manner to support the weight of the platform and not allow platform movement on the forks. The use of a hoisting grade chain or wire rope securement system is acceptable.
- The platform must be fitted with a top guardrail, an intermediate rail and a toe board securely fastened to the posts and extending from the surface of the working area. Metal screening in lieu of a mid-rail is acceptable.
- Moving machinery, including gears, chains, and shearing hazards created by the movement of the lifting mechanism, shall be guarded in a manner to protect the occupants of the platform.
- The platform deck should have a skid-resistant surface.

- The operator of the lift equipment remains at its controls when the platform and the lift equipment are in the elevated position.
- The lift equipment is on a stable, level surface, unless it is rough terrain lift equipment.
- The operator must immobilize the lift equipment vehicle against inadvertent movement before and during the time the work platform is occupied.
- The lift equipment operator must not leave the controls while workers are on the platform.
- The operator must respond to signals only from the designated signal person occupying the platform.
- The worker in the platform is wearing a fall arrest system when working at a height of 3 meters or more that is attached at an anchor point that can withstand a load capacity of 17.8 kN (4000lbf).

7.18 CONFINED SPACE ENTRY

- The QEC Code of Practice for confined space shall be followed for any work in a confined space.
- Signage must be posted at the entrance of any confined space to prevent unauthorized entry.
- Only employees that have been trained in confined space entry are permitted to enter confined spaces.
- Training will include atmospheric monitoring, confined space entry and rescue procedures.
- Prior to entering any confined space at QEC, a written hazard assessment must be completed by the Entry Supervisor to identify the hazards of the space and controls required to minimize risk. This must then be reviewed with the workers.
- A tailboard meeting must be held by the Entry Supervisor, workers entering the space and the attendant prior to entry.
- A confined space entry permit must be filled out prior to entry and posted at the entrance of the confined space. One copy of this permit to be kept on site and one copy forwarded to the HSE Dept.
- The entrant will monitor air quality and ensure that oxygen levels exceed 19.5%.
- The entrant will enter the confined space attached to a body harness and lifeline if it does not introduce additional hazards to the entrant rescue strategy.

- An attendant trained in confined space entry and first aid will stand at the entrance of the confined space and verbally or visually communicate with the entrant continuously. The entrant will remain in the space for no longer than one (1) hour at a time without visual contact with attendant.
- An effective means of communication (two-way radio or visual) must be in place prior to entry into a confined space. Radios must be tested to ensure that they are fully operational within the space.
- Co-entrant(s) will enter solely to observe entrant and assist as necessary. Co-entrant will assist with providing lighting and tools, and will be prepared to move entrant out in the event of injury.

7.19 SPOTTERS/SIGNALLERS

- Prior to maneuvering a piece of equipment or placement of a load, Spotters/signallers will be identified during the completion of a tailboard and used as required.
- Spotters/signallers must wear high visibility clothing or safety vests.
- Spotters/signallers must communicate with equipment operators using appropriate hand signals. These signals must be reviewed by the operator and spotter/signaler prior to starting work.
- Spotters/signallers will watch all activity surrounding the equipment work area.
- Before each signal, spotters shall ensure that no hazards exist that endangers any workers, equipment or property in the work area.
- Equipment shall move only with instruction from the designated signal person with the exception of “Emergency Stop” which can be given by any worker.
- Designated spotter/signaller to be in view of and maintain eye contact with the operator at all times.
- Designated spotter/signaller must know hand signals.
- Designated spotter/signaller must plan an escape route.
- Always keep a safe distance away from the equipment in the event of a rollover or equipment failure.
- If required a second spotter will be used.

7.20 USE OF HAND TOOLS

- Only use hand tools for their intended purpose. Do not, for example, use a screwdriver as a chisel.
- All hand tools must be in good condition. Any hand tools that are unsafe due to damage shall be removed from service and tagged.

- Tools which are struck by hammers such as chisels or punches should have the head ground to prevent mushrooming.
- Never secure any work with your hand in which a blade can slip and cause injury.
- Always keep all cutting edges sharp – replace or sharpen as needed.
- When working with tools always place them in a position in which they cannot fall on others working at a lower level or pose a tripping hazard.
- Always store tools in the proper places to avoid damage to tools and injury to one's self.
- Never carry tools such as chisels and screwdrivers in a pocket where they can cause injury when bending over or in the event of a fall. When carrying tools protect the cutting edges and carry the tool in such a manner that you will not endanger yourself or others.
- All tools that are to be used for electrical work shall have an insulated handle that is free of any defects.

7.21 CHAINSAWS

- PPE required for chainsaw use includes hardhat, safety glasses, face shield, hearing protection, safety boots, leather gloves, protective leggings (chaps) and leather jacket (if working from a bucket).
- Chainsaw shall be equipped with operational chain breaks and chains designed to minimize kickbacks.
- The correct method of starting, holding, carrying or storage and use of the chainsaw as directed by the manufacturer must be followed.
- The chain must be sharp, have the correct tension and be adequately lubricated during operation.
- Chainsaw must be adjusted so that the chain stops when the motor is idling.
- Ensure that the chain brake is functioning properly and adequately stops the chain.
- When carrying/transporting a chainsaw the bar guard must be in place, the chain bar must be towards the back and the motor must be shut off.
- Fueling of the chainsaw must be done in a well-ventilated area. Never fuel a chainsaw that is running or hot.
- An approved safety container must be used to contain the fuel used along with a proper spout or funnel for pouring.
- The chain brake must be engaged prior to starting the chainsaw.

- The chainsaw must not be adjusted when the motor is idling.
- The chainsaw must not be used for cutting above shoulder height.
- When the work is completed ensure that the chain brake is engaged.
- Any employee who is required to use a chainsaw from above ground must do so only from an approved work platform.

7.22 USE OF CLEANING SOLVENTS AND FLAMMABLES

Special care must be taken to protect the worker from hazards which may be created from the use of these liquids. Wherever possible, solvents should be nonflammable and nontoxic.

Supervisors must be aware of all solvents/flammables that are used on the site and be sure that all workers who use these materials have been instructed in their proper use and any hazard they pose. The following practices will apply when solvents/flammables are used:

- Use nonflammable solvents for general cleaning.
- When flammable liquids are used, make sure that no hot work is permitted in the area.
- Store flammables and solvents in special storage areas.
- Check toxicity hazards of all solvents before use by referring to the Safety Data Sheets (SDS).
- Provide adequate ventilation where all solvents and flammables are being used.
- Use goggles or face shields to protect the face and eyes from splashes or sprays.
- Use rubber gloves to protect the hands.
- Wear protective clothing to prevent contamination of worker's clothes.
- When breathing hazards exist, use the appropriate respiratory protection.
- Never leave solvents in open tubs or vats. Return them to storage drums or tanks.
- Ensure that proper containers are used for transportation, storage and the field use of solvents/flammables.
- Where solvents are controlled products, ensure that all employees using or in the vicinity of use or storage are trained in the Workplace Hazardous Materials Information System (WHMIS).
- Ensure all WHMIS requirements are being met.

7.23 HOISTING AND RIGGING

Crane Operator

- Assign appropriately sized equipment and appropriately trained people to perform the task.
- Maintain the equipment in accordance with manufacturers' recommendations and specifications as well as applicable safety regulations.
- Establish and follow preventative maintenance and inspection programs.
- The operator has the obligation to refuse to perform a lift if they consider it unsafe to do so.

Lift Coordinator

- Assess the lift to determine whether it is a critical lift, a serious lift or a standard lift.

(a) A Critical Lift is one where:

- the lift is over or near energized electrical equipment such as power lines and switchgears; or
- the lift is in a confined space or restricted area where the load or any part of the crane structure could come within 24 inches (600mm) of any existing structure or building; or
- failure of the lift could damage existing facilities or equipment; or
- the load will be greater than 90% of the manufacturers rating chart; or
- a lift involving two or more cranes lifting the same load simultaneously where the load may exceed more than 75% of any one cranes lifting capacity as measured on the lifting chart; or
- any load where special lifting or rigging equipment is used.

(b) A Serious Lift is one where:

- the lift is between 80% and 90% of the cranes rated capacity; or
- personnel are being lifted in a man lift; or
- the load or any part of the crane could come within approach limits for overhead power lines or transformers; or
- the actual weight of the load is unknown; or
- any lift that involves the use of two (2) cranes where the load is less than 75% of any one crane.

(c) A Standard Lift is any other situation where a crane is used.

- Employ a lift plan appropriate for the classification of the lift and communicate the plan to all affected parties.
- Ensure the ground beneath can support the loads imposed by the crane.
- Ensure that adequate space is provided to safely assemble, erect and operate the crane.
- Ensure that the cranes are placed in the optimum position for capacity and clearance from obstacles.
- Inform the crane operator of any hazardous conditions in the work area.
- Communicate the weight load (if known) to the operator.
- Ensure that pre-lift meetings are held if appropriate.
- Ensure that lift procedures and plans are adhered to. If a lift cannot be carried out according to plan, the lift is to be stopped until a formal review of the plan is completed. Any changes to the original lift plan must be reflected on the tailboard meeting.
- Designate a competent signal person and identify that person to the crane operator.

Rigger

- Rig loads and equipment in accordance to regulations and manufacturers' specifications.
- Interpret sling charts and lift plans.
- Identify appropriate rigging components for the load to be lifted.
- Visually inspect rigging components on a regular basis and prior to each lift to ensure compliance with applicable codes, standards, specifications and procedures.
- Know and understand operating parameters of cranes and be capable of reading wire rope, chain and synthetic sling capacity charts.
- Know and use appropriate hand signals for hoisting and moving loads.
- Give signals in a slow, smooth and decisive manner.
- Be aware of hazards and obstructions.
- Communicate with the crane operator throughout all stages of the rigging process.

7.24 GENERAL HYDRAULIC SAFETY

- The fluid used in hydraulic tools shall be fire-resistant and shall retain its operating characteristics at the most extreme temperatures to which it will be exposed.

- The exception to fire-resistant fluid involves all hydraulic fluids used for the insulated sections of derrick trucks, aerial lifts, and hydraulic tools that are used on or around energized lines. This hydraulic fluid shall be of the insulating type.
- The manufacturer's safe operating pressures for hoses, valves, pipes, filters, and other fittings shall not be exceeded.
- Line up hydraulic tool with the task and ensure it remains stable.
- Ensure surfaces are free of any oil which may cause the hydraulic tool or the worker holding the tool to slip.
- Use the 80% rule. It is safer to use high pressure hydraulic tools at 80% of their maximum rating than 100%.
- All exposed fittings and hoses must be examined before each use to make sure there are no visible defects.
- Hydraulic pressure must be released before connections are broken unless the equipment has quick acting, self-closing connectors.
- Keep your hands away from the operating switch when changing body or tool positions.
- When checking for pinhole leaks, depressurize the system first, then run a chemical resistant gloved hand over the hose looking for worn spots and potential leak points.
- If this procedure fails to find the leak (i.e. bundle of hoses) then, if safe to do so, start the machine and “stall” each hydraulic circuit represented in the hose bundle. For example, by bottoming a cylinder in its extend position, then, in the next test, in its retracted position. After each test, determine if leakage has increased by observing if the pool of oil under the suspect area has become larger. If so, then the last hose tested is likely the one leaking, but it can be replaced only after observing the above depressurization procedure.
- Hydraulic fluid injected under the skin can be FATAL. Pinhole injuries have occurred as low as 100 psi. If fluid punctures the skin, even if no pain is felt, a serious emergency exists. Proceed to Health Centre or Hospital ***immediately***. A QEC Incident Report will be required.
- Keep sources of ignition away from possible contact with escaping fluids, sprays or mists resulting from hydraulic failures.
- Hydraulic systems sometimes use accumulators to store potential energy or absorb shock. This energy can create pressure that keeps the system’s components moving. Charged accumulators can be lethal. Always open the accumulator’s valve to release pressure. Hoses under pressure act as accumulators.

- Objects supported by fluid pressure may fail. Do not stand directly underneath an elevated load. Watch out for swinging arms, booms, rollers, presses, etc…
- Turn hydraulic equipment off before starting to work on it. If the equipment serves a generation, distribution or transmission function, utilize Work Protection Code Standards.
- Hydraulic tools used on or near energized power lines or equipment must be supplied with non-conducting hose having adequate strength for normal operating pressures.
- Hydraulic systems typically operate between 100˚F - 200˚F, and can reach as high as 300˚F. Metal parts (such as fittings and adapters) and hoses can become hot and indirect touching of these parts can lead to burns. Direct contact with the hot liquid can also cause burns.
- Proper hose selection is critical to a safe hydraulic system. Use "STAMPED" for proper hose selection:

  SIZE
  TEMPERATURE
  APPLICATION
  MATERIAL
  PRESSURE
  ENDS
  DELIVERY (Volume)

- Most hydraulic systems should be designed with a 4:1 safety factor (burst test pressure vs. maximum recommended working pressure). Note: this does not apply for all systems i.e., waterblast, jack hose.
- Thread ends must be compatible in order to prevent leaking or assembly blow off. Male and female fittings must be compatible.
- Do not mix and match hose and couplings from various manufacturers.
- Wear Canadian Standards Association (CSA) approved safety eyewear when working near/on hydraulic equipment where there is a potential for spray to the eyes.

7.25 PORTABLE ELECTRIC SPACE HEATERS

- All portable electric space heaters must be Canadian Standards Association (CSA) approved. This shows the heater complies with recognized standards.
- Follow the manufacturer's instructions.

- Do not leave the heater unattended. Unplug the heater when not in use.
- Plug heater directly into wall outlet without the use of a power bar device or extension cord.
- If your heater is plugged into a ground fault circuit interrupter (GFCI) outlet and the GFCI trips, don't assume there is something wrong with the GFCI. Immediately stop using the heater until it can be checked by a professional— **if not, a serious shock could occur.**
- Place heater out of high-traffic areas and on a level, hard, non-flammable floor surface—NOT on carpets, furniture or countertops. Keep clear a 3 foot circumference around the heater. Remember: **space heaters need SPACE** in front and behind for air circulation and to prevent fires.
- Inspect for cracked or damaged, broken plugs or loose connections.
- Portable electric space heaters have one purpose —to provide supplemental heating. Never use to dry clothing or towels.
- Keep the heater clean by dusting or vacuuming it regularly when it is off and cool. Lint and dust can make the heater less efficient and can increase the risk of fire or explosion. When cleaning the heater and surrounding area, always turn the heater off first. Never use solvents or other flammable cleaners near a space heater that is turned on. Keep your hands away from the operating switch when changing body or tool positions.

7.26 LIGHT VEHICLE PRE-USE INSPECTION

- Check the surrounding area of the vehicle to ensure that it is clear of obstructions and snow.
- Conduct a circle check of the vehicle and complete the Daily Light Vehicle Pre-use Inspection checklist. The checklist is only required once a day, however, a visual inspection of the vehicle shall be conducted by each additional driver.
- Report any repairs identified during the inspection to your immediate supervisor.
- Do not drive a vehicle that is deemed unsafe to yourself or the public.

Check all items listed below and note any deficiencies on the Vehicle Log Sheet. Report all defects immediately to your supervisor/manager

Complete daily visual check prior to trip. Always wear your seatbelt	
Lights, signals	All working
Windshield	Free of cracks, chips, scratches
Brakes	Working
Clutch	Check operation/free play
Doors	Locks, glass, mirrors
Horn	Working
Interior	Clean, tidy, seats in working order
Gauges	Instruments operational
Steering	Operates properly
Documents	Registration, insurance , stickers
Tires	Tread good, inflation
Fluid Levels	Windshield fluid, oil, radiator
Seat belt	Working
Back-up alarm	Working
Other	Describe deficiency identified

7.27 ARC FLASH

Arc flash is an unexpected and sudden release of heat and light energy produced by electricity travelling through air. It is caused by an electrical fault and results in an explosion of light, heat, pressure, fire, toxic fumes, noise, and molten metal that can cause serious injury or death.

For further information on arc flash program refer to the *QEC Health & Safety Manual, Section 19 Arc Flash Program*.

General

- Shock and arc flash can be caused by:
  i. Faulty electrical apparatus
  ii. Worn or broken conductor insulation
  iii. Exposed live parts
  iv. Improperly maintained switches and circuit breakers
  v. Loose wire connections
  vi. Obstructed disconnect panels
  vii. Water or liquid near electrical equipment
  viii. High voltage cables
  ix. Static electricity

- QEC protects workers from arc flash by:
  i. Conducting surveys to determine arc flash hazards
  ii. Labelling equipment to identify sources of shock and arc flash hazards
  iii. Training workers on the QEC *Arc Flash Program* and *Utility Work Protection Code*
  iv. De-energizing equipment wherever possible
  v. Setting up barriers around the worksite, and
  vi. Using arc flash PPE

Arc Flash Hazards

- The health hazards associated with arc flash relate to the energies that are expelled from the arc flash and the impact on the worker's body. These include:
  i. Light: Light radiation is intense and can cause damage to unprotected eyes and skin.
  ii. Heat energy: The temperature of an arc may exceed 15,000°C (four times the temperature of the Sun's surface). These high temperatures cause rapid heating of surrounding air.
  iii. Fire: The high temperatures of the arc flash and the projectile molten metals can quickly ignite any flammable materials within striking distance. While these fires may cause extensive property damage and loss of production, the hazards to personnel are even greater.
  iv. Toxic fumes: The vaporizing of metal and other materials releases toxic gases into the air.
  v. Noise: The arc blast produces a very loud noise, sometimes exceeding 160 decibels, capable of damaging hearing.
  vi. Flying debris: Material and molten metal are expelled away from the arc at speeds exceeding 313 m/sec – 1027 ft/sec. The molten metal will often ignite any flammable materials it reaches.

- A potential arc flash hazard is present within the arc flash boundaries when the following conditions exist:
  i. Operating switches or breakers (i.e., opening, closing, or racking)
  ii. Testing for voltage
  iii. Splicing, cutting, or making a connection to an energized conductor/apparatus

iv. Installing/removing meters or metering apparatus while the apparatus or meter base/cabinet is energized or contains energized apparatus
v. Intentionally or accidentally making an electrical connection between conductors with a difference of potential or between energized apparatus and grounded/neutral conductors/apparatus, and/or
vi. Other work locations, conditions, or situations where energized conductors or apparatus are in close proximity to a grounded apparatus, cabinet, and/or conductor and the work being performed may reduce or eliminate the clearances between them

Arc Flash Surveys

- All arc flash studies must be based on the *IEEE 1548-2018 Guide for Arc-Flash Hazard Calculations*.

Arc Flash Labels

- Arc flash labelling shall be completed as per the *QEC Health & Safety Manual, Section 19 Arc Flash Program*.
- Arc flash labels shall be applied to all apparatus where potential arc flash hazards exist.
- Arc flash labels shall contain the following information, as identified in the arc flash surveys:
  i. Apparatus identification
  ii. Date the study was completed and the Company
  iii. Voltage
  iv. Arc Flash Boundary
  v. Limited Approach Boundary
  vi. Restricted Approach Boundary
  vii. Required category of arc flash PPE
- Arc Flash Labels indicate to workers where to put barriers and what PPE is required.
- Below (Figure 1) is the arc flash label template that is used as per the *QEC Health & Safety Manual, Section 19 Arc Flash Program.*

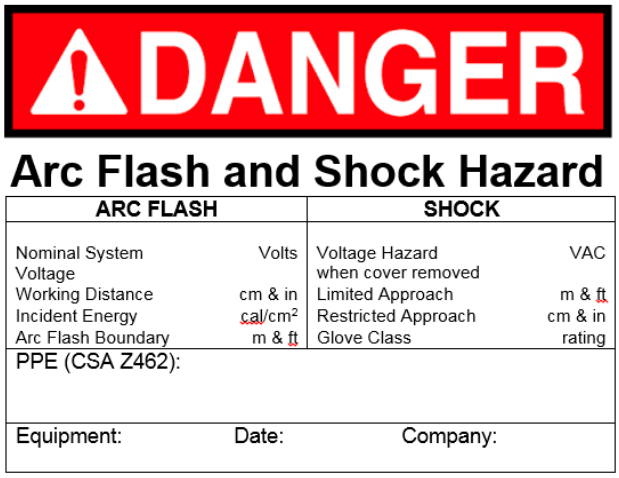


Figure 1: Arc flash label template

Hazard Assessment and Control

- All safe work comes down to proper hazard assessment and control.
    i. The safest option is always to eliminate the hazard, although sometimes this is not possible.
    ii. It is good practice to implement various levels of controls (e.g., put an engineered barrier/guard in place, ensure the worker is trained, follow a Safe Work Practice, and wear PPE).

- To eliminate/reduce risk related to arc flash hazards, follow the Hierarchy of Controls:
    i. Elimination (eliminate the hazard)
        a) Arc flash detection relays
    ii. Substitution (replace the hazard)
        a) Replace apparatus with one that has a reduced arc flash hazard level
    iii. Engineering Controls (isolate people from the hazard)
        a) Incorporate systems for remote switching/racking
        b) Isolate apparatus (lock-out/tag-out)
        c) Breaker racking handle extensions
    iv. Administrative Controls (change the way people work)
        a) Warning signs & barricades, training, procedures
    v. PPE (protect the worker)
        a) Arc Rated (AR) PPE
        b) Arc suppression blankets

- Work crews and workers shall follow approved work methods, procedures, and best practices to reduce the possibility and/or the effect of an electrical arc flash.
- Isolation of the apparatus and the conductors in the work area may be required to reduce the possibility of electrical arc flash.

Boundaries

- Arc Flash Boundary
  i. The area exposed to the effects of an arc flash.
  ii. If an Arc Flash occurred, a protected person within this space could receive up to 2nd degree burns.

- Approach Boundaries (shock protection)
  i. Defined zones surrounding **exposed** live electrical apparatus where shock hazard exists.
  ii. Two types: Limited and Restricted.
  iii. Limited Approach Boundary
    a) The distance from an **exposed** electrical apparatus where a shock hazard exists.
    b) This is the minimum distance from the apparatus where **unqualified** personnel may safely stand.
    c) To cross this boundary, workers must be either:
      - **Qualified** to perform the required work and use the appropriate Arc Rated (AR) PPE; or
      - Unqualified, but escorted by a Qualified Worker and wearing the appropriate AR PPE.

  iv. Restricted Approach Boundary
    a) The distance from an **exposed** live electrical apparatus where an increased risk of shock exists due to the potential for inadvertent movement to result in electrical over-arc.
    b) Shall only be crossed by Qualified Workers with:
      - The appropriate AR PPE;
      - Required training on the work to be performed; and
      - A written work plan that includes shock-protection techniques and equipment.

- Marking Boundaries
  i. Before starting work, read the label and mark the boundary furthest from the apparatus – either the Arc Flash Boundary or the
  ii. Limited Approach Boundary.

iii. Clearly identify the boundary with an easily visible barrier to keep unqualified persons outside of the boundary (e.g. signs, tape, cones, and barricades).

iv. The barrier may be placed beyond the farthest boundary to provide additional notification.

v. If marking the boundary does not provide sufficient warning, post an attendant outside of the boundary to ensure nobody enters the boundary. The attendant shall stay until the arc flash hazard is gone.

vi. The Arc Flash Boundary may be greater or less than the Limited Approach Boundary, depending on the characteristics of the apparatus.

vii. No one is allowed within an Arc Flash Boundary without wearing the appropriate AR PPE.

Arc Flash PPE

- General

i. QEC shall provide workers with the appropriate arc rated (AR) personal protective equipment (PPE).

ii. Arc flash PPE shall meet the requirements of *CSA Standard Z462, Workplace Electrical Safety*.

iii. Employees shall requisition the appropriate AR PPE through their manager or supervisor, selecting items listed in the appropriate table (located at the end of this SWP).

iv. Heat energy is expressed in calories per square centimeter (cal/cm^2). The arc thermal performance value (ATPV) indicated on the PPE label is the maximum incident energy the clothing is rated to withstand.

v. Arc rated clothing is flame resistant (FR). Non-FR clothing will burn, causing severe damage to an Arc Flash victim. It is important to note that not all FR clothing is arc rated. To be arc rated (AR), it must indicate the ATPV or specifically state incident energy rating in cal/cm^2.

vi. Synthetic clothing shall not be worn when working around energized apparatus as it will melt to the skin when exposed to high heat. Examples include nylon, polyester, polypropylene, and spandex.

vii. Only clothing constructed of non-melting fabrics (e.g., cotton) shall be worn beneath the outer layer of arc flash clothing and in non-Arc Flash hazard areas. Silk-screened prints on cotton garments will melt when exposed to high heat, so they are not allowed to be worn beneath AR PPE.

viii. Do not wear non-AR clothing over AR PPE, as it can ignite and cause severe burns. Arc flash clothing must be worn as the outer layer.

ix. Layering AR PPE clothing increases the level of protection. Clothing must be from the same manufacturer and a rating chart must be available.

x. AR PPE shall be worn in such a way as to afford maximum protection (i.e., collars closed, cuffs and sleeves worn down and secured).

- Inspection, Cleaning, Repair, and Storage

i. AR PPE shall be inspected before every use for wear/damage. Even small cuts or tears can greatly reduce the arc flash protection.

ii. Keep AR PPE clean. Dirt, oil, paint, chemicals, and other contaminants can impede the AR properties.

iii. Employees primarily working indoors should have a specific pair of AR coveralls to be used when conducting electrical work.

iv. Category 4 AR clothing shall be laundered as per the manufacturer's recommendations using commercial laundry facilities to ensure the cleaning products and methods do not affect the AR properties of the clothing.

v. Category 2 AR clothing and coveralls shall be laundered according to manufacturer's recommendations: washed in cool water and tumble dried on low heat or hung to dry. Washing with hot water or drying with high heat may cause garments to shrink.

vi. Do not use fabric softeners or bleach when washing AR PPE as they impede the AR properties.

vii. Torn garments shall be repaired with AR thread at commercial establishments or by the original equipment supplier. Repair of AR PPE is the responsibility of QEC.

viii. When not in use, AR PPE shall be stored in such a way as to keep it clean, dry, and undamaged (e.g., in a locker, cabinet, or duffle bag).

PPE Selection

- General
  i. Arc Rated (AR) PPE (either Category 2 or Category 4, as identified on the clothing label) shall be worn within the Arc Flash and Approach Boundaries when an arc flash hazard exists (i.e. during interaction with electrical apparatus).
  ii. Workers exposed to arc flash hazards shall wear CSA-approved leather footwear with an electric shock resistance sole (marked with a white rectangular CSA label containing an orange omega symbol (Ω)).
  iii. The combination of rubber insulating gloves with leather protectors satisfies the arc flash and electrical protection requirements.
  iv. Where the voltage is 120V or less, a face shield is not mandatory when working on or in a control panel, programmable logic controller (PLC) cabinet, or control circuit, as the arc flash hazard is minimal in those areas. However; shock hazards still exist, so appropriate gloves, eye protection, and insulated tools are still required.
  v. *Table 1: Arc Flash PPE* identifies the AR PPE required to be worn according to the arc flash category.

- Category 2 (1.2 cal/cm^2 to 12 cal/cm^2)
  i. When working on apparatus labelled with an incident energy level less than 8 cal/cm^2, each piece of AR PPE shall have a minimum ATPV of 8 cal/cm^2.
  ii. When working on apparatus labelled with an incident energy greater than 8 cal/cm^2 and less than 12 cal/cm^2, each piece of AR PPE shall have a minimum ATPV of 12 cal/cm^2 (see Figure 3).
  iii. The following measures shall be taken, at a minimum:
    a) AR PPE shall be worn to cover the body (e.g., coveralls, shirt, pants, jacket, bib overalls, parka, rain jacket, rain bibs).
    b) AR PPE balaclava and face shield (mounted on a Type 1, Class E, CSA approved hard hat) shall be worn. It shall include wraparound guarding to protect the face, forehead, ears, and neck.
    c) Appropriate rubber insulating gloves with leather protective covers shall be worn.

d) Eye protection, hearing protection (ear plugs), and CSA-approved omega rated leather safety footwear shall be worn.

- Category 4 (12 cal/cm^2 to 40 cal/cm^2)
  i. When working on an apparatus labelled with an incident energy level greater than 12 cal/cm^2 and less than 40 cal/cm^2, each piece of AR PPE shall have a minimum ATPV of 40 (see Figure 4).
  ii. The following measures shall be taken:
    a) Arc flash Category 4 PPE shall be worn to cover the body (e.g., jacket, pants, bib overalls, parka).
    b) Category 4 arc flash hood shall be worn.
    c) Appropriate rubber insulating gloves with leather protective covers shall be worn.
    d) Eye protection, hearing protection (ear plugs), and CSA-approved omega rated leather safety footwear shall be worn.
- Category >4
  i. No arc flash PPE is available from QEC for incident energy levels greater than 40cal/cm^2.
  ii. Apparatus labelled as >40 cal/cm^2 shall only be worked on in the **de-energized** state.

Work Methods

- All electrical work shall be conducted:
  i. By Qualified and authorized workers only
  ii. In accordance with QEC Safe Work Practices (SWPs) and Standard Operating Procedures (SOPs)
  iii. In accordance with the *Canadian Electrical Code*, and
  iv. In accordance with *the QEC Safety Rule Book, Section 2 Work Protection Code*
- All work requires a *Tailboard Meeting*.
- Approved work methods and best practices shall be followed to reduce the risk of injury from arc flash. This may include:
  i. Live line tools (hot sticks) used to operate overhead, underground, and station switches. Such tools shall be of sufficient length to position the worker outside of the Arc Flash Boundary. Workers shall position themselves to reduce being struck from arc blast materials.

ii. Specific switching operations may require the switches to be isolated before the switching operation can be initiated. Additional PPE may be required to reduce the effects of arc flash due to high fault current levels.

iii. Work in pad mount transformers shall be restricted to work on secondary equipment that has been isolated or that have protective barriers in place to reduce the risk of arc flash.

iv. Work on or in front of open station cabinets, metering cabinets, and meter bases shall be restricted to equipment that has been isolated or where sufficient precautions are in place to reduce the effects of a potential arc flash.

v. Temporary jumpers or safety grounds shall be installed by approved methods that enable electrical connections or splices to be made or broken without an arc flash being created. *Qualified and authorized workers only.*

vi. Adequate protection from second points of contact shall be in place.

vii. Prescribed clearances shall be adhered to during the completion of live line work procedures.

viii. Clearances between conductors and apparatus shall be maintained during stringing operations and the relocation of conductors and apparatus.

ix. Physical arc flash protection barriers (e.g. arc suppression blankets, arc flash venting hood) may be installed over an apparatus or conductor to reduce or redirect the arc flash away from the worker.

x. Specialized tools (e.g., meter-pullers, live line tools, etc.) shall be used to reduce the effects of an arc flash or to reduce the potential for an arc flash.

- Category 2 (1.2 cal/cm^2 to 12 cal/cm^2)

i. All live work shall be restricted to testing only, using appropriately rated equipment.

ii. If there is a special circumstance where live electrical work is required, a specific *Job Safety Analysis* for that work shall be developed and implemented before work starts.

iii. The motor control center (MCC) shall be de-energized prior to insertion or removal of individual starter buckets. If the MCC cannot be de-energized, Category 4 PPE shall be worn.

- Category 4 (12 cal/cm^2 to 40 cal/cm^2)
  i. Live work shall only be performed by workers that are Qualified and authorized to work at the rated voltage level.
  ii. Two people are required to work on apparatus labelled with an incident energy level between 12 cal/cm^2 and 40 cal/cm^2:
    a) One Qualified Worker to conduct the work; and
    b) A second worker, not necessarily electrically qualified but current in Level 1 First Aid and Cardiopulmonary Resuscitation (CPR), to respond in case of incident.
    c) Both workers shall wear the appropriate PPE.

Table 1: Arc Flash PPE

Category	Arc Rating	PPE
2	1.2 to 12 cal/cm^2	• Non-conductive safety glasses/goggles • Hearing protection (ear plugs) • Arc flash long-sleeve shirt & pants, or coveralls ATPV 8+ • AR Long sleeve sweat shirt ATPV 8+ • Arc-rated face shield attached to Type 1 Class E hard hat with AR balaclava, or arc flash hood with hard hat ATPV 10+ • Arc flash jacket, parka, rainwear, hat liner (as needed, ATPV 12+) • Leather CSA green triangle omega work boots • Leather gloves or rubber insulating gloves with leather protectors
4	> 40 cal/cm^2	• Non-conductive safety glasses/goggles • Hearing protection (ear plugs) • Arc flash long-sleeve shirt & pants, or coveralls ATPV 8+ • Arc flash jacket & bib overalls ATPV 40+ OR • Arc flash coveralls ATPV 40+ • Arc flash hood ATPV 40+ with hard hat (Type1, Class E) • Leather CSA green triangle omega work boots • Rubber insulated gloves with leather protectors

Table 2: Arc Flash PPE Minimum Provision for Plants with Arc Flash Hazards less than 12cal/cm^2

# Per Plant	Product Description
1	Arc-rated face shield attached to Type 1 Class E hard hat with AR balaclava (ATPV 10 or ATPV 12 depending on hazard)
1	Face shield storage bag
2	Rubber insulated gloves with leather protectors. Refer to *SWP-028 Inspection and Testing of Rubber Insulating Gloves and Electrical Protective Devices*.
2+	AR Coveralls with Hi-Viz tape, ATPV 8+ or ATPV 12+ depending on hazard (required for each Plant Operator)

Table 3: Arc Flash PPE Minimum Provision for Plants with Arc Flash Hazards of 12cal/cm^2 or greater

# Per Plant	Product Description
2	Arc-rated face shield attached to Type 1 Class E hard hat with AR balaclava (ATPV 10 or ATPV 12 depending on hazard)
2	Face shield storage bag
2	Rubber insulated gloves with leather protectors. Refer to *SWP-028 Inspection and Testing of Rubber Insulating Gloves and Electrical Protective Devices*.
2+	AR Coveralls with Hi-Viz tape, ATPV 8+ or ATPV 12+ depending on hazard (required for each Plant Operator, Electrician and Mechanic)
2	AR flash hood with cooling fan (ATPV 45, Category 4)
2	AR 2-layer jacket and pants (ATPV 45, Category 4) OR
2	AR Coveralls with ATPV >40+
2	Storage duffle bag for Category 4 arc flash suit (pants, jacket & hood OR coveralls and hood)

Table 4: Arc Flash PPE Provision for Power Line Technicians (PLTs)

# Per PLT	Product Description
1	Rubber insulated gloves with leather protectors. Refer to *SWP-028 Inspection and Testing of Rubber Insulating Gloves and Electrical Protective Devices*.
1	Bib overall, summer Arc/FR Hi-Vis (ATPV 12+, Category 2)
1	Bib overall, winter Arc/FR Hi-Vis (ATPV 40+ , Category 4)
3	Long sleeve t-shirt or work shirt Arc/FR Hi-Vis (ATPV 8+)
1	Long sleeve sweat shirt Arc/FR Hi-Vis (ATPV 12+)
1	Jacket, winter parka Arc/FR Hi-Vis (ATPV 40+, Category 4)
1	Rain suit (jacket and bib) Arc/FR Hi-Vis (ATPV 12+)
1	AR balaclava (ATPV 12+)

Table 5: Arc Flash PPE Provision for Meter Technicians

# Per PLT	Product Description
1	Arc-rated face shield attached to Type 1 Class E hard hat with AR balaclava (10 ATPV or 12 ATPV depending on hazard)
1	Rubber insulated gloves with leather protectors. Refer to *SWP-028 Inspection and Testing of Rubber Insulating Gloves and Electrical Protective Devices*.
2	AR Long sleeve t-shirt or work shirt with Hi-Viz tape (ATPV 8+)
1	AR Pants, Cargo style **or** Jeans (ATPV 8+)
1	AR Long sleeve sweat shirt with Hi-Viz tape (ATPV 12+) **or** summer jacket with Hi-Viz tape (ATPV 12+)
1	AR Jacket, winter parka with Hi-Viz tape (ATPV 40+, Category 4)
1	AR Bib overall, winter insulated with Hi-Viz tape (ATPV 40+, Category 4)

7.28 INSPECTION AND TESTING OF INSULATED RUBBER GLOVES AND DEVICES

Inspection

- Each Lines Person, Electrician, Plant Superintendent and Operator are issued at least two pairs of the rubber insulating gloves of the Class required. They are responsible for the first pair of gloves for 180 days (6 months); the second pair is a back-up to the pair in use. Spare rubber insulating gloves are to be available at the warehouse in each of the three regions (Qikiqtaaluk, Kivalliq, & Kitikmeot).

- Rubber insulating gloves are to be visually inspected (inside & out) for damage daily prior to use and after any incident suspected of causing damage. An air test inspection shall also be conducted (manually inflating the glove by rolling the cuff tightly to trap air inside then applying pressure to areas of the glove to listen for escaping air). The procedure is to be repeated with the glove turned inside out. See *SOP-22, Internal Inspection, Care and Use of Protective Rubber Insulating Gloves* for detailed test procedures.
- If the person using the gloves identifies any concerns during their pre-use inspection, they shall contact their supervisor. The gloves are to be returned to the warehouse in their region for immediate replacement and the worker shall use their back-up pair. Defective gloves shall NOT be used.
- The test date for the rubber insulating gloves, and any insulating equipment, must be verified to ensure the test date is still valid AND that the class/voltage rating is equal or greater to the nominal voltage being worked on.
- Rubber insulating gloves must always be used with approved leather protectors. Regular full leather work gloves cannot be used as substitutes.
- Leather protectors for rubber gloves shall be inspected prior to use for nicks, cuts, tears, and oil contamination. Defective leather protectors shall NOT be used, and the worker shall contact their supervisor for a replacement pair.
- Rubber insulating gloves and electrical protective equipment with any of the following defects may not be used:
  - A hole, tear, puncture, or cut;
  - Ozone/corona cutting or ozone checking (that is, a series of interlacing cracks produced by ozone on rubber under mechanical stress);
  - An embedded foreign object;
  - Any of the following texture changes -- swelling, softening, hardening, becoming sticky or inelastic;
  - Weak creases (from being left folded or inside out for too long);
  - Any other defect that damages the insulating properties;
  - Passed the test due date.

Equipment Testing Requirements and Intervals

- Rubber insulating gloves shall be tested prior to first issue, and retested at least every six months thereafter; or more often if field conditions warrant.

- Rubber insulating sleeves shall be tested prior to first issue, and retested at least every twelve months thereafter; or more often if field conditions warrant.
- Rubber insulating blankets shall be tested prior to first issue, and retested annually thereafter; or upon indication that the insulating value is suspect.
- Rubber insulating line hoses and covers shall be retested annually, or upon indication that the insulating value is suspect.

Note: If the insulating equipment has been electrically tested but not issued for service, it shall not be placed into service unless it has passed electrical testing within the previous six months for rubber insulating gloves and sleeves, and twelve months for rubber insulating blankets, line hoses, and covers.

- Rubber insulating equipment shall comply with the following American Society for Testing and Materials (ASTM) standards:
  - Specification for Rubber Insulating Gloves: ASTM D120
  - Specification for Rubber Insulating Matting: ASTM D178
  - Specification for Rubber Insulating Blankets: ASTM D1048
  - Specification for Rubber Insulating Covers: ASTM D1049
  - Specification for Rubber Insulating Line Hose: ASTM D1050
  - Specification for Rubber Insulating Sleeves: ASTM D1051
- All electrical protective equipment shall be subjected to periodic electrical tests conducted in accordance with appropriate voltages identified by ASTM standards to reliably indicate whether the insulating equipment can withstand the voltage involved. Insulating equipment failing to pass inspections or electrical tests shall NOT be used.

Recommended Glove Rotation

- All departments using rubber insulating gloves shall make the appropriate arrangements for testing of rubber insulating gloves to the appropriate ASTM standard every six months or more often if field conditions warrant.

- All QEC Supervisors responsible for electrical workers shall ensure the appropriate Class of rubber insulating gloves are used.

ASTM Class Specifications for Rubber Insulating Gloves & Equipment

Class	Proof Test Voltage	Max Use Voltage
Class 00	2,500 AC/10,000 DC	500 AC/750 DC
Class 0	5,000 AC/20,000 DC	1,000 AC/1,500 DC
Class 1	10,000 AC/40,000 DC	7,500 AC/11,250 DC
Class 2	20,000 AC/50,000 DC	17,000 AC/25,500 DC
Class 3	30,000 AC/60,000 DC	26,500 AC/39,750 DC
Class 4	40,000 AC/70,000 DC	36,000 AC/54,000 DC

- Area or Regional Production Supervisors will coordinate the exchange of rubber insulating gloves before 180 days (6 months) or more often if field conditions warrant.
- Area or Regional Production Supervisors will set up a reminder system to ensure rubber insulating glove rotation and testing takes place.

Recommended Glove Rotation

- All departments using insulating equipment shall make the appropriate arrangements for testing of such equipment to the appropriate ASTM standard on an annual basis.
- Supervisors will set up a reminder system to ensure such testing of insulating equipment takes place.

7.29 LIVE LINE TOOL INSPECTION, SAFE HANDLING & STORAGE

Visual Inspection

- All live-line tools should be wiped clean and visually inspected before each use. Certain defects or contamination could affect the insulating qualities or mechanical integrity of the tools.
- Live-line tools must be maintained in clean condition prior to use:
  - Clean hands or gloves are required while handling live-line tools to avoid contamination of the dielectric surface
  - Contaminants should be removed with a clean, absorbent cloth or paper towel
  - To clean live-line tools, only use isopropyl alcohol, an approved live-line tool cleaning solution, or live-line tool cleaning wipe
  - Do not use soap or liquid detergents to clean live-line tools as they can leave a conductive coating
  - Wipe the clean live-line tool with a silicone-treated cloth

- Visually inspect the surface of the live-line tool for:
  - Deterioration on the surface of the fiberglass-reinforced plastic rod, such as scratches, gouges, cracks, cuts, nicks and dents (through the finish)
  - Dull finish, excessive wear and delamination
  - Signs of electrical tracking, burn marks or blistering
- Visually inspect the end fitting and other mechanical parts for:
  - Proper operation
  - Damaged, bent, worn, loose, or cracked components or other visible damage
  - Elongated or deformed rivet ends, roll pins or fasteners
  - Excessive wear
  - Dirt, paint, creosote, grease or other foreign materials
- During initial use, a sign of dielectric failure is:
  - A tingling or fuzzy sensation when the tool comes near or in contact with an energized conductor or piece of equipment.

If any of the above conditions are found during an inspection or initial use, the live-line tool shall be immediately removed from service and tagged out using a QEC "Out of Service" tag. Alterations or modifications affecting the insulative properties and/or mechanical function of the live-line tool shall not be made to live-line tools.

Proper Handling of Live Line Tools

- During the performance of live-line work, if it is required to put down live-line tools, they shall be placed on tarps or back in their storage bag. If someone else available, they can hold the live-line tool.
- Live-line tools shall not be placed on the ground or against sharp objects such as wire fences, metal poles, or steel truck bins.

Proper Live Line Tool Storage

- Use a storage bag for live-line tools to reduce the risk of nicking and chipping
- Use the weatherproof enclosures on the line trucks when storing bagged live-line tools. Avoid leaving such tools loose in the back of the line truck.
- When not in the field, live-line tools should be stored in a dry, preferably warm indoor location.
- Proper storage is crucial to prevent dirt and damage that can compromise the dielectric safety of the live-line tools.

7.30 ATV & SNOWMOBILE SAFETY

Guidelines

- Drive in a manner suitable for the terrain and weather conditions.
- Always keep both hands on the handle bars and both feet on the foot pegs or running boards during operation.
- Always go slowly and be extra careful when operating on unfamiliar terrain. Always be alert to changing terrain conditions when operating the ATV or snowmobile.
- Always be sure there are no obstacles or people behind you when you operate in reverse. When it is safe to proceed in reverse, go slowly.
- Never stand while operating in reverse, as this can cause the thigh to push on the throttle and result in a loss of control. Remain seated while reversing.
- Never operate when fatigued, under the influence of intoxicants or at excessive speeds. Always go the speed that is proper for the terrain, visibility, operating conditions, and your experience.
- Never attempt stunts (e.g., wheelies, jumps, etc.).
- Never overload an ATV or snowmobile.
- Never operate an ATV in fast flowing or deep water. Remember that wet brakes may have reduced stopping ability. Test your brakes after leaving water. If necessary, apply several times to let friction dry out the linings.

Before You Travel

- Inform the Project Manager or your Supervisor of route, departure time, and expected return time.
- Valid driver's licence and registration is required for operation of an all-terrain vehicle for work purposes.
- Prior to operating ensure all-terrain vehicle (ATV) or snowmobile is mechanically sound and suitably equipped.
- Ensure fuel, oil, fluid, and tire pressure levels are adequate and tire/track condition is good.
- Ensure machine has enough fuel to complete the trip. Bring extra fuel if required.

- Ensure that the ATV/snowmobile is equipped as follows:
- Mobile phone, satellite phone, or radio as applicable;
- GPS with GPS coordinate map or SPOT device (if required); and
- Tools, spare parts (spark plugs, etc.).
- Secure cargo items properly and safely.

Travel Requirements

- Workers operating or travelling on an all-terrain vehicle or snowmobile shall wear protective head gear that complies with the DOT or Snell safety standard and displays the proper certification label.
- Never operate the all-terrain vehicle (ATV) or snowmobile on hills too steep for the machine or for your abilities.
- Check the terrain carefully before you start up any hill. Never climb hills with excessively slippery or loose surfaces. Shift your weight forward. Never open the throttle suddenly or make sudden gear changes. Never go over the top of any hill at high speed.
- Check the terrain carefully before you start down any hill. Shift your weight backward. Never go down a hill at high speed. Avoid going down a hill at an angle that would cause the vehicle to lean sharply to one side. Go straight down the hill where possible.
- When climbing a hill use the proper gear and maintain a steady speed to avoid stalling. If you stall or begin to roll backwards, keep the machine pointed up hill and apply the brakes.
- Avoid hills with excessively slippery or loose surfaces. When travelling along the side of a hill shift your weight to the uphill side of the ATV/snowmobile. Avoid crossing the side of a steep hill if possible.

Towing Conveyance (Trailer or qamutiq)

- No person shall tow a trailer or qamutiq or other vehicle behind an ATV or snowmobile unless the hitch or attachment used:
  - is designed so that the conveyance being towed substantially follows in the tracks of the towing vehicle;
  - is strong enough to safely control the conveyance being towed;
  - is not more than 1.83 metres (6 feet) long; and
  - prevents the conveyance from colliding with the towing vehicle during travel downhill and when the towing vehicle stops.
- If a qamutiq is used for transporting workers, they are required to use eye and head protection if the towed conveyance does not have an enclosed cab.

Signatures

Signatures are required on a onetime basis prior to scheduling work that requires the use of an ATV or snowmobile. Refer to SWP-030 for the fill sign-off sheet

7.31 SNOW BLOWERS

- The Supervisor shall ensure that all workers, contractors and sub-contractors will be informed of this practice before moving or using snow blowers.
- All workers, contractors, and sub-contractors will use this practice when moving or using snow blowers.
- Before operating the snow blower, conduct a tailboard meeting to clarify work conditions, nature of the task and hazards.
- Coordinate snow blower operation with others before and during the work due to projectile hazards. Operator is to be aware of their surroundings and constantly assess snow clearing area for changing conditions (i.e. people, weather, wildlife, etc.)
- Complete a pre-start check of snow blower and work area as per the
- *Owner's Manual*.
- Operator to use the snow blower on level surfaces, not on significant inclines or slopes.
- Follow manufacturer's and site procedures to operate the snow blower.
- Operate the snow blower cautiously at a safe operating speed.
- Do not overload the equipment. For deeper snow, complete narrower passes overlapping cleared areas.
- Do not operate the equipment when known projectiles are likely to be pulled in by auger.
- If removal of obstructions from the auger or chute is required, the Operator is to follow all instructions of the *Owner's Manual*. Ensure that the unit is turned off and that all rotating parts have come to a complete stop.
    - Remove spark plug cap from the spark plug.
    - Remove the snow clearing bar (if equipped) or use a wooden stick to clear the obstruction.

- During refueling operations, the Operator is to follow all instructions of the *Owner's Manual*.
  - Always refuel outdoors, due to hazards associated with gasoline fumes.
  - Ensure the engine is shut off.
  - Refuel the tank if the fuel level is low. Do not fill above the base of the filler neck. Fill tank to approximately 1.4 inch (35 mm) below the top of the fuel tank to allow for fuel expansion.
  - Refuel carefully to avoid spilling fuel.
- When parking/storing the equipment, clear the area for unit. Ensure the auger side is placed against a wall/equipment to prevent accidental contact with blades.
- Refer to *Owner's Manual* for specific instructions on servicing and maintenance.

7.32 SCAFFOLD

All scaffolds must be designed and erected in accordance with the *Nunavut Occupational Health and Safety Regulations, Part 12, Scaffolds, Aerial Devices, Elevating Work Platforms and Temporary Supporting Structures: Sections 177-197*.

The QEC supervisor, on behalf of the employer, shall ensure that every scaffold at a QEC worksite is:

- Erected, maintained and dismantled by a competent worker; and
- Inspected by a competent individual prior to use, and daily when in use, for any damage, deterioration or weakening of the scaffold or its components.

Every worker who designs or constructs a scaffold must have a clear understanding of what the manufacturers specifications are for the type of scaffold they are erecting.

Each type of scaffolding has its own fall protection requirements. A personal fall arrest system or guardrail system that meets the required criteria shall be used.

Safe Scaffolding Set-up

- Inform workers of the maximum working load and any other information necessary to ensure safe scaffold use.
- Use proper fall protection.
- Carefully follow manufacturer's instructions for safe set-up.
- Do not mix scaffolding components from multiple manufacturers.
- Level and erect the scaffold on a firm foundation with a wood, concrete, or metal sill to ensure stability.
- Anchor scaffolds vertically at no more than 4m / 12 foot intervals, and horizontally at no more than 6m / 18 foot intervals.
- Install cross bracing at all levels to support against lateral movement.
- Make sure locking devices and ties (pig tails, thumb screws, and banana clips) are secure.
- Set-up scaffold a safe distance from power lines and other uninsulated electrical conductors.
- Only competent individuals may erect, maintain, and dismantle the scaffold; and inspect it daily, when in use.
- Make sure planks, decks, toe boards and guardrails are in place and secure.

Safe Scaffolding Use

- Use a hoist or rope to move materials to upper levels. If equipped, use a gin wheel/hoist arm.
- Do not carry materials when climbing scaffolding.
- Do not allow tools, materials, or debris (grease, dirt, snow, ice) to accumulate on the platform.
- Do not overload scaffolding with too many people or materials in any one area.
- Make sure there is a safe entrance to all working levels.
- Barricade areas below if there is a chance of items falling from the scaffolding.
- Make sure there is a control zone for the lifting area.
- Never work on scaffolding during storms or strong winds (greater than 40km/h).
- Always conduct a tailboard meeting before beginning work on a scaffold.
- Use a personal fall arrest system when working on scaffolding at a height of 3m / 10 feet or more above ground level. Attach the lanyard or lifeline to a secure member of the scaffold or an adequately rated anchor.

Rolling Scaffold

A rolling scaffold is a type of supported scaffold set on wheels. A rolling scaffold is designed to allow for easy movement, creating a more efficient workplace. Workers who frequently change their position for at height work use rolling scaffolds regularly.

Safety standards for rolling scaffolds are different from other scaffold standards because of their mobility. As with any scaffold, rolling scaffolds are to be inspected before, during and after each use. Reject damaged parts from use and replace them as soon as possible.

- Always brace a rolling scaffold with:
  - Cross braces
  - Horizontal braces
  - Diagonal braces
  - Or a combination of braces

- Braces prevent collapse of the scaffold. Secure vertical members together, and automatically square and align vertical members. Always pin together separate sections of a scaffold.

- At heights of 3m / 10 feet or more, lanyards or lifelines must be attached to a suitable anchor point other than the scaffold.

- Lock scaffold wheels with positive wheel locks, wheel and swivel locks or equivalent means to prevent unwanted movement. Each castor is to have a brake on it to ensure safety of employees.

- When moving a rolling scaffold, apply manual force as close to the base as possible but not more than 1.5m / 5 feet above the supporting surface. Stabilize rolling scaffolds before movement to prevent tipping. Pay attention to flooring conditions such as holes, depressions, curbs, etc. that can cause the rolling scaffold to overturn.

- Notify each employee on a scaffold before moving it. Moving a scaffold with employees on it, especially if they are unaware of the move, can be dangerous.

- Do not allow workers to ride on a rolling scaffold.

8.1 WELDING

- Obtain and complete welding, cutting and burning permit (form HS4-01) from the plant superintendent or assistant operator.
- Ensure proper, safe condition of equipment (regulators functioning, hoses in good condition). When using arc welder check cables to ensure they are not frayed, check electrical plug and check amperage indicator.
- Ensure that you have all protective gear needed for welding: leather gloves, eye protection that has proper lens tinting, protective clothing so that there is no exposed skin, safety boots of ankle height and earring protection if applicable.
- Take into consideration any additional safety gear needed such as fall arrest, dependent on the environment which you will be working in.
- Ensure all combustible and/or flammable material is cleared from the area and wet down surrounding area if necessary.
- Ensure that a fire extinguisher or fire hose must be close at hand. Welding screens must be erected when arc welding is to be performed to prevent other workers in the area form UV exposure.
- IN THE CASE OF ARC WELDING, THE IMMEDIATE AREA MUST BE DRY BEFORE COMMENCING TO WELD.
- A fire watch shall be assigned as a safety back up.
- If welding is to be performed on a powered piece of equipment, all lockout procedures shall apply.
- If welding is to be performed on mobile equipment, remove propane tank, disconnect battery cable, and remove any combustible materials from wheels and under carriage. A fire watch shall be assigned as a safety back up.
- Ensure that no fumes or gases, which may ignite, are present in the welding area. Allow that proper ventilation is available or else a respirator with OV cartridges must be worn.
- When entering an enclosed area, ensure that proper lockout procedures are followed and that a safety watch is present at the outside of the area you are contained in.

8.2 PEDESAL GRINDERS

Preoperational Check

- Always wear eye protection. (Safety Glasses under a face shield).

- Remove rings, watches and other jewelry. Long hair should be tied back and loose sleeves should not be worn. Do not wear gloves when operating a buffing, grinding or polishing wheel.
- Make sure the wheel guards are in place and properly adjusted and tightened.
- Don't adjust a grinder when it is running.
- Blotter and wheel flanges used to mount the grinding wheels on the shaft of the grinder must be in place.
- Tool rests must be adjusted and tightened to ensure that there is less than 1/8 inch gap from the wheel.
- The tool rest must be adjusted so that its upper edge is not below the center line of the abrasive wheel.
- Wheels should be inspected prior to turning on the power. Wheels with cracks or chips or that are badly rutted should not be used. They may require dressing or permanent removal from service.
- Do not grind on the side of the abrasive wheel.
- Check that the speed rating of the grinding wheel is equal or exceeds the speed rating of the grinder. The maximum approved speed stamped on the wheel blotter should be checked against the arbour speed of the machine to ensure that the safe peripheral speed is not exceeded.
- Clear the area of any flammable materials as the sparks could ignite a fire.

Grinding Procedure

- Stand to one side of the wheel when turning on the power.
- Before commencing grinding, allow the grinding wheel to run at operating speed for a least one minute.
- When commencing a grinding operation, bring the object into contact with the grinding wheel slowly and smoothly avoiding impact or bumping motions.
- Move the object being ground back and forth across the face of the wheel, as this prevents ruts or grooves from forming.
- Use the face of the wheel when grinding. Do not press too hard on the wheel.
- Vibrating wheels should not be used. They must be dressed or replaced or the bearings of the shaft replaced if they are worn.
- Do not touch the ground portion of the work piece until you are sure it is cool.

- Shut off the power and do not leave until the wheel has come to a complete stop.
- Clean the work area when finished using the grinder.
- Disconnect angle grinders from the power source when making repairs or changing discs.
- Turn off the power switch to pedestal grinders and lockout the electrical switch before doing any repairs.

Wheel Dressing Procedure

- Wear a face shield over your safety glasses for protection against heavy particles.
- Dress wheels regularly. Do frequent, light dressings instead of one heavy dressing. Replace worn wheels if you cannot dress it.
- Dress the wheel on the face only. Dressing the sides may cause it to become too thin for safe use.
- Use a dressing tool approved for the job.
- Inspect star dressers for loose shaft and worn disks.
- Round off the wheel edges with a hand stone before and after dressing to prevent the edges from chipping.
- Use the work rest to support and guide the tool.
- Use a tool holder if one is available.
- Apply moderate pressure slowly and evenly.
- Always apply diamond dressers at the center or slightly below the center, never above.

8.3 TIRE CHANGE

- Position the vehicle on a flat, solid surface. Put the vehicle into park and set the emergency brake.
- Turn off the ignition and remove the key.
- To prevent the vehicle from rolling, place a wheel chock diagonally opposite the wheel to be changed. If you are changing the left front tire you should chock the back right tire. Placing wheel chocks at both wheels would be an added safety step.
- If your vehicle has separate wheel covers, use the pry bar to remove them. Place the pry bar under the edge of the wheel cover and gently pry it up. Do this at several points around the wheel cover to loosen it, and then remove it completely.

- If you have a wheel lock key, fit it to the wheel lock and place the lug wrench on it. Turn it in a counter-clockwise direction until the wheel lock cracks loose.
- Place the wheel lock in a safe place where it won't roll away and crack the other lug nuts loose. At this point you just want to crack them loose, not remove them.
- Now place the jack in position as per vehicles instructions. This is usually under the body just forward of the rear wheels and rearward of the front wheels. Slowly and steadily raise the vehicle until the tire is just touching the ground. Using the lug wrench remove all the lug nuts and place them aside.
- Raise the vehicle until the wheel clears the ground and remove the wheel.
- Place the replacement wheel onto the wheel studs and start the lug nuts by hand as far as you can. Wiggling the wheel will help in doing this.
- With the wheel on and secure, lower the vehicle until the wheel touches the ground. Use the lug wrench to tighten the lug nuts. There is a certain sequence you must follow. For five lug nuts the sequence is a star pattern.
- Lower the vehicle completely and give the lug nuts a final tightening with a torque wrench if available.

8.4 LIFTING LIGHT VEHICLE USING FLOOR JACK

- Inspect the hydraulic floor jack prior to use. Make sure all guards are in place, properly adjusted, and secured.
- Check the vehicle service manual or owner’s manual to determine the best position to support a vehicle. Do not jack or support a vehicle under any independent suspension components. Never lift a vehicle that is heavier than the jack’s rated capacity.
- Position the vehicle on a flat, solid surface. Put the vehicle into first gear or park and set the emergency brake.
- Turn off engine and remove key.
- Place blocks in front of and behind the wheels that aren’t going to be raised off the ground.
- Position jack properly under lift points on vehicle. NEVER raise the vehicle with someone in the vehicle.
- Make sure there are no people or objects in path of jack. Follow manufacturer’s procedures in operation of jack. Note: while using this machine, ensure that people are a safe distance away until car is secured on jack stands.

- Lift vehicle slowly and check the placement of the jack pad.
- If the vehicle is stable, continue lifting it until it's at the height where you can safely work.
- Adjust each jack stand to same height, insert positioning key and position them underneath the vehicle. Ensure they are positioned at a point that can support the weight. Under no circumstances is a vehicle to be worked on without the use of stands
- Gently lower vehicle onto jack stands. Keep a safe distance away from vehicle when lowering.
- Repeat this process to lift the other end of the vehicle if required.
- Once repairs have been completed, reposition the jack, lift the vehicle, remove the stands and lower the vehicle to the ground.

8.5 VEHICLE BATTERY CHANGE

- Position the vehicle into the work area, turn off the ignition, take the key out and open the hood for access to the battery.
- Review the Safety Data Sheet for car batteries prior to handling. Anyone handling batteries must be trained in WHMIS.
- Determine the condition of the battery through a visual inspection. Be cautious of a frozen battery (it "bulges" out). A charged battery does not freeze. The electrolyte keeps it from freezing.
- Check fluid level by the battery eye; i.e., green indicates charged, black indicates changeable, and white indicates frozen or it needs to be replaced.
- Neutralize any acid sitting on top of the battery with baking soda.
- Disconnect the negative (-) battery post first, followed by the positive (+) terminal. There is a danger of sparks flying if the wrong post is disconnected first.
- Clean battery posts with a post cleaner or wire brush.
- Detach any hardware that is holding the battery in place.
- Attach the battery lifter, lift out the old battery and set on the ground.
- Clean posts on new battery with a post cleaner or wire brush.
- Attach the battery lifter the new battery.
- Put the battery into the vehicle battery holder.
- Connect the positive (+) battery post first, followed by the negative (-) terminal.

- Check fluid level by the battery eye; i.e., green indicates charged, black indicates changeable, and white indicates a full charge.
- Close the hood and turn on the ignition to check battery is properly hooked up.
- Return job specific tools; ensuring good housekeeping practices and wash up.

8.6 OIL CHANGE

- Position the vehicle on a flat, solid surface. Put the vehicle into first gear or park and set the emergency brake.
- Turn off the engine and remove key.
- Place an oil drip pan directly beneath the vehicles engine oil drain plug. Both the plug and the engine oil tank will be located towards the front of the truck.
- Remove the oil engine drain plug with a socket wrench and allow the old oil to flow into your drip pan. It should take about 15 – 20 minutes for the oil to completely flow out.
- Wait for the oil to finish draining. Then, wipe down the oil drain plug opening with a clean rag. Replace the drain plug and tighten with a socket wrench. Do not over-tighten, as this could cause the threads to be stripped.
- Move the drip pan to the oil filter and partially unscrew the filter with a specialized oil filter wrench. This will allow the oil above the filter to drain out.
- Remove the oil filter completely. Ensure the gasket came off with it. Drop the filter into the drip pan.
- Coat the threads of the replacement filter in fresh motor oil and screw the new filter onto the oil filter mounting base. Tighten oil filter as per instruction on the oil filter or the oil filter box.
- Open the hood of the vehicle truck. Locate and remove the oil tank's dip stick. Add fresh motor oil into the tank. Depending on the size of the truck and the truck's oil tank, you will need to add somewhere between 5 to 7 litres of fresh oil. After 5 litres, monitor the levels by the wiping the dipstick clean, reinserting it into the tank, and removing it.
- Continue to add oil until the tank is full. Do not overfill the tank.
- Start the engine and monitor gages or warning lights.
- Once all gages read normal, shut the engine off, check underneath the vehicle for leaks at the engine drain plug and oil filter.

- Return job specific tools; ensuring good housekeeping practices and wash up.

WARNING: Oil change should not be done on a hot engine as the risk for burns is high.

8.7 FILLING DRY BATTERIES

- Mount the new batteries on a platform.
- Prepare a neutralizing agent of water and baking soda to keep near your work area in the event of a spill and to use as a cleaning agent before and after filling batteries.
- Clean the top of the battery and an empty acid container with neutralizing agent and a rag.
- Ensure that the work area is well ventilated and well-lit to minimize the risk of a spill.
- Prior to working with the battery acid, read the MSDS and wear appropriate PPE: rubber apron, faceshield, rubber boots and rubber gloves.
- Locate battery acid – H_2SO_4 and pour into a smaller plastic container.
- Remove the plastic cap covers. Find funnels to pour acid into the fill cap of the battery cell.
- Fill each battery cell only until the plates on the bottom are covered. This can be done visually by looking in the hole.
- Replace caps and clean excess acid off top with the neutralizing agent and a rag.
- Clean funnel and jug after use with neutralizing agent.

8.8 INSTALLING AND REMOVING LOAD LIMITERS

Installation

- Obtain directive to install load limiter from the Customer Care
- Department or their Supervisor.
- Travel to storage location (if necessary) to pick up load limiter and tools and proceed to destination by passenger vehicle.
- Prepare tools and materials and access meter location.
- Two employees utilizing the “buddy system” will proceed to site to complete the load limiter installation.

- Request customer/building owner to turn off the main breaker/switch to ensure that the meter has been de-energized or no loads connected. Complete a visual verification if access granted to main breaker/switch with the customer.
- If the meter is still energized, the work must be performed by qualified personnel as endorsed by Senior Meter Technician or certified meter trainer, with an arc flash face shield.
- Remove the meter from the meter base by the standard removal process:
  - Remove tamper seal with pliers
  - Remove meter ring from meter and meter base with screwdriver
  - Remove meter with/without meter puller

Note – *whenever possible a meter puller shall be used to reduce "Broken-Cover" injuries, protect operating personnel from exploding meters and decrease the likelihood of shock contact with energized parts.*

- Attach the new meter with load limiter by the following installation process:
  - Verify the voltage between phase to phase and phase to neutral on both top and bottom side of the meter base with multi-meter. Reading will be 0 if de-energized.
  - Attach load limiter to the meter
  - Attach meter with limiter to the meter base
  - Attach the meter rings and secure the seal
- Verify power status of meter before leaving site.
- Finish up – clean site.

Removal of Load Limiter

- Obtain directive to remove load limiter from the Customer Care Department or their Supervisor.
- Travel to storage location (if necessary) to pick up meter and tools and proceed to destination by passenger vehicle.
- Prepare tools and materials and access meter location.
- Request customer/building owner to turn off the main breaker/switch to ensure that the meter has been de-energized or no loads connected.

- Complete a visual verification if access granted to main breaker/switch with the customer.
- If the main power source cannot be accessed and the meter is still energized, leave site and arrange a new load limiter removal date and time with customer/building owner.
- Attach the new meter by following the installation process
  - Remove tamper seal with pliers
  - Remove meter ring from meter and meter base with screwdriver
  - Remove meter base cover or remove meter with/without meter puller
  - Verify the voltage between phase to phase and phase to neutral on both top and bottom side of the meter base with multi-meter
  - Reading will be 0 if de-energized
  - Attach new meter to meter base
  - Attach the meter ring and secure the seal
- Request customer/building owner to turn on the main breaker/switch and restore power to the meter.
- Verify power status of meter before leaving site.
- Finish up – clean site.

8.9 REGULAR 4/5 JAW METER REPLACEMENT

Removal

- Obtain directive to remove meter from the Customer Care Department or their Supervisor.
- Travel to storage location (if necessary) to pick up meter and tools and proceed to destination by passenger vehicle.
- Prepare tools and materials and access meter location.

Disconnection notice due to relocation/termination of account:

- Request customer/building owner to turn off the main breaker/switch to ensure that the meter has been de-energized or no loads connected.
- Complete a visual verification is access is granted to the main breaker/switch with the customer/building owner.
- If the main power source cannot be accessed and the meter is still energized, leave site and arrange a new removal date and time with customer/building owner.

- Upon second attempt where the main power source still cannot be accessed and the meter is still energized, the work must be performed by qualified personnel as approved by Senior Meter Technician or certified meter trainer, with an arc flash face shield.

Disconnection notice due to non-payment of account:

- Two employees utilizing the "buddy system" will proceed to site to complete the meter removal.
- Where the main power source cannot be accessed and the meter is still energized, the work must be performed by qualified personnel as approved by Senior Meter Technician or certified meter trainer, with an arc flash face shield.

- Remove the old meter from the meter base by the standard removal process:
  - Remove tamper seal with pliers
  - Remove meter ring from meter and meter base with screwdriver
  - Remove meter with/without meter puller
  - Attach Canadian Standards Association (CSA) approved meter base cover
  - Insert the meter ring and secure the seal
  - Plywood meter base covers are not acceptable.

Note – *whenever possible a meter puller shall be used to reduce "Broken-Cover" injuries, protect operating personnel from exploding meters and decrease the likelihood of shock contact with energized parts.*

Installation

- Obtain directive to install meter from the Customer Care Department or their Supervisor.
- Travel to storage location (if necessary) to pick up meter and tools and proceed to destination by passenger vehicle.
- Prepare tools and materials and access meter location.
- Request customer/building owner to turn off the main breaker/switch to ensure that the meter has been de-energized or no loads connected. Complete a visual verification if access granted to main breaker/switch with the customer.
- If the main power source cannot be accessed and the meter is still energized, leave site and arrange a new installation date and time with customer/building owner.

- Attach the new meter by following the installation process
  - Remove tamper seal with pliers
  - Remove meter ring from meter and meter base with screwdriver.
  - Remove meter base cover
  - Verify the voltage between phase to phase and phase to neutral on both top and bottom side of the meter base with multi-meter. Reading will be 0 if de-energized.
  - Attach new meter to meter base
  - Attach the meter ring and secure the seal
- Request customer/building owner to turn on the main breaker/switch and restore power to the meter.
- Verify power status of meter before leaving site.
- Finish up – clean site.

8.10 RADIATOR FLUSHING

*****IMPORTANT**** This procedure must only be done during summer preventative maintenance as the water could freeze in the cooling system and cause damage to the engine during the winter months.**

- Ensure engine has been turned off prior to flushing cooling system.
- Remove the plugs from the cooling system and engine block to drain the old glycol/water mix into a drum.
- Check the drained liquid to determine if there is residual oil in the cooling system that needs to be cleaned. Usually there will be oil sheen on the drained liquid. This product must be labeled and stored as per QEC Environmental Management System.
- Mix CAT Cooling System Cleaner as per instructions into a clean drum. If this product is not available, Cascade or another dishwashing agent can be used. *As long as the agent is low suds it will work, if it has a high soap suds you will get a lot of foaming and require more flushing with clear water.*
- Reinstall plugs and pump mixture into the cooling system with a water pump while bleeding air throughout the process.
- Run the engine to operational temperature so that the cleaner flows through the entire cooling system. Let it run for a while (usually 1 – 2 hrs.) and shut down the engine.

- Remove plugs and drain cleaner from the cooling system into another drum. This drum of fluid is not considered hazardous waste and can be disposed in a normal fashion.
- Reinstall plugs and pump regular water into the cooling system with a water pump to clean out all cleaning fluid while bleeding air throughout the process.
- Run the engine to operational temperature so that the water flows through the entire cooling system. Let it run for a while (usually 1 – 2 hrs.) and shut down the engine.
- Remove plugs and drain water from the cooling system into another drum. This drum of fluid is not considered hazardous waste and can be disposed in a normal fashion.
- Repeat steps 4.8 to 4.10 to ensure that all cleaner has been removed from cooling system.
- Reinstall plugs and fill with glycol water mix.
- Run the engine to full load capacity and check cooling system for leaks.

8.11 RACKING IN/OUT ITE or ABB CIRCUIT BREAKER

Racking Out

- If the genset is online, take it offline following the QEC Utility Work
- Protection Code.
- Prior to racking out a breaker, ensure that the circuit breaker is in the open position by checking pilot lamps/indicators.
- Slide open the access hatch on the door and insert the crank.
- Push the unlocking lever to the left and hold it in place. Rotate the crank counterclockwise until the unlocking lever remains disengaged.
- Continue rotating crank counterclockwise until the circuit breaker has been moved to the test position. The unlocking lever will then fall back into the locked position. It is important to remember not to force anything when removing a breaker.
- Once the circuit breaker is in the test position, the unlocking lever must be manually moved in to the unlocked position again.
- Rotate the crack counterclockwise again until the circuit breaker reaches the disconnect mark on the floor of the housing. The unlocking mechanism with then fall in to the engaged position.
- Once the circuit breaker is at the disconnect position, the panel door can be opened for complete removal.

- Push the unlocking lever to the left and hold in place. Rotate the racking crank counterclockwise two to three turns until it cannot move anymore. Do not apply any force.
- Remove the crank and set it aside.
- To remove the circuit breaker completely from the compartment, attach a 5th wheel assembly to the removal lug located at the bottom of the circuit breaker

*** Note:** If the springs are still charged upon removal, they will discharge.

- Once the circuit breaker has been removed, check the compartment for debris and fallen nuts/bolts.
- Inspect the shutter mechanism to ensure that the rod and the spring are inside the rod guide.
- Close the panel.

Racking In

- In order to rack in a breaker the above procedure for racking out must be followed in the reverse order.
- Once the circuit breaker has been reinstalled, ensure the electrical charge switch is turn on and the unit should charge.
- If the breaker does not charge, the manual charge handle into the slot and lift the handle up and down. There will be some resistance while pumping the handle and it will make a ratcheting sound.
- When the breaker is charged, the indicator will be seen on the front of the breaker.
- Close the front panel.

8.12 WORKPLACE VIOLENCE

Dealing With Abusive Telephone Call

- Interrupt the conversation firmly but politely.
- Inform the person that you are able to transfer the call to your supervisor who may be able to further assist with the issue.
- If the abuse continues, inform the person that QEC has zero tolerance regarding workplace violence, therefore, you will not accept their abusive treatment and will end the conversation if necessary. Write down exact wording of the abuse or threat and caller's tone of voice (i.e. angry, calm, etc.).

- End the conversation if the person continues to be verbally abusive.
- Inform your supervisor of the incident and complete a QEC Incident Investigation form (HS 13-01) for their review. The supervisor will then forward the form to the HSE Department.
- If the person calls back, interrupt the conversation firmly but politely and remind them of the zero tolerance requirement and that a supervisor is available to respond to their concerns if necessary.
- If the person asks to speak to the supervisor, put the person on hold and inform the supervisor taking the phone call of what has happened up to this point.
- If the supervisor is in another community, take a message with their name and phone number and inform them that your supervisor will be contacting them.
- Transfer the call to the supervisor.
- The supervisor shall attempt to clarify the issue and take appropriate action to resolve any misunderstanding while reminding the person that abusive language or behavior towards QEC employees will not be tolerated.
- Document the conversation and, if possible, record the call or ask another employee to listen on speaker phone.
- If the supervisor cannot resolve the issue at this time, take into consideration that the person may come to the worksite to file the complaint in person. Inform colleagues and have an action plan in place on how to deal with the possible situation.
- The supervisor will complete a QEC Incident Investigation form (HS 13-01), if one has not already been completed for the occurrence, and submit it to their supervisor or Senior Manager for review. They shall then forward the form to the HSE Department.

Ending a Negative Interaction

- Interrupt the conversation firmly but politely.
- Inform the person that QEC has zero tolerance regarding workplace violence, therefore you will not accept the abusive treatment and will end the conversation if necessary.
- Inform the person that you will ask them to leave the building/worksite or you will leave (where possible).
- If the abuse continues, end the conversation.

- Ask the person leave the building/worksite or leave yourself (where possible).
- If the person does not leave, contact the RCMP.
- Inform other staff to stay away from the area.
- Complete a QEC Incident Investigation form (HS 13-01) and submit it to your supervisor who shall forward the form to the HSE Department.

Ejecting an Aggressive Person from the Worksite

- Lay out the repercussions for their behavior.
  - If you feel like a situation is getting out of control and someone is threatening your personal safety, tell the angry person that you will ask them to leave if they don't control their frustration. If you are not on QEC property, tell them that you will leave if they don't control their frustration.
  - Everyone loses their temper from time to time, so give them a chance to get a handle on it. Remain respectful and calm; don't raise your voice or point your finger at them. Simply tell them what the next steps will be if their behavior doesn't change.
- Explain why you are asking them to leave.
  - People often take the slogan "the customer is always right" to heart, not realizing that the customer can very often be wrong. Explain to the person that their abusive behavior is personally threatening, and that QEC has zero tolerance regarding violence in the workplace.
- Escort the person out of the building.
  - To reinforce your verbal ejection, move toward the exit yourself and ask the person to follow you. Even if the person does not initially respond to the ejection, lead the way. Do this even if the person does not take your lead and move toward the exit at first; when they see that the object of their anger is moving away, they will likely follow you toward the exit.
- Don't put your hands on the aggressive person.
  - Unless you feel that the person has grown physically threatening to you, other employees, other people or themselves, avoid touching the person. Touching someone who is overly agitated could cause them to react in a potentially violent manner.
- Summon a supervisor or co-worker.
  - If possible, contact a co-worker or supervisor nearby for them come and be with you to provide assistance. Having a supervisor or co-worker to either witness, help, or take over from you is important and sends a clear message that you are not alone.

- Call the RCMP if necessary.
  - If you don't feel safe around the person, or if the situation is disrupting the workplace and doesn't have an end in sight, call the RCMP.
- Complete an Incident Report.
  - Following any incident involving a threatening altercation at work, complete a QEC Incident Investigation form (HS 13-01). Submit it to your supervisor who shall forward the form to the HSE Department.

Checking In

- Notify your supervisor of work that will be required to be done away from your designated work location. Gain approval if the work is out of your normal scope of duties or if duty travel is required.
- If your supervisor will not be the main designated check-in contact, inform your supervisor of who will be the alternate contact.
- Determine how often and under what circumstances you will check in.
- Keep the designated contact informed of your location and consistently adhere to your check-in schedule.
- Determine the procedure to be followed if the worker does not check-in as agreed to.
- If possible, arrange a communication method for off-site work such as a radio or cellphone. If none is available, ensure check-in calls or in-person visits are made at the designated work location during pre-determined breaks from the work.

8.13 FIRE WARDENS EVACUATION PROCEDURE

General Duties

- Know the emergency evacuation routes and location of exits for the building.
- Identify any disabled personnel and work out a plan for their evacuation.
- Know the location of fire extinguishers and how the alarm system works.
- Report problems to Maintenance Department or Property Management if exit signs or emergency lights do not work.
- Report problems to Operations Department or Property Management if exits or hallways are not clear of equipment, boxes or furniture.
- Be available to personnel on floor to explain evacuation plan and emergency procedures during non-evacuation periods.
- Participate with other fire wardens, Operations Department, Property Management and the HSE Department in preparing, scheduling, and conducting evacuation exercises.

- It is the responsibility of the Fire Warden to appoint a temporary Fire Warden to act in the role if away from office/building for an extended period of time (i.e. duty travel, annual leave).

Evacuation Procedure

- Upon activation of the alarm, fire wardens shall put on their reflective vests and quickly tour their designated floor/building to alert all occupants that a fire alarm has sounded and evacuation is required.
- Particular attention should be paid to isolated offices, bathrooms and individuals who may be deaf or hard of hearing. An assertive manner and authoritative voice will help motivate those who are hesitant about evacuating. Instruct occupants to use the exit stairwells to evacuate the floor/building.
- While checking the floor/building and alerting occupants, the fire warden should also close the doors to all rooms. Closing doors helps prevent fire spread, as well as limiting the spread of smoke and toxic gases. They should also note any pertinent observations on the way out of the building (smoke, people not leaving, blocked egresses etc.). Under no circumstances is a Fire Warden to remain in the building with individuals who refuse to leave.
- As occupants exit the floor/building, fire wardens should remind them to stay to the right of the stairwell and where their muster station is. It is also a good idea to remind people not to enter a floor where the alarm is sounding and to remain at the muster station until notified. All Fire Wardens are required to keep the most recent version of the worksite Phone List readily available at their workstation to take with them if the alarm sounds. Additionally in the Iqaluit Corporate Office, the first floor Fire Warden must also take the Visitor Log from the Customer Service entranceway upon their exit from the building. Attendance will be completed at the muster station.
- Persons remaining on the floor, in stairwells or the building should be reported by the Fire Wardens to the Plant Superintendent/ Operator or Property Manager as soon as possible who will then ensure that firefighters are sent to assist those in need if evacuation if required.

8.14 INSPECTION, CARE AND USE OF HOT GLOVES

Manual Inflation Test

- Hold the rubber glove and stretch to seal the glove closed.
- Roll up the gauntlet end 1.5 inches toward the palm and create an airtight seal by twirling the glove while holding both ends.
- Grasp the rolled up glove so as to entrap all air.
- Hold the inflated glove close to one ear, squeeze to add pressure, listen and feel for pinhole leaks while moving each finger back and forth.
- Turn the glove inside out and repeat the process.

Additional Inspection – Pull Test

- For bi-coloured rubber gloves (different colour outside than inside), an additional quick inspection may be utilized.
- Tug the fingers and other areas of hot glove to see if there abrasions, pin holes, cuts, etc... If there is damage, the inside colour should be visible.

Cleaning

- Hand wash rubber gloves gently inside and out with mild soap and warm water. Never use abrasive cleaners/chemicals. Rinse thoroughly.
- Allow gloves to air dry at room temperature with fingers facing upward allowing the excess water to drain out of the gloves.

Storage

- Store rubber gloves in their normal shape right side out with the fingers pointed towards the top of the glove bag to allow for any moisture to escape. This method will also ensure that items are kept out of the gloves. Storing gloves folded, creased, inside out, or in any manner which may cause stretching or bending will damage the rubber.
- Do not store rubber gloves inside the leather protectors.
- Keep both the rubber gloves and the leather protectors in the same protective glove bag. Never use the glove bag to store anything else but these two specific items.
- Rubber gloves should not be stored soiled, with any oil or grease on them, or with leather protectors that are soiled.
- When not in use, store dry hot gloves in the protective bag in a cool, dark, and dry location.

8.15 DOG DAZER

Pre-operational Check

- Press the built in button for 2 to 3 seconds. Ensure the LED light flashes red indicating the device has adequate battery supply before travelling to site.
- Replace batteries if unit LED light does not flash.

Known Dog Not Affecting Employee Safety

- If the presence of a dog hindering access to a customer property is known or detected immediately upon arrival to site not affecting employee safety, the Dog Dazer is not to be utilized.
- The employee shall leave the site and a note shall be made at the time with the information provided to Customer Care Department to resolve.

Unknown Dog Affecting Employee Safety

- Presence of unknown dog detected.
- If employee safety is threatened, point front of unit towards the dog.
- Press and hold built in button for 2 to 3 seconds. Sound bursts can be detected at distances up to 5 metres (15 feet).
- Do not move towards the dog.
- Back away from the site while maintaining eye contact on the dog in case of a possible strike.
- Complete QEC Incident Report and submit to supervisor if unit was deployed on a customer's dog that was tied, chained or penned on premises or known by personnel to be owned by a customer. The supervisor shall notify all affected parties so further interaction is prevented and Customer Care Department can take measures to resolve the hazard.

- ***Note* The Dog Dazer is not designed to be effective against all dogs which include docile, deaf, infirm and highly trained dogs.***

8.16 INSULATED RESCUE HOOK

Inspection

- All live line tools, including insulated rescue hooks, are to be dielectrically tested **at minimum** every 2 years by a qualified person to ensure compliance with ASTM F711 - Standard Specification for Fiberglass-Reinforced Plastic (FRP) Rod and Tube Used in Live Line Tools.
- Plant Superintendents/Plant Operators/Assistant Operators to inspect insulated rescue hooks monthly as a part of monthly plant safety inspection reports.
- Handle should appear clean and glossy.
- Inspect for surface contamination:
  - Cut or broken glass fibers on the tool. Damaged fibers reduce the strength and insulating protection of the tool
  - Cracks running the length of the tool (caused by crushing the tool). If this type of damage is found, immediately place the tool out of service.
  - Surface chipping
  - Damage from high heat or physical abuse
  - Loose or broken fittings
  - Light spots accompanied by a noticeable roughness. This type of damage is from hard blows, impacting the material or carelessly dropping tools on the ground.
  - Surface ruptures caused by bending or twisting.

Care

- Live line tools are to be cleaned with manufacturer recommended products only. Example: Hastings Live Line Tool wipes.
- Insulated rescue hooks must be mounted or hung in a location that would permit safe access in case of emergency (i.e. upon entrance to switchgear rooms).

Use

- Begin emergency scene management.
- Turn off source of electricity if possible.
- Call “Help” to alert fellow workers in the area. Instruct responder to call for medical help (Health Centre or Hospital) immediately, retrieve a first aid kit and the assistance of a QEC First Aid Attendant (if the rescuer is not certified in First Aid).
- Retrieve the insulated rescue hook from mounted location.

- Hold the insulated rescue hook by the handle portion only. Use the entire length of the insulated rescue hook to maintain safe distance outside the limits of approach of a qualified worker.
- Wear protective rubber insulating gloves, if available, to further protect against the risk of electrocution.
- Standing to the side, not directly in front of the emergency, place the bent side of the hook around the casualty's torso, arms, legs, etc. Do not place the hook on the throat.
- Pull firmly on the handle to drag or roll the casualty away from the source of electricity. Use as many pulls as required to ensure the casualty is clear of the source of the current.
- Check for signs of life. Contact QEC First Aid Attendant and ensure medical help is on the way.

Note* There is always the possibility of a back feed or a charged power capacitor on systems where the emergency is taking place.

8.17 DAILY PRE-OP INSPECTION FOR VEHICLES >4500kg

The purpose of this procedure is to ensure fleet vehicles with a gross vehicle weight rating greater than 4500 kg are inspected for defects and unsafe conditions by a competent worker prior to use.

The QEC *Daily/Pre-Operation Inspection Report For Vehicles Greater Than 4500 KG* satisfies Nunavut OHS Regulations and Nunavut Department of Transportation Regulations that coincide with national standards.

INSPECTION REPORT USAGE

- An inspection sheet must be completed for all vehicles with a GVWR greater than 4500kg (this weight class includes Ford F-350 vehicles unless specifically licensed under 4500kg and clearly marked GVWR under 4500kg on dash).
- Each vehicle must be inspected once per 24-hour period when in use. For example, Hall Beach's radial boom derrick truck will not be utilized daily so no inspection is required every single day, but only every day that vehicle is being utilized.
  If a different driver takes over in a 24-hour period, they have the option to accept the inspection as performed and sign in the driver's signature section. **However, it is the driver's ultimate responsibility to ensure an inspection is performed to their satisfaction.**
  If the previous inspection is questioned, the driver will complete another inspection on a different inspection sheet.

- The top portion of the form must always be completed regardless of vehicle type. Inspector, Community, Truck No (QEC #), Plate #, Time and Date of Inspection and mileage (ODO) at time of inspection.
- Column 1 must also be completed for all vehicles.
- The inspection criteria is comprised of the 25 items noted above in Column 1. If the vehicle does not have that component (i.e. air brakes, continue with the inspection and leave that box blank. The only time the Inspector shall check column A if a minor defect, or B if a major defect, is noted. The specifics of the defect are to be recorded in the remarks section. On the back page of the sheet the Inspector will find what classifies a minor and a major deficiency.

***If a major deficiency is noted then the vehicle is to be taken out of service.**

- If no deficiencies are found the “Vehicle Defects Reported” box is to be left blank, and Y on “Vehicle Condition Satisfactory”, circled.
- Proceed to bottom of the page and sign your name in the Inspector’s signature block ***if driving a truck with no aerial device application only***. If you are also the driver, sign in the driver’s signature block. If you are an additional driver that accepts the completed daily/pre-operation inspection as satisfactory, driver shall sign above previous driver’s name.
- If utilizing a vehicle with an aerial device/RBD, you must also inspect the items found within the Nunavut Safety Act and Regulations Inspection section. If the vehicle does not have that component (i.e. pole claws, keep moving on with the inspection) leave that box blank.
- It is mandatory to document the current leakage reading if performing live line work above 15 kV. See *SOP 036 – Frequent Dielectric Testing of Category B vehicle mounted aerial devices*.
- If no deficiencies are noted, “Boom defects reported” is left blank and circle Y for “Boom condition satisfactory”. Specifics of any boom defects found must be noted in the remarks section.
- Sign your name in the Inspector’s signature block. If you are also the driver, sign in the driver’s signature block. If you are an additional driver that accepts the completed daily/pre-operation inspection as satisfactory, driver shall sign above previous driver’s name. If the previous inspection is questioned, the driver will complete another inspection on a different inspection sheet.

CARBON COPY INSPECTION REPORT DISTRIBUTION PROCEDURE

- Each *Daily/Pre-Operation Inspection Report For Vehicles Greater Than 4500 KG Log Book* will remain in the cab of the vehicle. There are 50 carbon copy inspection sheets per log book. Each inspection sheet contains a white, yellow and pink copy.
- The *White Copy* will be kept in the Log Book for onsite inspection/verification.
- If there are defects/deficiencies identified, the *Pink Copy* will be removed by the Inspector **at the end of the 24 hour cycle** and colour scanned then emailed to their Supervisor and Distribution/Fleet Vehicle Manager directly. If colour scan is not available, a photo of the completed form (must show all details) can be taken and emailed.
- The Inspector shall also enter a CMMS ticket identifying the defects/deficiencies of the vehicle. The ticket is to be assigned to either Fleet Line or Fleet Operations as appropriate.
- If no defects are found and the vehicle is in satisfactory condition, the pink copy will remain in log book.
- The *Yellow Copy* will be removed by the Inspector before leaving each community or every Friday for headquarters and scanned/emailed to the Distribution/Fleet Manager. The originals shall be filed at each line shop or plant office. A master binder separated by tabs by each vehicle, or a separate file folder for each vehicle shall be maintained, by the Distribution Manager for audit purposes. These inspection sheets shall be kept for a minimum of 12 months from the date of inspection. After 12 months they can be discarded.
- In the case of the other (non-Line Department vehicles including heavy equipment), Inspectors will scan/email the yellow copy to the Distribution/Fleet Manager every Friday.
- Once a vehicle's Log Book is becoming low on inspection sheets, the Inspector will inform the Supervisor who shall ensure another Log Book is sent to site. Once a vehicle's Log Book has been completed, it will remain in the community for inspection reference for 1 year.

8.18 RACKING IN/OUT A TOSHIBA V16S-MLDA VACUUM CIRCUIT BREAKER

Industrial circuit breakers, devices for interrupting electric current, are typically contained in a cubicle and connected to a heavy conductor, known

as a bus and a line via a set of disconnects. The purpose of this procedure is to prevent an arc flash incident when racking a Toshiba Vacuum breaker in or out.

PPE to be Used

- Hard hat
- Steel toed boots
- Hearing protection
- Arc flash visor
- Arc flash clothing
- Insulating Rubber gloves

Racking Out

- If the Genset is online, take it offline following the QEC Utility Work Protection Code.
- Prior to racking out a breaker, ensure that the circuit breaker is in the open position by checking pilot lamps and on-board mechanical breaker indicator.
- Open breaker door.
- Observe that the breaker is in the connected position.
- Reaching in to the cubicle lift the trip leaver up.
- Reaching in with both hands grab the pull handles.
- Pull with a steady force until the breaker has reached the disconnect mark
- Remove control wire harness completely if the breaker is to be completely removed from the breaker cell.

  This wiring harness should only be removed or installed when the breaker is in the “disconnected” position. It should not be disconnected while fully in the cradle nor should it be connected after it has been completely racked in.

Racking In

- In order to rack in a breaker the above procedure for racking out must be followed in the reverse order and close the breaker door.

8.19 SR4 and SR5 HUB DRIVE PULLER

- Prepare for the use of the 2 Rose Bud heating tips, being sure to be safe at all times.
- Measure the distance of the hub to the end of the shaft, manufacture a stop that can be bolted to the hub on installation to stop the hub in the proper location.

- Thread the appropriate puller plate (SR4 or SR5) on to the hydraulic cylinder housing, being careful not to damage any of the threaded area.
- Use an overhead crane, if available, or set up a gantry crane to lift and hold the hydraulic cylinder and plate in place.
- There is a hole in one corner of the adaptor plates that can be used for a lifting eye. By hoisting from this hole, the unit is relatively balanced. Hoist the cylinder with the adaptor plate attached to the alternator shaft and install 4 bolts through the hub and adaptor plate (see figure 1). Be sure that the bolts are installed the same length to keep the puller in line with the shaft, and the cylinder is fully retracted. Components must be kept aligned to ensure full cylinder travel is available.
- Attach the quick coupler fitting from the power pack to the cylinder. Set the control valve to the hold position. With the hand held push button, apply approximately 5000 psi to the cylinder. Stop and inspect all components for being true and safe. All components will be subjected to about 50 tons of pressure. With the power pack at 10,000 psi the cylinder will have about 55 tons of force.
- With the 5,000-psi preload on the hub, begin to heat the hub with both torch tips. Be sure the heat is concentrated to the hub, keeping major heat away from the puller cylinder and the alternator shaft.
- With quick and even heat the hub should break free after about 4-8 minutes. The pressure can be raised after about 6 minutes, if required to break it free. Once the hub has started to move, keep heating it and keep steady pressure of 5000-psi on the puller until it is completely off. If you decrease heat or do not keep the hub moving it will adhere to the shaft. The shaft most likely will be damaged if the hub is allowed to cool during the final 6-8 inches (maximum pump pressure of 10,000 psi equals a full 55 ton pull).
- Following these guidelines and all required safety precautions will get the hub off the shaft without damaging components.

8.20 PAINTING CEMENT FLOOR WITH RUSTOLEUM AS6500 BASE AND ACTIVATOR

- Review the AS6500 Activator and Base product labels found on paint can as well as the SDS sheet for product and plan for application.

- Plan work with Operations staff (ideally during off peak times or when other workers will not be in area).
- Send notification to all affected staff of planned work. Post signage to alert others that may be required to enter the area.
- Open doors/overhead door to provide additional ventilation (when outside temperatures permit).
- If doors cannot be opened, workers shall wear respiratory protective equipment to ensure exposure below permissible levels. Such protection shall include the donning of a respirator (typically half mask) with Multi-gas/Vapour/P100 Cartridges.
- Wear safety goggles, nitrile or chemical resistant gloves and coveralls or Tyvek suit. Mix the base component slightly with power mixer before adding activator. Ensure no loose fitting clothing and long hair tied back.
- Pour the base component into clean 5-gallon bucket.
- Pour activator slowly into the same 5-gallon bucket that contains the base. Transfer as much activator into bucket as possible by scraping sides.
- Mix activator and base together in bucket (1-1 ratio) at 500-700 rpm for 1-3 minutes.
- Immediately pour the mixture out of bucket directly onto the pre-washed floor. Do not use a roller pin or secondary bucket. This will cause heat to build up and shorten pot life and work time. It will cover 100 sq. feet and requires a thickness of 16 mm.
- Roll the material smooth using a squeegee or phenolic roller. Make all final passes parallel and in same direction. Do not roll excessively and do not reroll.
- The material on the floor will be workable for about 20 minutes.
- Wait for product to harden in bucket before mixing new batch or utilize a new bucket (repeat as required).
- Floor will be ready for traffic in 10 hours. All will be ready for full use after 72 hours. Do not wash floor for 5 days afterwards.

8.21 INSTALLING TECH CABLE INTO DISTRIBUTION PANEL

- No live work is permitted on 600 Volt live panels. Follow *SOP-012 Lockout-Tagout* (LOTO) or *Utility Work Protection Code (WPC)* as required.
- If working on a distribution panel with an Arc Flash label, appropriate AR PPE as indicated on the Arc Flash label must be worn.

- Identify type of Teck cable to be installed, along with calculating length from the distribution panel to the item(s) being connected. If cable has been stored in sub-zero conditions, it should be allowed to warm up indoors for 12 hours before work begins to ensure sufficient flexibility.
- Live work is only permitted on 120, 240 single phase, and 208 3-phase panels. Electrically insulated tools must be used. Ensure adequate lighting, use a headlamp if required.
- Remove exterior covers of the electrical distribution panel.
- Cover inside panel with an electrically rated insulative protective cover-up blanket. Tape the cover-up blanket in place with duct tape.
- If an existing hole in the distribution panel is not available, remove one of the pre-existing knock-outs to open a hole into the panel. Push the knock-out away and out from the wall of the distribution panel. Avoid using excessive force.
- Use a reducing washer if the hole is too large for the Teck cable and connector to be used.
- If either an existing hole or knock-out hole is not available in the required side of the distribution panel, drill a 3/8” hole into the panel where needed. When using the drill, always drill a pilot hole first. Brace arm to prevent hard punch through of the metal with the drill bit. If drilling the hole in the top of the electrical panel cabinet and the cover-up blanket must be removed during this step, use a piece of insulating material to protect live bus from metal shavings.
- After drilling 3/8” hole, set up Greenlee Quick Draw hydraulic hole-punch with a ½” knock out (die with punch). Install knock-out into drilled hole to enlarge and smooth the hole opening by operating punch. Remove punch fitting from hole when complete. When holes larger than ¾” are needed, a pneumatic hole-punch kit is required. If the Greenlee punch is not available, a Unibit drill bit may be used to create the right size hole.
- Install Teck connector fitting into the hole of the distribution panel. The Teck connector must be sized to match the Teck cable being used.
- Prepare the Teck cable, measuring length to allow reach from the connector to the panel for installation. Remove outer rubber cover and aluminum armour.
- Insert Teck cable into Teck connector, passing enough length until exposed aluminum connects with grounding ring inside the connector. Fold ends of wires back to prevent contact with the grounding bus or other live circuits in the distribution panel.
- Tighten lock nut and bushing of Teck connector inside of distribution panel cabinet, then tighten gland nut on Teck connector cable outside of cabinet.

- If required, replace the breaker for the appropriate amp breaker required. Use rubber insulating gloves with leather protectors. Pull back protective cover-up blanket. Ensure that the breaker is open and locked-out/secured.
- Prepare conducting wires for connection. Ground wire to chassis or ground connector; white wire to neutral connector; black to circuit breaker. For 3-phase wiring, label wires appropriately to avoid mixing up red/blue/black wires.
- Pull back protective cover-up to connect wires to circuit breaker. Ensure that the breaker is open and locked-out/secured. Use rubber insulating gloves with leather protectors. Connect ground wire first, then white (neutral), then black (live).
- To test the breaker connection is working, remove LOTO device and switch on load (if possible). Use an appropriately rated electrical testing tool. Wear rubber insulating gloves with leather protectors.
- Vacuum bottom of distribution panel cabinet to clean up metal filings and dust. Do not touch electrical contacts or wiring.
- Put the distribution panel covers back on.
- If necessary, install cable straps or tie wraps to secure Teck cable in place.

8.22 LOCKOUT/TAG-OUT

Guidelines

- Only authorized employees are permitted to perform lockout/tag-out procedures.
- If an energy isolating device is capable of being locked out, then it must be locked and tagged.
- If an energy isolating device is not capable of being locked out, then it must be tagged out.
- Prior to commencing servicing or work, equipment and machinery shall be inspected to verify the equipment or machinery can be effectively isolated.
- All potential sources of hazardous energy (e.g. gravity, electrical, mechanical, pneumatic, pressure etc.) must be considered when determining lockout/tag-out procedures.
- Each person performing servicing or work on a machine must apply their own lock. Multi-lock hasps must be used if more than one worker is performing work or service on a machine. After the lock has been applied, the key must be retained by the person who applied the lock.

Lockout/Tag-out Equipment

- Each department is responsible for selecting and maintaining their lockout/tag-out equipment.
- Lockout/tag-out equipment must meet the following requirements:
  - Locks must be key operated and standardized for each department or trade;
  - Locks must not be used for purposes other than lockout/tag-out.

When preparing for shutdown the authorized employee will:

- Identify machines, equipment and processes to be isolated.
- Inform all affected employees when machinery or piece of equipment will be locked out.
- Identify the types and magnitude of hazardous energy to be controlled and understand the hazards of that energy.
- Identify the methods for controlling the hazardous energy.
- Identify all isolation points and energy isolation devices to be locked out. Ensure remote computer and/or programmable computer logic controllers are considered (i.e. local/remote switches are disabled).
- Identify and obtain appropriate personal protective equipment.
- Identify and obtain locks, tags, lockout devices and other equipment required to perform the work.

When performing equipment shutdown the authorized employee will:

- Notify all affected employees of the lockout.
- Shutdown the equipment following the normal stop or rundown procedures. (e.g. push ON/OFF or START/STOP buttons or switches).

When isolating equipment the authorized employee will:

- Locate all energy isolation devices required to control the hazardous energy.
- Operate the energy isolation devices such that the machine or equipment is isolated from energy sources. This usually involves opening a disconnect switch, circuit breaker or closing valves.

Note: Never open a disconnect switch without first shutting down the equipment as it could result in an arc flash incident. Use the left hand rule when opening and closing disconnect switches. (Left hand rule: Stay to the right of the disconnect switch, face away and use your left hand to operate the switch. This positioning protects the face and body in the event of an arc flash incident).

Appling Lockout/Tag-out Devices

- Apply locks and tags to each energy isolation device to ensure it is held in OFF position.
- Where a lockout device is required for an energy isolation device, install the lockout device and apply locks and tags to ensure it is held in the "OFF" position.

De-energization: Stored Energy Release or Restraint

- After application of lockout devices, all stored or residual energy must be relieved, disconnected, blocked, bled, restrained or otherwise made safe.

Note: Remember to consider energy stored in capacitors, springs, pressure lines and elevated equipment.

Verification of Lockout/Tag-out Devices

- Ensure all affected employees are cleared of the machine or equipment.
- Before beginning any work, verify the machine or equipment is isolated and cannot be activated or restarted manually by operating control buttons or switches to start or operate the machine or equipment.
- Return controls to their off or neutral position.
- Use test instruments to test circuits.
- Visually inspect the position or movement of parts such as gears, rotating parts, shafts, flywheels to ensure movement has ceased.
- Visually inspect gauges or other indicators.

Release from Lockout

- Ensure all non-essential equipment or parts have been removed from the machine and the machine is operationally intact and safe to be operated.
- Ensure the machinery, equipment and surrounding area is clear of anyone who could be harmed by the start-up.
- Ensure each person who applied a lockout device and tag removes these from each energy isolation device.
- Energize the machine, but do not start it up.

- Notify all affected employees the machine or equipment is ready to be started.
- Re-start the machine or equipment.

Exception to Written Lockout/Tag-out Procedures

Written procedures are not necessary for servicing or maintenance on machines or equipment with a single energy source that can be readily identified and isolated and where:

- There is no stored or residual hazardous energy after shut-down.
- The isolation and locking out of the energy source will completely deactivate and de-energize the machine or equipment.
- The machine or equipment is isolated and locked out.
- The lockout device is under the exclusive control of the authorized person performing the servicing or maintenance.

Lockout/Tag-out Device Removal

Each authorized employee who applies a lock and tag is responsible for removing their own lock and tag. In situations where it is not possible for the employee to remove his/her own lock, the lock can be removed by an individual authorized to do so and by the following steps:

- The authorized individual will assess the situation to determine whether it is safe to remove the lock, preferably with someone knowledgeable of the machine, equipment or process and reason for the lockout and/or the maintenance or service work being performed.
- The authorized individual removes the lock and ensures the person whose lock was removed is notified of the removal before they return to work.

Tagging out Defective Equipment

Any tools or equipment identified as defective shall be tagged out with an out of service tag and taken out of service until repaired or discarded. An orange “DO NOT OPERATE – OUT OF SERVICE” tag shall be used.

8.23 OIL CLEANER SPINNER MAINTENANCE

- Complete Work Permit 1A+1B. The fuel valve, air valve, pre-lube pump, spinner supply valve (if equipped) and local engine control panel (LECP) are to be closed, locked & tagged out.
- Close, lock, and tag-out the fuel valve, air valve, pre-lube pump, spinner supply valve *(if equipped)* and LECP for generator with oil cleaning spinner attached to stop flow of oil to the spinner.
- Ensure the oil cleaning spinner has come to a complete stop before proceeding. Use sight glass window on spinner if available (G7 & G8 Iqaluit). Otherwise check for vibration by touch.

CAUTION: The oil will be hot and is a potential burn hazard. Allow unit and oil to cool or use appropriate PPE as required.

- Remove band clamp, unscrew the cover nut, and remove the oil spinner cleaner cover assembly.
- Allow the oil to drain from the rotor assembly. This may be assisted by raising the rotor on the spindle. Withdraw the rotor assembly vertically upwards from the spindle. The rotor should be removed and replaced on the spindle with care in order to ensure that the rotor bearings are not damaged.
- Put the housing cover back on and clamp it in place. Replacing the cover prevents accidental spills and also keeps dirt out of housing while spinner being cleaned.
- Secure the rotor assembly on the rotor disassembly tool. Unscrew the rotor cover nut and carefully remove the rotor cover. Ensure an appropriate work area is set up to disassemble the rotor.
- Remove the rotor tube from the rotor base. This should ensure the majority of the sludge remains within the rotor tube.
- Remove the paper insert from the rotor tube and clean any remaining sludge by using a wooden spatula or other non-damaging tool.
- Remove the separation cone from the rotor.
- Clean the rotor tube, separation cone, nozzles, rotor body and other parts using a suitable cleaning product (i.e. Varsol). Ensure all rotor components, including nozzles located in rotor base, are thoroughly cleaned and free of debris.

- Examine the top and bottom bearings and rotor assembly O-rings for excessive wear or damage. Replace if necessary or at intervals of 2500 hours.
- Replace the separation cone, making sure that it properly fits into rotor base. If separation cone does not fit properly, ensure the base location area is free from dirt and then refit. If the separation cone shows any sign of damage, then it should be replaced.
- Examine rotor body O-rings for damage and assemble if necessary. A new seal should be fitted every 2500 hours or if old seal is damaged.
- Locate the rotor tube onto the rotor base, ensuring the seal is positioned correctly. Improper seal may lead to oil leaking from spinner.
- Fit a new paper insert into the rotor tube. Without the paper insert, impurities (sludge) will not be filtered from oil efficiently.
- Complete the reassembly of the rotor by replacing the rotor cover on the rotor tube, ensuring the seal is positioned correctly. Tighten the rotor nut to a torque of 40N·m (29.5 ft·lbf). Incorrect torque may result in rotor imbalance – use a torque wrench.
- Remove housing cover *that was previously put back on*.
- Examine the body and spindle of the oil cleaning spinner for signs of damage or excessive wear. Damage or excessive wear may result in spinner failure.
- Replace the rotor assembly onto the spindle. Make sure the rotor assembly spins freely. Avoid damage to bearings as this will lead to spinner failure.
- Clean and inspect the cover, paying special attention to the cover nut assembly. If not sufficiently cleaned, cover nut assembly may not function properly.
- Examine the spinner body cover seal and replace if damaged.
- Replace the cover assembly and tighten the cover nut securely by hand only. *The band clamp must be securely fitted during operation of the oil cleaning spinner.* Make sure that the cover seats on the base assembly evenly all-around so that the cover seal is properly compressed. Refit the band clamp and tighten by hand.
- Surrender WPC 1A+1B permit.
- Remove locks and tags, open fuel valve, air valve, pre-lube pump, spinner supply valve and LECP for generator. Open isolating valve if oil cleaning spinner is equipped with one.

- Run pre-lube pump in manual mode and check for leaks before starting engine. If there is a leak, examine the cover seal and replace if necessary.
- With the engine running, check all connections and joints for leaks. Replace any worn components or leaking seals. If excessive vibration occurs, disassemble and inspect.

8.24 REPLACING FUSE IN A CUTOUT FOR LIMITED LINE WORK

Assessment and Protection

- Identify which feeder which has tripped or is experiencing a partial outage, referencing the community feeder map.
- Complete a line patrol to ensure there are no hazards existing along the length of the affected feeder line. The primary conductor may have been damaged and fallen low enough to contact the ground or buildings.
- Call the supervisor and relay the outage information and condition of the distribution system.
- Contact the On-Call Powerline Technician. With their assistance, create and verify a switching order (WPC 1B) to isolate the feeder from the power source. The risk is that an incorrect switching order could lead to not isolating the correct feeder. The On-Call PLT is to ensure that checking the open tie points is part of the switching order.
- Complete a *Line Tailboard Form (HS 7-01)* and WPC Self Protection Permit (WPC 1A) for the work to be performed.
- Execute the switching order according to procedure as per the completed WPC 1B. Complete each step of the switching order with a verbal confirmation to the On-Call Powerline Technician before proceeding with the next step.
- Confirm that the feeder is isolated from the power source at the feeder protection relay (e.g. Multilin) by checking the breaker open/close LED and confirming the breaker amperage to be zero (0). For the confirmation of circuit isolation to be accurate, there must be no closed feeder tie points in the field.
- All appropriate PPE must be utilized, which includes hard hat, eye protection, AR clothing, CSA Green Triangle Omega protective footwear, and leather work gloves.
- Travel to location of blown cutout fuse and set up traffic control. Set up traffic cones and warning signs around work area as the QEC vehicle may impede flow of traffic.

Replacing Fuse in Cutout

- Check live line telescopic live line tool inspection date. Clean the tool of contaminants with a clean, absorbent cloth and then wipe the clean live-line tool with a silicone-treated cloth (available from the Line Maintenance Dept.). Refer to *QEC SWP 029 – Live-line Tool Inspection, Storage, and Handling.*
- Stay a minimum of 3.7m (12 feet) away from the base of the pole, as this is the minimum safe distance to protect against being stuck by falling objects from the fuse cutout. If it is not possible to stand 3.7m (12 feet) away from the drop zone due to reasons such as adverse weather conditions, stand as far away as possible.
- With the base of the telescopic live line tool resting on the ground, extend the tool upwards until the head of the stick is within 30cm (1 foot) of the bottom of the cutout.
- Insert the head of the switch stick in the hole (slot) of trunnion on the bottom of the cutout fuse barrel.
- Lift the barrel upwards from the hinge several inches and swing the stick with barrel attached away from the cutout.
- Collapse the telescopic live line tool with barrel attached until able to handle the barrel.
- Follow procedure for replacing the fuse link in the cutout fuse barrel. Use *QEC Distribution Standard D-11-03: Distribution Transformer Primary Fuse Selection Charts,* for transformer fuse size. Contact the On-Call Powerline Technician or Regional Line Supervisor if required.
- Attach cutout fuse barrel back onto head of the telescopic live line tool in the same position as it was removed.
- Extend the tool towards the same position it was during the cutout fuse barrel removal.
- Connect barrel onto fuse cutout hinge on the bottom of the fuse cutout. Proper positioning and maintaining stick height is required.
- Remove stick head from fuse barrel while leaving the barrel in place. The fuse barrel should swing freely on the hinge if in the correct position on the cutout.
- Place head of telescopic live line tool into the pull ring at the opposite end of the fuse barrel.
- With a strong upward thrust, close the fuse barrel door into the upper latch assembly of the cutout.
- Remove head of telescopic live line tool from the pull ring and collapse the tool.

Re-energize and Verify the Cutout

- Return to the power plant and execute switching order plan to re-energize the feeder. Use the completed WPC switching order (WPC 1B) that was verified by the On-Call Powerline Technician. Complete each step of the switching order with a verbal confirmation to the On-Call Powerline Technician before proceeding with the next step.
- Once the feeder is energized, return to the location of the blown fuse and confirm the fuse cutout barrel has remained in its normal operating position.
- If the cutout fuse blows again and the barrel is swinging open, patrol the feeder line again to identify any further hazards and report it to the Supervisor.
- If the fuse barrel has remained in place, notify the On-Call Powerline Technician and the Supervisor to let them know the work has been successfully completed. Appropriate paperwork (Tailboard, etc.) is to be processed.

8.25 OPENING BREAKER SWITCHES

- Ensure you have completed the right permit as per the WPC. Obtain device protection lock and tag.
- If working on a breaker switch with an Arc Flash label, wear appropriate AR PPE as indicated on the Arc Flash label. **Warning**: If abnormal conditions exist, an arc flash is probable.
- If applicable, ensure all downstream devices are de-energized to drop the load on the breaker switch.
- If applicable, move selector to off position before opening the main disconnect. Move selector to “Local” operation before opening the main disconnect.
- **Warning**: If abnormal conditions exist, an arc flash is probable.
- No matter where the operating mechanism is mounted, always stand where there is minimum exposure to the possible arc flash.
- Keep your body on the hinged side of the panel when you open the switch. The panel door should provide some shielding from an arc flash.
- Use one hand whenever possible to open the breaker switch. Stand out of the line-of-fire.
- If wearing an AR face shield, face the switch. If you face the arc source the face shield can do its job. If you turn your head, the face shield will act like a scoop.

- If AR face shield is not necessary, turn your head away.
- Take a deep breath and hold it.
- Operate the switch quickly and decisively.
- Attach device protection lock and tag.

8.26 SETTING A POLE WITH AN EXCAVATOR

This procedure identifies the safe methods for setting a pole using an excavator or telehandler. Only competent and qualified personnel shall perform this task. They must be able to identify voltages by the type of construction and/or insulation of the line. Personnel performing this task must understand the limit of approach for different voltage levels.

NOTE: QEC does not permit lines to remain live during the setting of power poles. The lines adjacent to the pole being erected must be de-energized as per the *Utility Work Protection Code* (WPC).

- Conduct a Line Tailboard Meeting. Check weather forecast and schedule work on days with favourable conditions.

- Obtain Work Permit from CIA at the plant, follow WPC procedures to de-energize lines where the pole is to be set. Lines shall not be live during pole setting.

- Verify load rating on slings and shackles to be used. Inspect condition of slings for damage to ensure safe for use. Only suitably rated slings and shackles shall be used.

- The following equipment is required be going to the work site:
    - Excavator / Telehandler
    - Shovels (2)
    - Tamper
    - Peavey (Cant Hook)
    - Plumb Bob
    - Sling (rated for load)
    - Shackle (rated for load)
    - Taglines (3)
    - Scoop
    - Portable Grounds
    - Basic Line Hand Tools

- Inspect work areas along with adjacent poles and structures. Eliminate and control hazards (if any) before starting work on job site.
- Install portable grounds on all primary conducting power lines.
- Position excavator. Ground if possible. Set up pylons or suitable barricades.
- Dig hole with excavator until proper depth is reached for height of pole. The rule of thumb is to get a nominal depth equal to 10 percent of the pole length plus 61cm / 2 feet – this is the butt-to-ground line distance used by *ANSI 05.1 Pole Standards* for poles set in ordinary soil. However, if the pole is set at curves, corners or points of extra strain, the best practice is to increase the nominal depth by approximately 15cm / 6 inches, and if the pole is set in a rock-hole, then the nominal depth can be reduced by up to 30cm / 12 inches.
- Clean out bottom of hole with a scoop to allow butt of pole to sit on solid ground. Take time to position yourself properly before using scoop to avoid awkward postures and slipping into the hole.
- Designate a signal person to assist the excavator operator during the pole setting operation.
- Attach sling to the pole at a position approximately 40% from the butt on desired side of sweep. Ensure pole is butt heavy. Proper sling position will allow for proper pole alignment.
- Attach sling to excavator or telehandler with a shackle. Ensure the sling is as short as possible to prevent the pole from swinging.
- Lift the pole with the excavator / telehandler and guide the pole butt into the hole with taglines. Do not stand under the pole in case of sling or equipment failure. Only the excavator / telehandler operator shall be aboard vehicle during pole installation.
- Line up the pole close to plumb sighting from two directions while maintaining a 10cm / 4 inch air gap.
- If necessary, position the pole face {the concave (curving inwards) side of greatest curvature in a pole with a sweep in one plane and one direction} in the proper direction using a peavey.
- Pole sweep is a deviation of straightness in one plane and one direction with no more than 2.5cm / 1 inch deviation per 3m / 10 feet of pole length.
- The side opposite to the face on which the load is applied shall be perpendicular (90 degrees) to the ground. On corners and dead-ends, the pole should face the anchor.
- Fill in pole hole by hand with shovels. Tamp or compact soil and remove excess material around butt of pole.
- Disconnect pole from excavator by removing sling and tag lines.

- Frame the pole by placing cross-arms. This will be done by working at height either from the bucket of a line truck or by climbing the pole.
- Place the primary line on the insulator(s) of the framed pole.
- Remove grounds from equipment.
- Clean and stow all tools and equipment.
- Install pole number at eye level.
- Take down barricades and/or pylons.
- Surrender Work Permit to CIA at plant.

SECTION IX RESOURCE MATERIAL

This booklet has been developed as a quick reference guide for workplace health and safety. Additional information can be located in the following resource materials:

9.1 INTERNAL

- QEC Health and Safety Manual
- QEC Plant Operator Training Program
- QEC Intranet Site
- QEC Spill Contingency Plans
- QEC Emergency Plans

9.2 EXTERNAL

- Infrastructure Health and Safety Association
- Northern Safety Association
- Original Equipment Manufacturers Specifications
- Nunavut Safety Act and OHS Regulations
- Nunavut Workers' Compensation Act
- Nunavut Fire Prevention Act
- Nunavut Labour Standards Act
- National Fire Code of Canada
- National Building Code of Canada
- National Electrical Code of Canada
- Canadian Center For Occupational Health and Safety website

If you have any questions, be sure to discuss them with:

- your Supervisor or Manager
- your Joint Occupational Health and Safety Committee
- your Union Representative
- the HSE Department

SECTION IX RESOURCE MATERIAL

PHONE NUMBERS:

NOTES:

SAFETY RULE BOOK RECEIPT

Date:

Location:

I have received a copy of the QEC Safety Rule Book and will review the Sections pertinent to my position/duties, as identified by QEC below within ten days.

Sections

1 2 3 4 5 6 7 8

Print Name:

Company:

Signature: