USE THREE-WAY COMMUNICATION

SAFETY FIRST

T  Talk about job.
A  Assign specific duties.
I  Identify hazards.
L  Let workers know what is expected.
B  Beware of changing conditions.
O  Observe safety standards.
A  Allow time to do the job safely.
R  Review protective equipment.
D  Determine if workers understand.
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<td>Safety Manual All Sections</td>
<td>The Safety Manual underwent an entire review and update. Significant changes were made to the organization of sections, new programs were added to maintain compliance with OSHA requirements, an Appendix was added to contain written programs and other supplemental documents.</td>
<td>A. Fitch, M. Fiske, B. Connaughton, D. Haas, D. Nelson, C. Root</td>
<td>01/07/19</td>
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<td>Introduction</td>
<td>Removed strategic plan text. Misc. non-substantive edits.</td>
<td>D. Sawyer</td>
<td>08/30/13</td>
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<td>General Practices</td>
<td>Updated incident reporting to be consistent with current process/practices. Moved vehicle-related info to vehicle section. Updated safety contacts. Review and misc. non-substantive edits.</td>
<td>D. Sawyer</td>
<td>08/30/13</td>
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<td>Personal Equipment</td>
<td>Added statement about visitors requiring escorts consistent with current policy. Removed stipend amounts. Review and misc. non-substantive edits.</td>
<td>D. Sawyer</td>
<td>08/30/13</td>
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<td>Hazard Communication</td>
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<td>D. Sawyer</td>
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<td>Added Section 8 on vehicle tagout.</td>
<td>D. Sawyer</td>
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<td>Traffic Control</td>
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<td>D. Sawyer</td>
<td>08/01/14</td>
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<td>Traffic Control</td>
<td>Updated section regarding truck drivers must be tail-boarded and guided by a spotter.</td>
<td>P. Kearney</td>
<td>04/06/16</td>
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<td>Compressed Gas</td>
<td>Added Material Handling and Storage. Review and misc. non-substantive edits.</td>
<td>D. Sawyer</td>
<td>08/30/13</td>
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<td>Barricades and Spotters – Changed to Work Area Protection</td>
<td>Added clarifying text regarding use of barricades, tape and spotters.</td>
<td>N. Boutwell</td>
<td>05/19/14</td>
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<td>Barricades and Spotters– Changed to Work Area Protection</td>
<td>Added section on Person in Charge signage.</td>
<td>M. Fiske</td>
<td>01/02/15</td>
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<td>Tailboard</td>
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<td>Portable Ladders</td>
<td>Minimum Approach Distances updated to be consistent with the 2012 revision of the NESC. Review and misc. non-substantive edits.</td>
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<td>Working Near Energized Parts</td>
<td>Minimum Approach Distances in Table 1 were updated to be consistent with the 2012 revision of the NESC. Review and misc. non-substantive edits.</td>
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<td>Working Near Energized Parts</td>
<td>115 KV Minimum Approach Distance in Table 1 was updated to include the Transient Over Voltage factor.</td>
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<td>Overhead Lines</td>
<td>Added requirement to contact the Director of Transmission Assets or the Asset Engineer before an uncontrolled drop if a controlled drop is not feasible.</td>
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Section 1.0

Introduction & Commitment to Safety
1.0 INTRODUCTION

VELCO HEALTH & SAFETY MISSION & VISON

VELCO is committed to the health and safety of our employees and the public. VELCO’s commitment to safety works to advance our mission as a Trusted Partner and expresses VELCO’s vision to create a sustainable Vermont through our people, assets, relationships and operating model. The company strives to create and maintain a culture where safety is considered a core value and will provide employees and contractors the training and resources to ensure a safe and healthy work environment. Continued growth as a learning organization is critical to VELCO’s long-term, sustainable success. Exercising skills such as dialog and insight are essential to a culture of safety. Accountability is to be modeled and practiced. Employee expertise is to be shared, and VELCO encourages all to learn the best safety practices of others.

Stop Work Authority

It is the policy of the company that every employee has the authority and obligation to stop work if there is any safety concern, to question unsafe conditions, and have their concerns addressed expeditiously. Employees must continually evaluate their work environments and exercise stop work authority when working conditions present unexpected or unplanned risks to workers, visitors, public or the environment. When work is stopped, a stand-down meeting is conducted, work site hazards are reassessed, risk management plans are modified or developed to include the unexpected hazard, and the modified or new work plans are communicated to workers and visitors. If the risk associated with the hazard cannot be immediately mitigated, the work will not resume until it is safe to do so.

Stop, Think, Act & Review (STAR)

STAR requires you to STOP & THINK to make sure what you are about to do is indeed what you want to do. It is used to focus attention on the specific task, think about the intended action, understand the expected outcome before acting, and verify the intended results after the action. STAR is an expected standard of performance for personnel at all times during their daily work activities. An individual must be 100-percent sure that the action they are about to take is correct, before taking action such as the manipulation of any equipment.

THREE-WAY COMMUNICATION

Effective communication is an important defense in the prevention of errors; oral communication possesses a greater risk of misunderstanding compared to written communication. Therefore, confirmation of verbal exchanges of information between individuals must occur to promote understanding of communication content that could affect safety, reliability, or equipment damage. Three-way communication is a tool that assists effective communication, is required for switching & tagging activities and recommended for exchanging operational, health, or safety information.

Three-way communication includes the following protocols:
1) The sender transmits message clearly and concisely to the receiver
2) The receiver acknowledges the communication by repeating the message back to the sender, not necessarily verbatim

3) The sender acknowledges the reply and either
   a) confirms the receiver understood the message and acknowledges so ("That is correct"); or
   b) reports the receiver has NOT understood the message and restates the original message, thus repeating the process ("That is NOT correct, repeat the message")

Three-way communication is required for all switching and tagging instructions and recommended for exchanging operational, health, or safety information.

COMMITMENT TO SAFETY

The VELCO Community including its Management, Executives, and the Board of Directors are all committed to a Safety First Culture. We are all committed to providing a safe and healthy work environment and to ensuring that the proper measures are in place to prevent occupational injuries and illnesses. This commitment is implemented through the systematic application of a comprehensive safety program. This commitment is consistent as it applies to the VELCO employees, its contractors, and the public.

VELCO SAFETY MANUAL

All at VELCO are equally responsible for the overall safety of themselves, their co-workers, any contract resources working on VELCO property and the public. The VELCO Safety Manual contains safety expectations for management, supervisors, employees and any contractors/consultants working for VELCO. The information in this manual is part of a comprehensive approach to safety and work practices; no single section shall ever be used independently from the rest of the manual. Future revisions to this Safety Manual will be made on an annual basis or as necessary to improve safety rules and maintain compliance with updated regulations. It is the intent of the VELCO Community to strive for continuous improvement to these standards and work practices.

SAFETY – A CRITICAL COMPETENCY

Through continuous improvement, VELCO is committed to maintaining a culture that embraces a collaborative responsibility for the health and safety of the employees and the public. These fundamental safety practices include:

- Plan the job, reference applicable JHAs, conduct a documented Tailboard
- Maintain situational awareness to identify the hazards and risks continually through the duration of every task
- Determine the appropriate controls to mitigate the hazards and risks
- Use appropriate PPE based upon the hazards and risks
- Work the plan – constantly communicate, stop when questions, concerns or changes occur, encourage feedback from co-workers, think safety and work safely
VELCO Safety Program Overview

The core elements of VELCO’s safety program are as follows:

1. The Safety Advisory Committee (comprised of Management, Executives, and Employee representatives from each department) has the responsibility to implement the safety programs at VELCO. Effective development and implementation is the collaborative responsibility of all within the VELCO community.
2. All employees must be properly trained and equipped to work safely.
3. Safety is a fundamental requirement for continued employment by VELCO. Each employee and contractor is responsible for personal compliance with all applicable safety rules, standards and work practices. Willful or repeated violations of safety rules will result in discipline or discharge.
4. Management is committed to effective communication and consultation with the employees on matters of safety and health.
5. Occupational safety and health performance is an integral part of our business and incorporated into job performance evaluations as a critical competency.
6. Learn from incidents that occur by fully understanding them and implementing improvements.

REMEMBER, SAFETY STARTS WITH YOU!

Questions concerning our safety programs should be addressed to your Supervisor, or if further information is required, please contact the Safety Manager.

JANUARY 2019 VELCO Safety Manual
Section 2.0

General Safety Practices and Standards
SECTION 2.1 EMERGENCY PROCEDURES

1. Control Center Emergency Line (802-770-6260 or extension #260)
   a. It is recommended that all VELCO employees, contracted resources, and resources working within VELCO facilities or in close proximity to VELCO facilities and assets use the VELCO Emergency Line to report health or safety emergencies.
   b. If no electrical hazards are present, employees or contracted resources may choose to call 911 directly and shall notify the Control Center once health and/or safety conditions are secured.
   c. Receipt of an emergency call via VELCO’s extension #260 triggers a unique call signal heard throughout the control center. The Operators will immediately respond, determine the callers location and nature of emergency, de-energize electrical hazards or request electrical hazards de-energized by communicating with neighboring control center if necessary, and conference Emergency Services (911).

   ❖ CALL FOR HELP & PROVIDE YOUR LOCATION
   ❖ STAY CALM
   ❖ ASSESS SITUATION
   ❖ PROVIDE PROTECTION FOR INJURED
   ❖ GUIDE EMERGENCY SERVICES
   ❖ AID & MANAGE USING FIRST AID/CPR TECHNIQUES
   ❖ PROTECT YOURSELF FROM EXPOSURE TO OTHER HAZARDS INCLUDING; ELECTRICAL, MECHANICAL, BLOOD-BORNE PATHOGENS, ETC.

2. VELCO Radios - Emergency Call Operation

   When an emergency call is made, all SRS radios are bridged into the call. The SRS System drops any open calls and bridges everyone together into one call.

   • Start on any talk group. (Will NOT work if you’re on SIMPLEX).
   • Press and hold the EMG (Orange) button for 2-sec, and release.
   • The radio will switch to the EMERGENCY talk group.
   • EMG is broadcast to all talk-groups in VELCO fleet with radio unit ID displayed on all radios in the fleet.
   • Communicate the emergency to the Control Center, follow their guidance and respond according to your level of training.

3. Motor Vehicle Accidents

   Report all serious company related vehicle crashes to the VELCO Operators (802) 770-6260 or 911.

   For all vehicle accidents, workers shall follow these immediate actions (consistent with the Vehicle Accident Kit instructions in your vehicle’s glove box):
a) Pull over to a safe location.
b) Determine if there are any injuries, and notify emergency services (ambulance and police) for help.
c) Assist others if it is safe to do so.
d) Take pictures of the accident scene.
e) Exchange information with the other driver(s) and any witness(es) using the Liberty Mutual Vehicle Accident Kit that should be in the vehicle’s glove box.
f) If the owner of the damaged property is not available, leave your name and company phone number.
g) Report the accident to the Person in Charge (if applicable), your immediate supervisor, and the Safety Manager as soon as possible.
h) Do not accept blame or discuss the accident with anyone other than the police officer, your supervisor, or other VELCO representatives.
i) Document the incident through the VELCO insurance portal.
j) Return the Vehicle Accident Kit forms to your supervisor as soon as practical in accordance with the VELCO Incident Reporting Process.

Operators of vehicles involved in a crash may have to file a state accident report (Vermont Uniform Crash Report) depending on the amount of property damage involved. The amount of property damage that triggers a state accident report changes often; operators involved in accidents must check with the state for the latest figures. If applicable, the report must be filed within 72 hours.

The VELCO Incident Reporting process will be used for incident investigation, tracking and trending, and follow-up action items for continuous learning and improvement.

4. Facility Evacuation, Control Center - Refer to VELCO Emergency Response Plan & Evacuation Plan (Located on VELCO Interact)
SECTION 2.2 INJURY / ILLNESS / INCIDENT INVESTIGATION AND REPORTING
Refer to Appendix I for Incident Reporting Forms

1. Injury / Illness / Incident Investigating

The VELCO Safety Manager is responsible for investigation of all work related safety incidents and near misses (a near miss is an “unplanned event that did not result in injury, illness or damage – but had the potential to do so.”). The VELCO Incident Reporting process is used for incident investigation, tracking and trending, and follow-up action items for continuous improvement. All injuries, incidents and near misses will be entered into CATSWEB, investigated, and reviewed by the Incident Review Committee. Lessons learned from these events will be shared across the company and action items will be tracked until their completion.

2. Injury/Illness/Incident Reporting

Timely and accurate injury/illness/incident reporting is a critical first step towards managing a situation. Serious injuries/illnesses (immediately dangerous to life & health) are to be reported to the VELCO Operators (802) 770-6260 or extension #260 or 911. First Aid and/or Medical Treatment are most important and shall be addressed as soon as it is safe to do so. Employees shall notify their Direct Supervisor and the VELCO Safety Manager of injuries, illnesses, incidents and near misses. The Safety Manager will ensure that the proper forms are filled out and Human Resources is notified.

To assist in reporting and record keeping, VELCO uses the Employees First Report of Injury Form. Contact Human Resources to fill out this form for Employee Work Related Injuries and Illnesses.

This form is used to report all work related injuries and illnesses regardless of severity. It is State of Vermont Form 1, also approved for use as OSHA 101.

- a) used to report all injuries and illnesses;
- b) filed immediately even if some details are still lacking;
- c) prepared and reported separately for each worker injured; and
- d) sent to the Safety Manager upon completion.

3. Contact Info for Injury/Illness/Incident Reporting

VELCO Operators (802) 770-6260 or extension #260

<table>
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<th>Safety Department:</th>
<th>Human Resources:</th>
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<tr>
<td>Abe Fitch</td>
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SECTION 2.3 AERIAL BUCKETS

1. Overview:
Aerial lifts are vehicle-mounted, boom-supported aerial platforms, such as man-lifts or bucket trucks, used to access utility lines and other above ground job sites. The major causes of fatalities are falls, electrocutions, and collapses or tip overs.

2. Training & Safety Requirements

- Workers who operate aerial lifts shall be properly trained in the safe use of the equipment. This includes bucket rescue training which shall be refreshed every year.
- Before use each day, mechanical elevating and rotating equipment shall be operated and visually inspected for defects in components whose failure would result in a free fall or free rotation of the boom. This testing shall be performed from ground controls if equipped.
- 100% fall protection is required at all times when the aerial lift is in use and out of the cradled position. Use a body harness or restraining belt with a lanyard attached to an approved anchorage point to prevent the worker(s) from being ejected or pulled from the basket. Where there is a potential for an arc flash while working near energized lines or components, the body harness or restraining belt with a lanyard must be Arc Rated.
- Anytime there is a worker aloft in an aerial lift, there shall be at least one person on the ground that can assist in an emergency.
- Maintain and operate elevating work platforms according to the manufacturer's instructions. Never override hydraulic, mechanical, or electrical safety devices.
- Never move the equipment with workers in an elevated platform unless the manufacturer permits this.
- Do not allow workers to position themselves between overhead hazards and the rails of the basket. Movement of the lift could crush the worker(s).
- Maintain a minimum approach clearances away from the nearest energized overhead lines.
- Always treat power lines, wires and other conductors as energized, even if they are down or appear to be insulated.
- Do not exceed the load limits of the equipment. Allow for the combined weight of the worker, tools and materials.
- Vehicle brakes must be set, and outriggers must be set on pads or a solid surface. Wheel chocks must be used before using an aerial lift.
- An aerial lift truck may not be moved with the boom in the elevated position.
- Climbers (Lineman Hooks) shall not be worn while working in an aerial lift.
- Belting off to an adjacent pole, structure, or equipment while working in an aerial lift is not permitted.
- Workers must stand firmly on the floor of the bucket and shall not sit on the edge of the bucket or use planks to make a working surface across the top of the bucket.

Any aerial bucket equipment that does not have a current dielectric testing sticker will be designated as non-insulating and will not be used for any work near energized lines or parts. Whenever any work is done on the aerial bucket equipment or a hydraulic leak occurs that could affect the dielectric integrity of the boom, bucket, or control assembly, the equipment must be tested before returning it to unrestricted service.
SECTION 2.4 ASBESTOS

1. Overview:
Asbestos is a naturally occurring mineral fiber that is resistant to heat and corrosion. Asbestos has been used in building construction materials for insulation and as a fire retardant. Other products that may contain asbestos include insulation for pipes, ceiling and floor tiles, roofing shingles, and asbestos cement products. Asbestos fibers are too small to be seen with the naked eye.

2. Hazards:
Asbestos is a health hazard and its use is highly regulated by both OSHA and EPA. If asbestos containing materials are disturbed or damaged in any way, asbestos fibers can be released into the air and breathed in. Breathing asbestos fibers can cause a buildup of scar-like tissue in the lungs called asbestosis and result in loss of lung function that often progresses to disability and death. Asbestos also causes cancer of the lung and other diseases such as mesothelioma of the pleura, which is a fatal malignant tumor of the membrane lining the cavity of the lung or stomach.

VELCO has identified and documented asbestos at several different facilities over the years. While asbestos abatement projects have been completed at many of these sites, the risk for coming into contact with asbestos containing materials remains; therefore, VELCO employees and contractors must be able to identify suspect materials in order to avoid disturbing it and creating a health hazard.

Known asbestos containing materials within the VELCO system include, but are not limited to: electrical wiring insulation inside switchgear, relays, and circuit breaker cabinets (small diameter wire with blue/grey color sheath); cementitious/transite pipe, interior and exterior caulking, hard board, and wall board.

3. Training & Work Practices:
All VELCO employees who have the potential to encounter and disturb asbestos containing material are required to attend asbestos awareness training. Any suspect asbestos containing material detected is to be reported to the VELCO Safety Manager and/or the VELCO Environmental Manager. VELCO employees are instructed not to disturb any asbestos or presumed asbestos containing material. A qualified professional will be retained to perform an inspection of the suspect material/s and to collect representative samples for laboratory analysis and perform necessary abatement work, as needed. Under no circumstances shall an employee break, damage, cut, or otherwise disturb a material labeled as asbestos containing or that is suspected to contain asbestos. The annual asbestos awareness training shall include examples of the most common suspect asbestos containing materials including those that have typically been identified at VELCO facilities.

Prior to any demolition project, a hazardous building materials assessment must be performed in order to appropriately characterize the waste materials and determine whether or not asbestos sampling is required. Contact the VELCO Environmental Team for assistance or with any questions regarding demolition or renovation projects and waste characterization/disposal requirements.
SECTION 2.5 ALL-TERRAIN VEHICLES

This section refers to All-Terrain Vehicles (ATV), which for the purpose of the Safety Manual are defined as motorized off-highway vehicles including; 4-Wheelers, UTVs and Snowmobiles.

1. Training
Employees shall successfully complete the required hands-on training prior to operating 4-Wheelers. Refresher training is required every 2 years. VELCO is in the process of developing formal training for UTVs and snowmobiles. Prior to the operation of UTVs or snowmobiles, employees must have completed 4-Wheeler training, reviewed the operator’s manual for the equipment they will operate and have approval from their supervisor to operate this equipment.

2. JHA
The JHA shall be reviewed prior to operation of All-Terrain Vehicles

3. Other Requirements
   • While operating an All-Terrain Vehicle a DOT approved helmet shall be worn by the driver and passengers.
   • Seat belts shall be worn if vehicle is equipped.
   • Passengers shall only ride in designated seats.
   • Eye protection shall be worn. If the helmet does not have an approved face shield, then approved safety glasses shall be worn.
   • Refer to equipment operator's manual prior to operating an All-Terrain Vehicle
   • Properly rated tri-fold ramps anchored in at least two locations shall be used to load 4-Wheelers into trucks.
SECTION 2.6 CHAINSAWS

Operating a chain saw can be hazardous. Potential injuries can be minimized by using proper personal protective equipment and by following safe operating procedures.

1. Training Requirements
VELCO employees shall receive training before operating a chainsaw at work.

2. PPE
Approved personal protective equipment shall be worn when operating chain saws: Hard hat with hearing protection, work gloves, safety glasses, safety toe boots, face shield and protective clothing (chaps).

3. Before Starting a Chain Saw
   • Complete a Tailboard and reference JHA prior to use.
   • An employee using a power saw shall be in sight of other employees in case of emergency.
   • Check controls, chain tension, and all bolts and handles to ensure that they are functioning properly and that they are adjusted according to the manufacturer’s instructions.
   • Make sure that the chain is always sharp and that the oil tank is full.
   • Start the saw on the ground or on another firm support. Drop starting is never allowed.
   • Start the saw at least 10 feet from any other people in the area, with the chain’s brake engaged.
   • Be cautious of saw kickback. To avoid kickback, do not saw with the tip.

4. Fueling a Chain Saw
   • Use approved containers for transporting fuel to the saw.
   • Dispense fuel at least 10 feet away from any sources of ignition. No smoking during fueling.
   • Use a funnel or a flexible hose when pouring fuel into the saw.
   • Never attempt to fuel a running or HOT saw.
SECTION 2.7 CLIMBING & STRUCTURE INSPECTION

Prior to climbing poles and structures, an inspection shall be made to determine if the poles or structures are capable of sustaining the additional or unbalanced stresses which they will be subjected to from climbing or from adding or removing conductors or equipment.

1. Inspection Methods

Visual inspection performed prior to climbing a wood pole includes looking for defects, rotted or hollow spots, and defective equipment.

Sounding – Involves striking the wood pole with a hammer around the ground line and six feet above for evidence of hollowness and heart rot. Generally, a good pole gives solid thud as it is struck, while a hollow heart or decay pocket in the pole gives a hollow sound.

Prodding - Probing the rotted shell or decay area with a large screwdriver or other blunt tool. Prodding should be deep enough to reach solid wood but not enter it. Never use a digging bar to prod, as it may damage a good pole. Additionally, it is not recommended to probe at the ground line unless there is cause to doubt the condition of the pole. Openings made by prodding can become entry points for fungus, which causes decay. If possible, excavate around the base of the pole to examine the condition at and below the ground line.

If the pole or structure cannot withstand the loads that will be imposed, it shall be deemed unsafe to climb unless braced or otherwise supported so as to prevent failure.

2. Fall Protection Requirement

Employees working more than [4] feet above the ground on poles, towers, or similar structures shall be protected with personal fall arrest equipment that they have been trained to use and has been inspected for any damage or defects prior to use.

3. Pole/Structure Rescue

- All employees that climb poles or structures shall be trained in pole top & structure rescue.
- The items needed for rescue must be on-site before climbing begins.
- Emergency notification must be made as soon as possible.
- The rescuer shall exercise extreme caution to prevent from also becoming a victim.
SECTION 2.8  COMPRESSED GASES

a) Compressed gases must:

1) be stored upright, whether full or empty, with contents properly identified;
2) be secured so that tipping over is prevented; and
3) have the valve stem cover or valve protection device on or a regulator attached (Never transport a cylinder with the regulator in place).

b) When cylinders are transported by powered vehicles, they shall be clearly marked, secured in a vertical upright position with valve cap or valve protection device in place.

c) Oxygen cylinders in storage shall be separated from fuel-gas and acetylene cylinders or combustible materials (especially oil or grease) by a minimum distance of 20 feet or by a 5-foot high non-combustible barrier.

d) Cylinders shall not be placed where they may become part of an electric circuit or within 5 feet of an electrical outlet.

e) The person who determines that a cylinder is empty should tag the cylinder as such. The tag should remain with the cylinder until it leaves the facility.
SECTION 2.9  CONFINED SPACE ENTRY

For Additional Guidance Refer to Confined Space Program - Appendix C

VELCO employees who perform this work must be trained and comply with the “Confined Space Entry” written program. (This section does not apply to distribution type electrical manholes, which are called enclosed spaces rather than confined).

1. Inventory of Confined Spaces

Supervisors, assisted by the VELCO Safety Manager, will inventory and list confined spaces in work areas under their responsibility. Confined spaces are those spaces that:

   a) are large enough and so configured that a person can enter and do work;
   b) have limited or restricted means of entry or exiting; and
   c) are not designed for continuous worker occupancy.
   d) VELCO specific examples include – Transforms, breakers, manholes in causeway, containment tanks.

2. Hazard Evaluation

After a confined space inventory is conducted, supervisors, assisted by the VELCO Safety Manager will assess workers’ exposure to hazards of each space. Hazards considered are the following:

   a) atmospheric (oxygen contents, flammability, toxicity);
   b) engulfment (water);
   c) mechanical/electrical; and
   d) configuration (wedging of the body so as to cause suffocation).

3. Permit System

For spaces that meet the definition of a confined space and that have atmospheric, mechanical/electrical, engulfment, or configuration hazards, entry into the space is allowed only under an OSHA permit/certification system. The permit/certification system regulates entry in various confined spaces depending on the degree of worker exposure to hazards. The levels of entry are the following:

   a) Permit Required Confined Spaces

OSHA regulations require a permit when a worker must enter a space that has hazards that have not been eliminated or controlled. VELCO workers are not allowed to enter spaces that require a permit for entry. If the confined space cannot be de-classified as non-Permit required, the confined space shall not be entered.
b) Alternative Entry Certification Confined Spaces

As an alternative to a permit, entry into a confined space is allowed using an Alternative Entry Certification. This certification is allowed if mechanical/electrical, engulfment and configuration hazards have been eliminated using lockout/tagout procedures and atmospheric hazards are controlled by continuous forced-air ventilation. Certification can be requested from the employee’s supervisor or the Manager of Safety.

c) Reclassification Entry Certifications

A confined space may be entered using a Reclassification Entry Certification if mechanical/electrical, engulfment, and configuration hazards have been eliminated using lockout/tagout and the space has no potential or actual atmospheric hazards. This certification can be requested from the employee’s supervisor or the Manager of Safety.

4. Gas Detection Meters

a) Refer to Gas Detection Meter Instruction Manual.
b) Gas detection meters will be used in conjunction with continuous forced air ventilation during confined space entry under Alternative Entry procedures.
c) Meters will be calibrated annually and their batteries verified before use.

5. Training and Work Practices

a) Only workers who have had confined space entry training are allowed to enter confined spaces regulated by the permit/certification system.
b) Written work practices for confined space entry will be used.
SECTION 2.10 CONTRACTOR/SUBCONTRACTOR

1. Initial Requirements

In advance of work being performed, VELCO Project Managers, Construction Management and Procurement shall ascertain that any contractors and subcontractors to be used on VELCO projects including but not limited to; ROW access, Transmission line work, Substations and Telecommunication have supplied:

1. Certificate of Insurance - Procurement will verify their insurance certificate with VELCO named as also insured;
2. Safety Programs - Procurement will request a copy of or proof of company safety program, and will be verified by the Safety Manager
3. Qualification Forms - Construction Manager will request documentation certifying qualifications of all their employees to work in a high voltage environment – on energized equipment or conductors of more than 600 volts (when applicable to the scope of work).

2. Host Employer Transfer of Information

As the Host Employer VELCO will communicate the following information to its Contractors and Subcontractors:

1. System Characteristics
   a. Nominal voltage of lines and equipment.
   b. Max switching-transient voltages per unit (T-factors).
   c. Hazardous induced voltages.
   d. Presence of protective grounds and equipment grounding conductors.
   e. Location of circuits and equipment, including supply, communication and fire protective signaling circuits.
   f. Other known system information related to safety and requested by the contractor.

2. Known Installation Conditions
   a. The condition of protective grounds or other equipment grounding conductors. This could include whether they are in place and in effect as originally installed.
   b. The condition of poles.
   c. Any known environmental conditions related to safety, including water or other environmental hazards in manholes.

3. Additional safety information requested by Contractors or Subcontractors

3. Safety & Environmental Orientation

The VELCO Safety Manager or qualified designee will brief the contractor personnel, at a minimum, on the following requirements:

1. Contact System Operator when entering and leaving substation.
2. Report all accidents, incidents, and injuries to VELCO.
3. JHAs, Tailboards/Job briefings and coordination with other crews on site.
4. Compliance with all OSHA and VOSHA requirements.
5. Compliance with VELCO Safety Rules for PPE (e.g. safety shoes).
6. Compliance with VELCO Environmental Requirements.
7. Contractor shall provide or designate an on-site safety supervisor.
8. Contractor shall provide first aid facilities at the job site that are consistent with the nature of the work.
9. All contractor-supplied equipment will comply with OSHA required standards.

Contractors must comply with OSHA/VOSHA standards and any other applicable federal or state mandated laws. Contractor must also meet VELCO’s Tailboard & JHA requirements, and provide qualified employees with appropriate oversight/supervision.

Prior to conducting any work on VELCO Property, Contractor shall ensure that its employees, staff, independent contractor and subcontractor personnel complete both VELCO’s safety orientation and environmental awareness training program, collectively referred to as “VELCO Safety & Environmental Training”. The Contractor shall also provide a copy of employee qualification forms for any work on electrical equipment, lines or components.

4. Drug & Alcohol Free Workplace
VELCO requires all Contractors to comply with the requirements of the Drug & Alcohol Free Workplace. Contractor employees and subcontractors are expected to report to work in an appropriate mental and physical condition for work. Use of alcohol or controlled substances during work while on VELCO Property is strictly prohibited and grounds for termination.

5. Safety Equipment and Personal Protective Equipment (“PPE”)
The Contractor is required to provide all appropriate safety equipment, including PPE and Fire Resistant (“FR”) Clothing. The selection of the appropriate safety equipment and PPE is the sole responsibility of the Contractor. Contractor shall ensure that equipment and PPE are functioning properly, well maintained, and periodically inspected.

6. Work Stoppage
Any VELCO employee or representative that observes an unsafe work practice or condition is authorized to request a work stoppage. Unsafe work practices or conditions shall be immediately reported to the Safety Manager. All damages, whether direct or consequential, as a result of safety-related work stoppages, shall be borne by the Contractor.

7. Environmental Guidance Document
Contractor shall abide by the rules, requirements and guidelines as set forth in VELCO’s Environmental Guidance Document.
SECTION 2.11 CRANE / LIFT OPERATIONS

For Additional Guidance Refer to Crane Program - Appendix D

1. Purpose & Scope

This defines VELCO’s minimum requirements for operations involving cranes or other lifting equipment. These requirements must be complied with when they exceed local regulations.

In the absence of regulatory specific guidance and where the guidance is less protective than that provided by this document, the VELCO requirements must be followed.

This document identifies the requirements for all types of overhead and mobile cranes. It also details the requirements for other fixed and temporary lifting equipment, such as winches, hoists, chain blocks and the requirements for lifting equipment and load attaching ancillaries.

2. Training & Qualifications

All personnel involved in crane and lifting operations shall have the necessary training and qualifications to perform their work. Crane operators shall have a valid license for the size and type of crane they will operate. All personnel performing rigging and signaling shall have current rigging and signalman training. Additionally, no one shall operate cranes or perform crane related duties that are beyond their training, qualification and experience levels.

3. Summary Guidance

VELCO has identified the acronym P.I.C.K. (Plan, Inspect, Check the environment, Keep looking and listening) as a quick way for Operators and Lift Team members to evaluate the lift prior to starting.

The use of cranes and other lifting equipment is considered a high-risk operation, and there is a constant battle to remain alert to what could go wrong and avoid complacency…especially where these tasks are part of routine operations. This guidance is a tool to help all employees involved in the use of cranes and lifting equipment to remain alert to what can go wrong, consistently follow established safe work practices, and to stop when unexpected conditions occur to re-verify it is safe to proceed. We have coined the acronym P.I.C.K, which is explained below, to help keep these principles in mind.

P.I.C.K.
P - Plan
I - Inspect
C - Check the environment
K - Keep looking around (and listening)
SECTION 2.12 DROP ZONE PROTECTION

1. Overview

This procedure applies during work being performed by employee(s) aloft, in the bucket, basket, climbing poles or towers, or other structures that require workers at elevated surfaces and other tasks with potential of falling hazard of objects.

There is a potential hazard for objects to accidentally drop, such as tools and/or material when working aloft or other suspended objects are present.

The Drop Zone refers to the area with the potential of impact during accidental fall of an object.

2. Safety Requirements

Protecting the Drop Zone using cones, barricades, signs or any practical means to identify the hazards can prevent injuries and/or fatalities to the workers and public near working area.

The work supervisor shall evaluate the site conditions, identify all known & potential hazards and determine the safest method possible for workers to perform their task.

This method shall be discussed with all workers and documented on the job brief. If the hazard cannot be eliminated, the use of barricading by means of cones, barricade and/or spotter to impede access to the Drop Zone area.

If it is necessary to enter the Drop Zone, use 3-way-communication with the person aloft. They must acknowledge that someone is entering the area and suspend all work aloft until the zone is cleared.
SECTION 2.13 ERGONOMICS

In the workplace, ergonomics helps adapt the task to the worker to reduce stress and eliminate potential injuries associated with overuse of muscles, bad posture, and repetitive motion. If you think you have a work related ergonomic injury, it is your responsibility to notify your supervisor and HR.

1. Cumulative Trauma Disorders

Cumulative trauma disorders are disorders of the skeleton, muscles, or nervous system caused or made worse by repetitive motions, vibrations, or sustained or awkward positions.

To avoid these disorders, workers are trained to:

1) use material handling tools such as hand trucks, forklifts, and pallet jacks to move material;
2) get help when lifting material that is awkwardly sized or shaped;
3) use lifting techniques that avoid twisting or bending the back;
4) use proper body positioning throughout the course of a task

Stretching:

Stretching exercises should be performed before starting physical work to avoid muscle strains.
SECTION 2.14 FACILITY ACCESS

1. Call-in Procedure
   a. VELCO Substations, Switching/Terminal Stations and Line ROW’s
      When arriving at or leaving a VELCO substation, switching/terminal station or right-of-way, workers shall call the VELCO Control Center at (802) 770-6261 to notify the System Operator of their arrival and departure. The System Operator will transfer the workers to the Security Officer for logging.
   b. GeoNet Crew Mapping
      Crews are required to be mapped on the GeoNet Mapping system when accessing VELCO substations, switching/terminal stations and line ROW’s. The crews can be mapped on or removed from the GeoNet system either by the System Operator or by the crews using the Crew Locator Smartphone Application. When mapped on the GeoNet system, a single call to the VELCO System Operator will expedite any emergency response using the GPS location, nearest cross streets, adjacent crews, access directions, open fields for helicopter landings, etc.
   c. Pinnacle Ridge facility
      When arriving at or leaving the Pinnacle Ridge facility during off hours (between 6pm and 6am on weekdays or anytime on weekends), employees shall notify Security at (802) 772-6670 that they are on premises.

2. Controlled Access for Substations and Switching/Terminal Stations
   a. When in a substation or switching/terminal station, all gates must be locked or controlled. To be controlled, an employee must have a clear, unobstructed view of the gate and be present near the gate the entire time the gate is open/unlocked.
   b. All gates must be locked when leaving the site.

3. Control Center Emergency Line (802-770-6260 or extension #260)
   a. It is recommended that all VELCO employees, contracted resources, and resources working within VELCO facilities or in close proximity to VELCO facilities and assets use the VELCO Emergency Line to report health or safety emergencies.
   b. If no electrical hazards are present, employees or contracted resources may choose to call 911 directly and shall notify the Control Center once health and/or safety conditions are secured.
   c. Receipt of an emergency call via VELCO’s extension #260 triggers a unique call signal heard throughout the control center. The Operators will immediately respond, determine the callers location and nature of emergency, de-energize electrical hazards or request electrical hazards de-energized by communicating with neighboring control center if necessary, and conference Emergency Services (911).
SECTION 2.15 FALL PROTECTION

For Additional Guidance Refer to Fall Protection Program – Appendix F

1. Fall Protection - Overhead Electric Structures, Poles, Towers, Substation Structures, and Telecommunications Structures

a) Personal Fall Arrest devices, safety straps, lanyards, lifelines, and body harnesses shall be inspected before each use to determine if the equipment is in safe working condition.
b) Lifelines shall be protected against being cut or abraded.
c) Fall arrest equipment, work positioning equipment, or travel restricting equipment must be used by workers whenever working at elevated locations more than 4 feet above the ground.
d) The use of fall protection equipment is not required to be used when climbing or changing position on a pole, unless ice, high winds, or the design of the structure leaves no provision for holding on with hands. (Unqualified persons, such as trainees, must have fall protection at all times.)
e) Climbers using climbing belts for wood poles shall never be allowed to drop or slide down a pole or structure more than two feet. Personal fall arrest systems shall be rigged such that a worker cannot fall more than 6 feet or contact any lower surface.
f) When stopping or arresting a fall, personal fall arrest systems shall limit the maximum arresting force on an employee to 900 pounds if used with a body belt or 1800 pounds if used with a body harness.
g) If vertical lifelines or drop lines are used, only one worker may be attached to any one lifeline.
h) Snap hooks shall be double-locking and may not be connected to each other or to loops made in webbing type lanyards.

2. Fall Protection - Aerial Lifts

a) 100% fall protection is required at all times when the aerial lift is in use and out of the cradled position. Use a body harness or restraining belt with a lanyard attached to an approved anchorage point to prevent the worker(s) from being ejected or pulled from the basket. Where there is a potential for an arc flash while working near energized lines or components, the body harness or restraining belt with a lanyard must be Arc Rated.
b) Belting off to an adjacent pole, structure, or equipment while working in an aerial lift is not permitted.
c) Workers must stand firmly on the floor of the bucket and shall not sit on the edge of the bucket or use planks to make a working surface across the top of the bucket.
d) A body harness must be worn and a shock-absorbing lanyard attached to the boom or bucket.
e) Man baskets/buckets shall be fastened to the overhead structure when used to transfer personnel to the structure.
SECTION 2.16 FIRE PREVENTION

For Additional Guidance Refer to Fire prevention Program – Appendix G

1. Workers must be familiar with the following:
   a) fire evacuation routes and alternate routes;
   b) the locations of fire alarm pull stations; and
   c) the locations of fire extinguishers and their use.

2. Only those workers trained or knowledgeable in firefighting should attempt to put out a fire, and only after:
   a) an alarm is sounding and others are evacuating;
   b) the fire department has been called;
   c) an escape route is available; and
   d) they have made a personal decision to attempt to put out the fire.

3. Supervisors will ensure that:
   a) designated workers perform monthly checks of fire extinguishers that include checking pins, seals, gauges, accessibility, visibility, presence of inspection tags; and
   b) that inspections are logged on the fire extinguishers’ inspection tags.
   c) annual Fire Extinguisher Training is conducted.

4. Storage of Flammables
   f) Materials that may be spontaneously combustible, such as rags soaked in oil or solvents, must be stored in metal containers with metal covers.
   g) Flammable liquids shall be used only for their designed purposes. E.g., gasoline, benzene will not be used for cleaning purposes.
   h) All solvents shall be kept in approved, properly labeled containers. Gasoline shall be handled and dispensed only in UL approved, properly labeled (yellow letters), red metal safety cans.
   i) Compressed gases must:
      1) be stored upright, whether full or empty, with contents properly identified;
      2) be secured so that tipping over is prevented; and
      3) have the valve stem cover or valve protection device on or a regulator attached.
   j) When cylinders are transported by powered vehicles, they shall be clearly marked, secured in a vertical upright position with valve cap or valve protection device in place.
   k) Oxygen cylinders in storage shall be separated from fuel-gas cylinders or combustible materials (especially oil or grease) by a minimum distance of 20 feet or by a 5-foot high non-combustible barrier.
   l) Cylinders shall not be placed where they may become part of an electric circuit or within 5 feet of an electrical outlet.
   m) Check with Environmental Department when chemicals are stored or transported for appropriate documentation/inspection.
SECTION 2.17 FIRST AID AND BLOOD-BORNE PATHOGENS

For Additional Guidance Refer to Blood-borne Pathogen Program - Appendix B

1. Attendance of CPR and First Aid Trained Workers
   a) When two or more employees are working on exposed lines or equipment energized at greater than 50 volts, at least two trained CPR and first aid workers shall be in attendance.

   b) For fixed work locations, the number of trained persons available shall be sufficient to ensure that each employee exposed to electric shock can be reached within four minutes by a trained person. However, where the existing number of employees is insufficient to meet this requirement (at a remote substation for example), all employees at the work location shall be trained.

2. To fulfill their first aid responsibilities, field personnel must:
   • maintain their first aid and CPR/AED certification;
   • familiarize themselves with the location and contents of first aid kits;
   • provide first aid to fellow workers;
   • replenish contents of first aid kits as they are used; and
   • report all accidents that require first aid or medical attention to their supervisors.

   Blood-Borne Pathogen training provided to all employees on an annual basis.

3. First Aid Kits and Supplies
   First aid kits shall be maintained, readily available for use, and inspected frequently enough so that expended items are replaced. When the job site is a rural location, the crew will have on hand a larger, well-stocked medical kit.

4. Exposure to Blood-borne Pathogens
   First aid responders must protect themselves from potential exposure to bloodborne pathogens. To provide this protection, personal protective equipment is stored in first aid kits and must be used.

   a) The following are first aid kit personal protective devices used to prevent exposure to blood-borne pathogens:
      1) disposable rubber gloves;
      2) disposable breathing tubes for mouth-to-mouth resuscitation;
      3) goggles for splash protection;
      4) antiseptic towelettes; and
      5) biohazard bags to contain used gloves, clothing, etc.

   b) Hepatitis B vaccination will be offered to workers after exposure to blood or other potentially infectious material. Workers who decline this vaccine must sign a declination statement provided by the company.

   c) Notify your Supervisor immediately after you have been exposed to someone’s blood in the work place.
SECTION 2.18 FORKLIFTS / POWERED INDUSTRIAL TRUCKS

For Additional Guidance Refer to PIT/Forklift Program – Appendix L

The VELCO supervisor shall ensure that each forklift (Powered Industrial Truck) operator is competent to operate a powered industrial truck safely, as demonstrated by successful completion of the training and evaluation specified in the OSHA standard. [Ref. 29 CFR Subpart N, 1910.178]. Refresher training shall be provided every 3 years. The Safety Manager maintains all Forklift training records.

SECTION 2.19 HAZARD COMMUNICATION

Hazard Communication, known informally as “Worker Right-to-Know,” requires the employer to communicate to workers the physical and chemical hazards of materials used in the workplace. These hazards are communicated to the worker through Safety Data Sheets (SDSs), labeling, inventories, and training.

1. Safety Data Sheets (SDSs) (SDS can be accessed by clicking the MSDS online link on the Safety Page on VELCO Interact Intranet or by contacting the Safety Manager or Control Center.)

Manufacturers’ Safety Data Sheets provide information more detailed than found on product labeling alone. When new products are purchased, the supervisor is responsible for obtaining the SDS and, assisted by the Environmental and Safety Departments, making a determination on worker exposure.

Safety Data Sheets are readily available to all employees during their work shifts. Employees should review SDS for all hazardous chemicals used at their workplace. The SDSs are updated and managed by the VELCO Safety Manager.

2. Identifying Containers of Hazardous Chemicals

All hazardous chemical containers used at this workplace will be marked with one of the following:

a) The original manufacturer’s label that includes a product identifier; an appropriate signal word, hazard statements, pictograms, and precautionary statements; and the name, address, and telephone number of the chemical manufacturer, importer, or other responsible party;

b) Another label with the appropriate label elements as described above; or

c) Workplace labeling that includes the product identifier and words, pictures, symbols, or a combination that provides at least general information regarding the hazards of the chemicals.

Department Managers will ensure that all containers are appropriately labeled. No container will be released for use until this information is verified. Workplace labels must be legible and in English.
3. Identifying Hazardous Chemicals

A list is available in the MSDS online system that identifies all hazardous chemicals that employees have the potential to be exposed to at this workplace. Detailed information about the physical, health, and other hazards of each chemical is included in an SDS and the product identifier for each chemical on the list matches and can easily be cross-referenced with the product identifier on its label and on its SDS.

4. Worker Information and Training

Before employees start their jobs or are exposed to new hazardous chemicals, employees must attend a hazard communication training that covers the following topics:

a) An overview of the requirements in OSHA’s hazard communication rules;
b) Hazardous chemicals present in their workplace;
c) Operations in their work in which hazardous chemicals are used;
d) The location of the written Hazard Communication plan and where it may be reviewed;
e) How to understand and use the information on labels and in SDS;
f) The meanings of pictograms, signal words, precautionary statements, and SDS format;
g) Physical and health hazards of chemicals in their work areas;
h) Methods used to detect the presence or release of hazardous chemicals in the work area;
i) Steps that have been taken to prevent or reduce exposure to these chemicals;
j) How employees can protect themselves from exposure to these hazardous chemicals through the use of engineering controls, work practices, and personal protective equipment;
k) Any explanation of any special labeling present in the workplace; and
l) Emergency procedures to follow if an employee is exposed to these chemicals.

The VELCO Safety Manager and the employees’ managers are responsible for ensuring that employees receive this training.

5. Contractors

If employees of other employers may be exposed to hazardous chemicals at our workplace (e.g. employees of a construction contractor working on-site), it is the responsibility of the Person in Charge to provide contractors and their employees with the following information:

a) The identity of the chemicals and how to review our SDS;
b) An explanation of the container and pipe labeling system; and

The Person in Charge will also obtain an SDS for any hazardous chemical a contractor brings into the workplace.

Contact the manufacturer of the hazardous chemical or the Safety Manager with any questions.
SECTION 2.20 HEAVY EQUIPMENT OPERATIONS

1) Equipment shall only be operated by personnel who are properly licensed (as applicable) and trained on the specific type of equipment they will be operating.

2) Equipment shall be operated in accordance with the Operator's Manual.

3) Safety overrides and/or equipment shall not be removed or deactivated.

4) Ensure adequate spill response supplies.

5) Ensure proper communication with workers in proximity of the equipment. Be aware of swing areas and operator blind spots.

6) Extreme caution should be exercised when operating on uneven and/or steep terrain. Do not operate beyond the capabilities of the machine or utilize the equipment beyond its intended use.

7) No equipment or vehicle with an obstructed view to the rear may be operated at an off-highway jobsite where a worker is exposed to the hazard of backing vehicles unless:

   a) the vehicle has a backing signal that is louder than the surrounding noise level; or
   b) the vehicle is backed only when a designated ground guide signals that it is safe to do so.

8) A vehicle operator may not leave his control position while a load is suspended unless workers (include the operator) are free of hazards due to the suspended load.

9) Tractors, dozers, and excavators shall not be operated without rollover protection.

10) Vehicle outriggers shall be extended and firmly set as necessary for the stability of the vehicle. Outriggers may not be extended or retracted outside the clear view of the operator unless all workers are outside the range of possible equipment motion.

11) Equipment used to lift or move lines or other material shall be used only within its maximum load rating and other design limitations for the conditions under which the work is being performed. Employees shall not operate an unsafe vehicle or equipment. Unsafe vehicles or equipment shall be removed from operation and reported promptly.

12) Spotters - Where visibility is obscured and sufficient personnel are available; a spotter (wearing hi-vis) shall be used and signals to be used will be discussed & agreed upon with the operator. The spotter shall be positioned in such a manner as to see the area to the rear of the vehicle and be seen by the operator. The operator shall obey signals given by the spotter and stop movement if communication is lost.
13) Where seat belts are provided, they shall be used.

14) When loading, unloading, or exiting equipment it shall be placed in PARK position and brakes shall be set or the wheels shall be chocked.

15) Equipment and materials carried on beds or on trailers shall be properly secured and the weight evenly distributed.

16) The use of cell phones should be limited to those cases where they will NOT be a distraction to the safe operation of equipment. Cell phones shall NOT be used while the equipment is in motion unless being used as a form of communication with a spotter.

17) Operators shall be aware of all overhead hazards and maintain clearances to overhead power lines. The following tables are VELCO’s requirements for unqualified workers minimum approach distances (MAD).

<table>
<thead>
<tr>
<th>Voltage in kilovolts</th>
<th>Minimum Clearance in feet</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤50 kV</td>
<td>10 feet</td>
</tr>
<tr>
<td>115 kV</td>
<td>15 feet</td>
</tr>
<tr>
<td>230 kV</td>
<td>20 feet</td>
</tr>
<tr>
<td>345 kV</td>
<td>20 feet</td>
</tr>
<tr>
<td>450 DC</td>
<td>25 feet</td>
</tr>
</tbody>
</table>
SECTION 2.21   HOT WORK PROCESS

For Additional Guidance Refer to Hot Work Program – Appendix H

1. Hot Work Permit Process

   a) When Hot Work (work that involves welding, cutting, or other flame-producing operation like open flame soldering) is performed inside a building or outside where the risk of fire is present due to dry conditions or proximity to flammable material, the employee (VELCO or Contractor) must notify their Supervisor that a Hot Work Permit is needed.

   b) The employee and Supervisor are responsible for completing the Hot Work Permit.

   c) The Hot Work Permit details the location of the Hot Work, the type of work to be performed, hazards associated with the work, and it is used to ensure that adequate preparations for Hot Work activities have been taken.

   d) The employee and the Supervisor must inspect the Hot Work Zone to evaluate whether the Hot Work activity can be safely conducted.

   e) Inspection of the Hot Work Zone shall cover all items listed on the permit and include any special procedures where applicable.
SECTION 2.22 HOUSEKEEPING

VELCO employees and contractors shall maintain clean, neat and sanitary conditions in all buildings, yards, work sites, vehicles and equipment. These locations shall be kept free of debris and unnecessary accumulation of waste and trash that has the potential to be hazardous to all personnel and the public.

- Store quick-burning, flammable materials in designated locations away from ignition sources.
- Properly dispose of oils, paint thinners, solvents, rags, scraps, waste, or other flammable and combustible substances, or store them in covered fire-resistant containers, at the end of each work shift or when the job is complete, whichever occurs first.
- Keep passageways and fire doors free of obstructions. Stairwell doors should be kept closed. Do not store items in stairwells.
- Keep materials at least 18 inches away from automatic sprinklers, fire extinguishers and sprinkler controls. The 18-inch distance is required, but 24 to 36 inches is recommended. Check applicable codes, including Life Safety Code, ANSI/NFPA 101-2009.
- Hazards in electrical areas should be reported, and work orders should be issued to fix them.
- Never leave nails or screws protruding from boards or scrap material where they may cause an injury.
- Eliminate slippery conditions, such as snow, ice, and grease, from walkways and working surfaces as necessary. Where removal is not possible, access to such areas must be restricted using barricading and an alternate route established, or slip-resistant footwear used.
- Store materials in a way that does not create hazards for workers.
- Ensure easy and open access to all exits (including ladders, staircases, scaffolds, and gangways), fire-alarm boxes, fire extinguishing equipment and fire call stations.
- Maintain walkways so that they provide adequate passage and are:
  - Free from debris, including solid and liquid waste;
  - Clear of tools, materials, equipment, and other objects; and
  - Free from trip hazards as a result of the improper storage or placement of hoses and electrical service cords. Hoses and cords must be placed above or underneath walkways or covered.
- Vehicles and equipment shall be kept in a safe condition by keeping cabs neat and orderly. Objects in the cab should be secured from shifting, rolling or falling while moving. Snow and ice must be cleared to ensure safe operation.
SECTION 2.23  JOB BRIEFINGS (TAILBOARD CONFERENCE)

For Tailboard Forms Refer to Appendix J or Interact > Safety > Forms

1. Job Briefing/Tailboard Conference and Form

a) Before starting each job, the Person in Charge (or designated worker) must conduct a job briefing at the worksite with all onsite employees and/or subcontractors involved. The briefing shall be documented on a Tailboard Form and shall include, at a minimum, a discussion of the following subjects:

1) Person in Charge identified
2) Emergency Procedures – Location Identified with VELCO Control Center
3) Hazards associated with the job accomplished by job planning; may require job hazard analysis development or refer to developed documents;
4) Hazards identified at the job site
5) Work procedures listed;
6) Tool, Rigging & Equipment inspections;
7) Special precautions;
8) Energy source controls; and
9) Personal Protective Equipment (PPE) required to mitigate hazards and risks

b) Each worker at the site shall initial the Tailboard Form upon completion of the Tailboard discussion to indicate that they have been briefed and acknowledge the work and safety practices for the day.

c) Tailboard Forms must be kept on site throughout the workday.

d) Tailboard Forms will be returned to the employee’s manager within a reasonable timeframe.

e) Tailboard Form shall be retained for 1 year.

2. Number of Job Briefings/Conferences

a) If the day’s work is repetitive and similar, at least one job briefing shall be conducted before the start of the day or shift.

b) Additional job briefings shall be conducted if changes at the job affect worker safety (additional hazards are encountered, major change in scope or location, significant environmental changes). Any additional briefings shall be noted on the Tailboard Form.

c) Conduct a job briefing refresher after lunch.

d) The Person in Charge (or designated worker) shall conduct a Tailboard with all new workers arriving at the site prior to their beginning work. All new workers to the site shall review and sign the Tailboard Form to acknowledge the work and safety practices.

e) Any worker can request an additional briefing(s) to clarify work practices at any time during the workday.
3. Extent of Briefings

A brief discussion is satisfactory if the work is routine and workers, by virtue of their training and experience, can reasonably be expected to recognize and avoid job hazards. A more extensive job briefing is required if the job is particularly hazardous, tasks are infrequently performed, or workers cannot be expected to recognize and avoid job hazards.

4. Working Alone

If work is regular in nature, the on-site job briefing does not apply. However, the employee shall assess the worksite for hazards, the nature of work to be performed and determine work procedures, energy source controls if applicable, and the level of PPE required to perform the work safely.

5. Contractor Job Briefings

Contractors are required to complete their own documented job brief. The job brief shall meet or exceed OSHA and VELCO requirements. In certain situations Contractors may receive a job briefing from a VELCO representative to transfer information such as; status of power lines and clearance orders, grounding requirements, environmental requirements and other info specific to VELCO requirements. In addition to receiving this briefing, the Contacto shall complete their own task specific job briefing.
SECTION 2.24  LADDERS

Due to the nature of our business: Portable metal ladders or portable conductive ladders shall not be used.

1. Care of Ladders

Ladders shall be kept in good condition at all times; the joints between the steps and side rails must be tight; all hardware and fittings must be securely attached; and the movable parts must operate freely without binding or undue play. Bearings shall be lubricated and frayed or worn ropes replaced. Ladders shall be inspected daily before use.

2. Use of Ladders

a) Ladders shall be:

1) used at such a pitch that the horizontal distance from the top support to the foot of the ladder is one-quarter of the working length of the ladder;
2) placed to prevent slipping; or
3) lashed or held in position.

b) Ladder use rules will not cover all situations encountered so safety common sense must be used.

1) Always face a ladder when ascending or descending.
2) Always climb or descend with 3 points of contact.
3) Do not climb or descend with equipment or tools in hand. They are to be handed up or down or raised and lowered with a hand line.
4) If your feet are higher than 4 feet off the ground and if the ladder is securely lashed, it would be prudent to use a work-positioning belt fastened to the ladder to be able to work hands free.
5) When working on the side of an energized transformer, the top of the ladder and the worker’s body shall at no time extend into the plane of the unit’s top. Minimum approach distances apply; see Table 1 of Electrical Safety, Working on or Near Exposed Energized Parts & Use of Electrical Protective Equipment & Tools.
6) Workers will not work on that side of an energized transformer that holds the tertiary bushings.

c) Ladders shall not be used:

1) in the horizontal position as platforms, runways, or scaffolds (exception: specialty ladders used in transmission line work);
2) by more than one person at a time;
3) in front of doors, unless the door is blocked, locked, or otherwise guarded;
4) as guys, braces, skids, or for other than their intended use;
5) placed on boxes or unstable bases to obtain additional height; or
6) if there are missing rungs, steps, or cleats, broken side rails, or other faulty equipment.
d) When used to gain access to a roof or platform, portable ladders must extend 3 feet above the point of support.
e) On two-section extension ladders, the minimum overlap for the two sections shall be the following:

1) Ladders up to and including 36' must have a minimum overlap of 3 feet.
2) Ladders over 36' up to and including 48' must have a minimum overlap of 4 feet.
3) Ladders over 48' up to and including 60' must have a minimum overlap of 5 feet.

f) Ladders must be rated to support the worker and all tools/equipment to be carried or used on the ladder.
SECTION 2.25 LOCKOUT / TAGOUT

Note: Refer to VELCO Operations for Switching & Tagging training and policy requirements

1. These procedures are established to:

   a) provide safety to personnel;
   b) decrease the chance of equipment damage; and
   c) record the event for future reference.

2. Standards

   a) Building & grounds facilities (VELCO Main Office, Wenlock Line Facility) shall follow 1910.147 (lockout/tagout).
   b) Overhead/Underground lines and substation machines, equipment, and controls that are used exclusively for the purposes of Transmission or Distribution of power shall follow 1910.269 (d), (m) and (n) (Switching & Tagging).
   c) Overhead/Underground lines and substation machines and equipment that are not an integral part of Transmission or Distribution shall follow 1910.269 (d) (lockout/tagout).
   d) Vehicles - When working on a vehicle, to avoid accidental starting and eliminate energy sources (e.g. hydraulic, gravity), follow 1910.147 (lockout/tagout). (See (6)(a)(2) Tagout in this section.)

3. Responsibility

   The responsibility for seeing that these procedures are followed, is binding upon all authorized employees. They shall be instructed in the significance of the Lockout/Tagout procedure by authority of the Safety Department.

   Each new or transferred employee in affected departments shall be instructed in the purpose and use of lockout/tagout procedure by the safety department or designate. Annual lockout/tagout refresher training will be conducted by the Safety Department or authorized designate to all VELCO Authorized employees.

   Contractors are responsible for coordinating their work with the VELCO Person in Charge. They shall be advised at the Contractor Safety Indoctrination on the lockout/tagout procedures, and all rules shall be followed.

4. Authorization and Definition

   **Affected employee**: Person working with authorized employees. Affected employees shall understand the purpose and use of energy control devices.

   **Authorized employee**: Person responsible for eliminating all energy sources to apparatus or equipment prior to performing, or causing other employees to perform work. Each authorized employee shall be trained in recognition of hazardous energy sources, the type and magnitude of energy available in the workplace, and the methods and means necessary for energy isolation and control.
Contracted employees: May be considered authorized or affected at the discretion of a qualified VELCO designated employee. The VELCO employee shall determine, through a job briefing, the qualifications and limitations of the contracted employees.

Other employees: Not otherwise defined employees whose work operations are in an area where energy control procedures may be used. They shall be instructed about the procedures and about prohibition relating to attempts to restart or reenergize machines or equipment that are locked out or tagged out.

Person in Charge: Designated at the job briefing before starting work and shall be responsible for ensuring all energy sources (electrical, hydraulic, pneumatic, mechanical, gravity, etc.) covered within the scope of this policy are rendered safe before work begins. She/he shall establish local control for all hazardous energy sources for that particular task and is responsible for coordinating activities related to isolating sources of energy.

5. Basic rules

a) In accordance with VOSHA regulation 1910.147, which describes VELCO’s role in regards to facility installations such as Pinnacle Ridge and Wenlock in regards to lockout/tagout and,

b) In accordance with VOSHA regulation 1910.269 (m), (d), (n) which defines VELCO’s role in installations exclusively for the purpose of electric transmission and distribution:

For a) and b) above, the following basic rules apply:

1) Only the VELCO issued colored locks with tags affixed to the lock with your name and a DO NOT ENERGIZE sticker will be used. A single key to your series of locks will remain on your person as long as the lock is in service.

2) These designated locks and tags will not be used for purposes other than the implementation of this program.

3) VELCO master locks may not be used for this procedure.

4) Whenever outside service personnel are to be engaged in activities covered by the lockout/tagout procedure, the company and the contractor must inform each other of their procedures. The contractor shall ensure his/her personnel understand and comply with restrictions and prohibitions of VELCO’s energy control procedures.

5) VELCO’s Switching and Tagging procedure shall be followed for isolation and control if the system is under the direct control of a System Operator.

6) In situations where lockout/tagout devices must be temporarily removed and the equipment energized to test or position the machine, the procedure for removing and applying locks and tags must be used to ensure the safety of everyone involved.

In substations, each Qualified Person will be responsible for their own safety. It will be the responsibility of the individual to carry out all steps of the lockout/tagout procedure and ensure that all authorized employees have placed locks and tags on equipment if they are performing work on the same circuit and or device. The person in charge process can be utilized, but requires a group lockout box in which each employee applies their own personal lock.
6. Energy Source Control Procedures

Procedures shall be developed, documented, and utilized for the control of hazardous energy. These procedures shall be documented and reviewed as a part of the Required Tailboard.

a) Authorized persons shall place the equipment out of service as follows:

1) Lockout
   
   i. Shut down or turn off equipment in an orderly manner.
   ii. Determine all sources of energy powering the equipment, such as, but not limited to, electricity, pneumatics, hydraulics or mechanical. The Developed Procedures shall be used to reference locations of various energy isolation means and associated devices required to stop or block energy sources.
   iii. Eliminate all sources of energy (e.g. breaker, valve, fuse, disconnect). The Developed Procedures shall be used to reference locations of various energy isolation means and associated devices required to stop or block energy sources.
   iv. A locking device, such as a multi-holed LOTO hasp will be inserted at the point of energy disconnection to not allow the device to be reenergized. Each person working on the circuit or device will place their padlock on the LOTO device to not allow removal of the LOTO device unless all locks have been removed. Each authorized person shall hold and safeguard the key for their personal lock placed on the point of energy source isolation. If the equipment to be locked out can only accept a single lock, then a key to this lock shall be placed in a lock box that itself is locked by the locks of all individuals working on the locked out device.
   v. Test to make certain that all sources of energy have been eliminated prior to beginning work on affected equipment. Relieve all stored energy where applicable (e.g. capacitors, pressure tanks).
   vi. Inform through a tailboard affected employees and all other employees working in the area of the equipment isolated and the points of isolation.

2) Tagout

If it is not possible to install a lockout device, in order to achieve a level of safety demonstrated in a lockout procedure, additional precautionary measures must be utilized for employee protection. Measures may include, but are not limited to, removal of an electric circuit element, blocking a control switch, opening an extra disconnecting device, pulling a fuse, or removal of a valve handle.

   i. Follow the procedures as written for lockout steps 1a, 1b, 1c, 1e, and 1f listed above.

   ii. Affix a supplied, standardized tag out device (red striped equipment
lockout tag), capable of withstanding the environment to which it is exposed. Attach it at the point of energy control, with a nylon cable tie or other means with an unlocking strength of no less than fifty (50) pounds.

3) Removal of Locks and Tags and Restoring Energy
   i. Replace all machine or equipment guards and remove tools from the area.
   ii. Notify affected employees that lockout/tagout devices are being removed.
   iii. Check the area for workers.
   iv. Remove locks and tags.
   v. Restore equipment/apparatus to normal status.

b) Damaged Defective or Unsafe Equipment and Apparatus

1) Equipment, tools, vehicles or other apparatus that are damaged, defective or deemed unsafe shall be tagged with a Red “DANGER DO NOT OPERATE” LO/TO tag for the protection of all employees.
2) Any authorized or affected employee may tag equipment or tools with a Red “DANGER DO NOT OPERATE” LO/TO tag. Such tags shall bear the name of the employee, the date tagged and reason for the tag. The employee shall notify his/her team lead/supervisor of the apparatus, tool, vehicle or other equipment tagged by the end of his/her shift.
3) The Red “DANGER DO NOT OPERATE” LO/TO tag must be capable of withstanding the environment to which it is exposed (e.g. weather proof) and shall be attached with a supplied cable tie.


a) In order to ensure continuity of lockout and/or tagout protection, any authorized employee leaving the premises shall inform the authorized Person in Charge prior to leaving the site. If work will continue on the equipment or apparatus with new employee(s), the following procedures shall be utilized:

1) Facilities: Incoming authorized worker(s) shall follow all procedures, ensure that all sources of energy are eliminated and place locks/tags on all points of energy source controls prior to removal of locks/tags by the outgoing worker(s). If the site is vacated, all locks/tags will remain until the authorized employee(s) return to complete the procedure. All affected employees in the area shall be informed of any change in status of tagging responsibilities.
2) VELCO Locations/Properties: The incoming authorized person shall follow all procedures, ensure that all sources of energy are eliminated and place his/her locks/tags on all points of energy source controls prior to removal of locks/tags by the outgoing person. If the site is vacated, all locks/tags will remain until the person returns to complete the procedure. All affected employees in the area shall be informed of any change in status of tagging responsibilities.
b) If the authorized employee who locked out the apparatus cannot remove his/her locks/tags due to emergency or any other situation, the following shall occur:

1) The supervisor of the authorized employee for whom the apparatus is locked/tagged shall be notified.
2) The supervisor or their designate shall attempt to reach the authorized person who originally locked out the apparatus.
3) If the person cannot be reached, then three (3) authorized employees may remove the locks/tags as outlined in this procedure.
4) An authorized employee and a supervisor may remove the locks/tags as outlined in this procedure, 7(a)(2), using bolt cutters.
5) After the locks/tags have been removed, the original “authorized person” shall be notified of the change.

8. Training

Lockout/tagout training is an annual requirement and is the responsibility of the Safety Department.

SECTION 2.26 OFFICE – GENERAL SAFETY

For additional Guidance Refer to Office Safety Program – Appendix O

Purpose
The purpose of this program is to provide guidance to office staff on the elements of safe office work. The office is like any other work environment in that it may present potential health and safety hazards. Most of these, however, may be minimized or eliminated by maintaining situational awareness, designing jobs and workplaces properly, and by taking into account differences among tasks and individuals. Notify your Supervisor and the Safety Manager of any workplace safety concerns.
SECTION 2.27 PERSONAL PROTECTIVE EQUIPMENT (PPE)

For Additional Guidance Refer to PPE Program – Appendix P

VELCO provides all Employees with required PPE to suit the task and known hazards. It is the Employee’s responsibility to properly maintain, inspect and use the appropriate PPE for the task.

1. Flame Resistant Apparel

Fire Retardant Clothing is required by VELCO when performing work on or near energized equipment and where one could become exposed to an electrical arc or flame. FR clothes must be worn which exceed calculated arc flash energy. VELCO’s Engineering Department maintains Tables identifying the Arc Flash Hazard Category for VELCO’s substation & transmission line assets. Other electrical equipment (i.e. AC Panels & Breakers) have labels identifying the Arc Flash Boundary including the PPE & FR requirements.

All employees in this situation must wear VELCO approved/issued flame resistant clothing as the upper and lower outer layer.

Proper use of FR clothing includes sleeves rolled down and buttoned, and shirts buttoned and tucked in.

Natural fiber undergarments are required when FR clothing is required.

Visitors and contractors shall meet the requirements of this section when near work activities involving energized equipment.

All visitors requiring infrequent or temporary access to VELCO substations and not performing work in the proximity of electrical apparatus (e.g. Vermont state regulatory staff, vendors delivering or picking up materials), are required to be Tailboarded and escorted by VELCO staff that are knowledgeable of electrical hazards and applicable safety rules.

2. Head Protection

Workers will wear an approved hard hat (Class E, Type 1 or 2) for head protection when there is an overhead or moving hazard, when in substations, when maintaining lines or equipment. Worker will wear a DOT helmet when riding on snowmobiles, UTVs and ATVs.

Hard hats and helmets must be visually inspected before each use for any damage or defects. Hard hats and helmets must be replaced after 5 years of being put into service.
3. Eye Protection

The majority of occupational eye injuries can be prevented by the use of suitable/approved safety spectacles, goggles, or shields. Approved eye and face protection shall be worn when there is a reasonable possibility of personal injury.

a) Goggles and Safety Glasses

Goggles or safety glasses with side panels are personal protective devices that provide eye protection. Eye protection is required when performing any hands-on work where one could be exposed to flying particles or other unsecured objects such as wire or conductor ends. Exposure to chemicals requires face shield protection as well. Being in proximity of others performing hands-on work also requires the use of eye protection.

- Each employee shall use appropriate eye or face protection when exposed to eye or face hazards from flying particles, molten metal, liquid chemicals, acids or caustic liquids, chemical gases or vapors, or potentially injurious light radiation.
- Each employee shall use eye protection that provides side protection when there is a hazard from flying objects. Detachable side protectors are acceptable.
- Each employee who wears prescription lenses while engaged in operations that involve eye hazards shall wear eye protection that incorporates the prescription in its design, or shall wear eye protection that can be worn over the prescription lenses without disturbing the proper position of the prescription lenses or the protective lenses.
- Eye and face PPE shall be distinctly marked to facilitate identification of the manufacturer.
- Each employee shall use equipment with filter lenses that have a shade number appropriate for the work being performed for protection from injurious light radiation.

b) Eye Wash Facilities

Workers must be familiar with the location of eyewash facilities and how to operate them. Workers should locate eyewash stations upon entering substations, especially when performing battery inspections or maintenance. Eyewash units must be located within 10 seconds of the hazard and on the same level. The paths of travel to the unit must be unobstructed.

c) Equipment Guards

Equipment guards found on tools or equipment must be in place, adjusted, and used in conjunction with eye protection. Shops with welding booths must have and workers must position portable screens to protect other workers when welding is performed.
4. Face Protection

Face shields provide face protection but they do not provide eye protection except in the case of welding face shields. If face shields are worn and eye protection is also required for a job, they must be used in conjunction with goggles or safety glasses and not as an alternative to them. Face protection is required when:

a) exposed to chemicals
b) installing, removing, or servicing batteries other than automotive batteries;
c) welding;
d) sandblasting; and
e) when performing primary switching or applying removing worker grounds there is the possibility of electric flash.

5. Hand Protection

Hand protection is required when employees’ hands are exposed to hazards such as those from skin absorption of harmful substances; severe cuts or lacerations; severe abrasions; punctures; chemical burns; thermal burns; and harmful temperature extremes.

a) Appropriate general duty work gloves will be worn when a worker’s hands are exposed to pinching, gashing, or crushing resulting from material or tool handling; and when driving ATVs.
b) Cut resistant gloves shall be worn when there performing work with particularly sharp edges or objects.
c) Chemical protective gloves will be worn when a worker’s hands are exposed to caustic cleaners or battery electrolyte.

6. Ear Protection

Ear protection is required when operating chain saws or cut off saws, grinding, hammering or breaking pavement, and working in generating/synchronous condenser stations. Other situations may warrant ear protection based on noise levels and duration of exposure. Generally if you have to shout to hear over continuous noise, hearing protection should be used.

7. Foot Protection

Each affected employee shall wear protective footwear when working in areas where there is a danger of foot injuries due to falling or rolling objects, or objects piercing the sole, and where employee’s feet are exposed to electrical hazards.

Footwear worn by employees in the performance of their duties shall be suitable for the work they have to perform and the conditions under which they have to perform such work. Safety footwear will be worn in those job positions designated by the Manager of Safety.

All employees in Substation and Transmission Field Services, Transmission Engineering & Construction, System Protection Engineering & Construction, HVDC/FACTS, System Protection Field Services, Telecommunications and the
Warehouse (including supervisory personnel) are required to wear safety-toed footwear that complies with ANSI Z41.1 – 1999. In addition, substation and line crew personnel shall wear boots with a minimum 1” heel for climbing poles and structures. This safety footwear will be worn when on any job site.

Electrical hazard, safety-toe shoes are nonconductive and will prevent the wearers’ feet from completing an electrical circuit to the ground. These shoes can protect against open circuits of up to 600 volts in dry conditions and should be used in conjunction with other insulating equipment and additional precautions to reduce the risk of a worker becoming a path for hazardous electrical energy.

8. Jewelry

Conductive articles of jewelry and clothing (such as watch bands, bracelets, rings, key chains, necklaces, metal material aprons, cloth with conductive thread or metal headgear) may not be worn if they may contact exposed electrical parts. However, such articles may be worn if rendered non-conductive by covering or insulating.

9. Chaps

Proper use of chainsaw chaps is required when operating a chainsaw unless the chainsaw is being operated in an aerial bucket and the saw is kept outside the bucket.

10. Switching PPE

a) Although remote, the possibility of electric failure with arcing exists when equipment is energized in a substation. This can usually be minimized by testing (e.g. Doble, TTR) and by energizing the equipment remotely. However, in some locations, it is necessary for the person energizing the equipment to stand directly in front of the equipment where he/she faces exposure to electric arcing from the equipment itself or the single blade hook stick disconnect switch or fuse used to energize it.

b) When energizing equipment in this situation, the switch person must wear a polycarbonate face shield and fire resistant switching coat. These will be provided in the control building. This specialized PPE must also be worn at any other time that the risk of arcing exists, such as working on energized metering equipment.

c) The switching coats must be worn fully closed over the normal FR garments of the employee with the cuffs being inside the gauntlet portion of the rubber gloves. The collar must be turned up and fastened
SECTION 2.28  PRE-WORK SUMMARY DOCUMENTATION PROCESS
AND PRELIMINARY HAZARD ANALYSIS

1. Purpose

Ensure that pre-planning of work is completed so work is performed in an efficient and safe manner, while conforming to VELCO maintenance and operational procedures.

Specifically, through proper planning, the Work Crew can ensure that:

a) work is adequately staffed;
b) adequate VELCO oversight of Work Crew is defined and scheduled, as necessary;
c) necessary regulatory permitting or authorization has been acquired, or an appropriate timeline has been developed and incorporated into the Project schedule;
d) the required equipment, materials and supplies are available to execute the Work;
e) a Job Hazard Analysis is completed so that hazards can be identified and precautions can be taken in advance to eliminate or mitigate hazards;
f) appropriate coordination is accomplished between applicable VELCO departments;
g) advanced notice is provided to VELCO Operations for the coordination of required system outages and associated switching and tagging, for both internal and external utility coordination; and
h) all other issues or concerns are identified and appropriate measures are taken to resolve or address them.

2. Terms and Definitions

VELCO Project Manager: The person accountable for all aspects of the Work. In addition, the Project Manager is responsible for the completion, revisions, and/or updates of the Pre-Work Summary documentation process.

Person in Charge (PIC): The onsite person coordinating the performance of the identified Work in the Pre-Work Summary. This individual reports directly to the Project Manager with regard to project activities. If there is no VELCO Project Manager for the Work, the PIC will assume those responsibilities.

Qualified Person or Subject Matter Expert (SME): Any individual possessing suitable knowledge and the proven experience within a given discipline (e.g., electrical, construction, environmental). The SME may participate in project discussions, assist in planning and support the Project Manager in the completion of the Work Summary and/or other project documentation/reporting. To the extent possible, the SME should remain the same person through the course of a project.

Pre-Work Summary: A documentation process that is completed during the project planning phase, and its appropriate completion will ensure the Job Scope, Schedule, Job Hazard Analysis and any necessary mitigating aspects are identified and thoroughly vetted in advance of the work.
Pre-Work Summary Meeting: Meeting held with project stakeholders to review and provide comment on the proposed activity. The completion and distribution of the Pre-Work Summary documentation should precede this meeting by at least a week to allow for necessary review time. A complete packet should be distributed to all VELCO Affected Departments. As part of the completion of the Pre-Work Summary documentation process the Project Manager / PIC will identify VELCO Affected Departments which he/she believes must attend the Pre-Work Summary Meeting. However, any of the VELCO Affected Departments may attend.

Work Crew: Any person or group (e.g., VELCO crew, contractor, subcontractor, consultants) conducting Work. This includes but is not limited to 1) contractors and consultants; 2) subcontractors; and 3) VELCO Departments and employees (e.g., Telecommunications, Right-of-Way, Vegetation Management). While performing work, the Work Crew will report directly to the designated PIC.

Work: Includes all phases of Capital Project and certain aspect of Maintenance activities which rely on outside parties. These activities will include but are not limited to pre-construction reconnaissance, field survey, exploratory borings and testing, tree clearing, line construction, substation construction, road building, site restoration, and other field activities that are required to support VELCO activities. Work does not include activities performed by the Asset Maintenance Department.

3. Roles & Responsibilities

a) Project Manager or Person in Charge

1) Accountable for all aspects of the Work and responsible for the execution of this procedure.
2) Ensures that the Work Crew has received safety and environmental training.
3) Schedules and coordinates Pre-Work Scoping Meeting.
4) Consults periodically with the Person in Charge (PIC), Safety Manager, and Procurement to monitor Capital Projects / Maintenance activities to ensure that this procedure is being executed for Work. Additionally, the Project Manager must monitor Work activities to ensure that new Work is being captured and reviewed in accordance with the procedure (e.g., boring work at a new location).

b) Person in Charge (PIC)

1) Responsible for the Work being performed onsite.
2) If no Project Manager is assigned, then the Person in Charge (PIC) will assume the responsibility to complete Pre-Work Summary documentation and maintain it throughout the course of Work.
3) Ensures that Work Crew is informed of requirements to complete environmental and safety training.
4) Updates the Pre-Work Summary document when significant changes in work scope are identified and updates the Project Manager if applicable.
c) Procurement

1) Responsible for contract administration, from the RFP stage through contract award.
2) Ensures that Work Crew is informed of requirements to complete environmental and safety training.
3) Notifies the Project Manager / PIC of changes in Work Scope, Change Orders, or other contract changes that may prompt the need for an additional Pre-Scoping Meeting(s).

d) VELCO Qualified Person or Subject Mater Experts (SME)

1) Assist Project Manager / PIC with the completion of the Pre-Work Summary Documentation process. Consult and provide information as necessary to allow for work to proceed safely and efficiently.
2) May be involved with the day-to-day management / consultation of onsite work crew(s) throughout the course of Work.

e) Work Crew

1) Responsible for executing the Work consistent with design plans, specifications, permits, best management practices, and other requirements as may be required by VELCO from time to time.
2) Ensure that Work is executed in a safe and efficient manner.
3) Ensure that the proper tools and equipment are available to complete the Work, and that personnel are trained in the safe use of said.
4) Assess Work to determine methods and means.
5) Ensure that all individuals of Work Crew have received environmental and safety training and are qualified to perform the Work.

4. Procedure

a) The Pre-Work Scoping process will be for:

1) single Contractor work crews who will not be supervised by a VELCO employee; or
2) when two or more work crews are performing work on the same job or location. (e.g. Highgate Converter Outage).

b) Contract Award

Upon contract award, Procurement will ensure that both Project Manager and the PIC are notified of the award. This also applies to change orders and/or contract amendments that may result in additional or new Work.

c) Initial Job Review

Before Work commences, the Project Manager / PIC will review the Work with the SMEs, complete the Pre-Work Summary Documentation and distribute to the appropriate VELCO departments for review and comment.
A Pre-Work Summary Meeting will then be scheduled for final signoff of Work.

d) The Pre-Work Scoping Meeting

The Pre-Work Scoping Meeting is the opportunity for comments and concerns to be expressed and updates to the Pre-Work Summary made. The Project Manager or PIC shall use judgment in determining required attendance and/or participation in the meeting. However, all VELCO Affected Departments will receive the completed Pre-Work Summary form and have an opportunity to attend the meeting. At a minimum, the Project Manager / PIC and SMEs must participate to ensure that the Work is fully evaluated from all perspectives.

The Project Manager / PIC will schedule the meeting far enough in advance to ensure that VELCO Departments receive proper notification and ample time to make necessary plans and arrangements to allow the Work to proceed. Examples include:

1) operations to schedule outages, conduct switching/tagging, or make other operational arrangements or notifications, as specified in VELCO Operating Procedure OP-3;
2) ROW to confirm landowner access arrangements and provide courtesy notifications; and
3) environmental authorizations/assessments to ensure protected resources are identified with measures planned to protect or avoid, as required.

e) Field Meeting Not Required

There are instances when the Project Manager / PIC may elect not to hold the Pre-Work Scoping Meeting in the field, given the nature and/or location of the Work. Examples include:

1) landscaping outside utility ROWs;
2) installation of fencing; and
3) ROW restoration (e.g., seeding and mulching).

In these cases, the Project Manager / PIC are still required to complete the Pre-Work Scoping Checklist, and VELCO sign-off is required by necessary VELCO Departments (which will be specifically identified in the form).

f) Documentation

Upon completion of the Pre-Work Summary Meeting, the Project Manager / PIC shall distribute notice of completion, including a file path of its location to all VELCO departments.

The Summary Documentation must be completed in its entirety and signed by the Project Manager, and necessary VELCO departments identified therein, to be deemed complete.
SECTION 2.29  RESPIRATORY PROTECTION

For additional Guidance Refer to Respirator Protection Program – Appendix M

In the Respiratory Protection program, hazard assessment and selection of proper respiratory PPE is conducted in the same manner as for other types of PPE. In the control of those occupational diseases caused by breathing air contaminated with harmful dusts, fogs, fumes, mists, gases, smokes, sprays, or vapors, the primary objective shall be to prevent atmospheric contamination. This shall be accomplished as far as feasible by accepted engineering control measures (for example, enclosure or confinement of the operation, general and local ventilation, and substitution of less toxic materials). When effective engineering controls are not feasible, or while they are being instituted, appropriate respirators shall be used.

1. Requirements for employees using respirators

   a) Before being declared qualified to use a respirator, a worker must be medically evaluated by a physician, clean-shaven and trained in the specific type of respirator used.
   b) After being medically cleared for respirator use, a worker’s medical status will be reviewed annually. The annual review will be done by using a medical status statement and every other year by a physician’s reevaluation.
   c) Only employees who have been properly trained and have been determined physically able to perform the work and wear the respirator shall be assigned a task that requires use of a respirator.
   d) When respirators are provided for a particular work activity, they shall be used.
SECTION 2.30  RIGGING & HOISTING

1) Employees shall only use rigging equipment within the rated capacity as recommended by the manufacturer and/or Federal Regulations.

2) Employees shall inspect rigging prior to and after each use for defects. Defective rigging will be tagged and removed from service. When not in use, rigging equipment will be stored in a clean place away from the immediate work site.

3) Employees shall only use synthetic web slings that are marked or coded to show:
   - name or trademark of manufacturer
   - rated capacities for the type of hitch
   - type of material.

4) Employees shall not allow synthetic slings to be used in contact with fresh paint, oil, acid, sharp objects or excessive heat, unless specifically designed or protected for this purpose.

5) Employees shall not use line hardware for rigging.

6) Latches will be in place on all hooks, eliminating the hook throat opening. When encountering a hook with a throat latch that does not close, employees shall remove the hook from service.

7) Before each job when lifting with a crane, the person in charge of the job shall include in the Tailboard Conference the regulations and job requirements of using cranes.

8) Employees shall ensure monorails, trolley beams, hoists, and all associated rigging shall be marked with the rated load capacity.

9) NOTE: Ropes approved for rigging applications will contain a physical marking listing the safe working load rating on the rope. This information must be legible and available for review.

10) Employees shall verify the rated capacity of the attachment beam, hoist, and all rigging equipment is not exceeded by the intended load.

11) Employees will use a tag line at all times while guiding a suspended load. All employees will guard that no employee or passerby ever crosses under a suspended load.
SECTION 2.31  SILICA

For additional Guidance Refer to Respirable Crystalline Silica Program - Appendix N

This Respirable Crystalline Silica Program applies to all employees who have the potential to be exposed to Respirable Crystalline Silica when covered by the OSHA Standard.(29 CFR 1926.1153)

PURPOSE

This Respirable Crystalline Silica Program was developed to prevent employee exposure to hazardous levels of Respirable Crystalline Silica that could result through construction activities or nearby construction activities occurring on worksites. Respirable Crystalline Silica exposure at hazardous levels can lead to lung cancer, silicosis, chronic obstructive pulmonary disease, and kidney disease. It is intended to meet the requirements of the Respirable Crystalline Silica Construction Standard (29 CFR 1926.1153) established by the Occupational Safety and Health Administration (OSHA).

All work involving chipping, cutting, drilling, grinding, or similar activities on materials containing Crystalline Silica can lead to the release of respirable-sized particles of Crystalline Silica (i.e. Respirable Crystalline Silica). Crystalline Silica is a basic component of soil, sand, granite and many other minerals. Quartz is the most common form of Crystalline Silica. Many materials found on constructions sites include Crystalline Silica; including but not limited to – cement, concrete, asphalt, pre-formed structures (inlets, pipe, etc.) and others. Consequently, this program has been developed to address and control these potential exposures to prevent our employees from experiencing the effects of occupational illnesses related to Respirable Crystalline Silica exposure.
SECTION 2.32 SLIPS, TRIPS, AND FALLS

1. Proper Shoes

Workers must account for changing work conditions and surfaces and select footwear appropriately. Office workers must adjust their style of footwear during winter when crossing parking lots to office buildings. Outdoor workers must account for icy conditions on customer-owned or public walks and drives that may not be maintained with salt and sand. Additional precautions, such as wearing ice creepers, need to be considered if ice conditions are widespread and extremely hazardous.

2. Stairs

Workers shall use handrails, not carry loads that they cannot see over, walk deliberately, and not store materials on steps.

3. Chairs

Workers may not use chairs or boxes as a substitute for step stools or ladders.

4. Housekeeping

Most tripping hazards are eliminated through housekeeping practices that account for proper storage of materials. Control houses, substation yards, shops and offices with poor housekeeping practices create tripping hazards when materials are stored in aisles and hallways.

5. Employee Responsibility

Report any high-risk situations/locations to the Facilities Department. It is every employee’s responsibility not to ignore a potential hazardous situation.
SECTION 2.33 TOOL SAFETY

For additional information concerning portable electric tools, refer to OSHA standards 29 CFR 1910, Subpart P and 29 CFR 1910.269.

1. Tools
   a) All tools, regardless of ownership, shall be maintained in good condition. (Tools are subject to inspection at any time. A supervisor has the authority and responsibility to condemn unserviceable tools, regardless of ownership.)
   b) Defective tools shall be tagged to prevent their use, or they shall be removed from the jobsite.
   c) Employees shall always use the proper tool for the job performed. Makeshift and substitute tools shall only be used with proper authorization and under supervision.
   d) Tools shall be used only for the purposes for which they have been approved by the manufacturer's recommendations.
   e) All powered tools shall be examined before use to ensure general serviceability and the presence of all applicable safety devices. The electric cord and electric components shall be given an especially thorough examination.
   f) Tools connected to a central power supply, including portable and vehicle-mounted generators not isolated and not double-insulated shall be protected by a Ground Fault Interrupter (GFI) or by an "assured grounding system."

2. Cord and Plug Connected Power Tools
   For grounding purposes, cord and plug connected tools shall be:
   a) equipped with a cord containing an equipment ground connected to the tool frame and a means of grounding; or
   b) double insulated.

3. Portable and Vehicle-Mounted Generators
   Portable and vehicle-mounted generators used to supply cord and plug connected tools shall meet the following requirements:
   a) The generator may only supply equipment on the vehicle or cord and plug connected tools through receptacles mounted on the generator or vehicle.
   b) Non-current carrying metal parts of tools, and the equipment grounding conductor terminals of the receptacles, shall be bonded to the generator frame.
   c) In the case of a vehicle-mounted generator, the generator shall be bonded to the vehicle frame, and neutral conductors shall be bonded to the generator frame.

4. Hydraulic and Pneumatic Tools
   a) Safe operating pressures for hydraulic and pneumatic tools, hoses, valves, pipes, filters, and fittings may not be exceeded.
   b) Hydraulic and pneumatic tools used where they may contact exposed live parts shall be designed and maintained for such use.
   c) Pneumatic tools used where they may contact exposed live parts shall provide protection against the accumulation of moisture in the air supply.
   d) Workers may not use any part of their body to locate or attempt to stop a hydraulic leak.
SECTION 2.34 TRAFFIC CONTROL

Refer to DOT Standards for Work Zone Traffic Control, Part VI: Manual on Uniform Traffic Control Devices (MUTCD) & VELCO’s Traffic Control Program – Appendix K

1. General

Work area protection is the adequate safeguarding or protection of pedestrians, motorists, and equipment by the use of adequate barriers, warning signs, lights, flags, traffic cones, flagmen, etc. on approach to work areas, excavations, open manholes, parked equipment, etc.

Work area protection shall be used any time the traveled portion of the road is obstructed.

2. Training Requirements

Employees who will be performing traffic control operations or oversight shall have Flagger training and shall have all necessary PPE signage and equipment to perform their task safely and in compliance.
SECTION 2.35 TRENCHES AND EXCAVATIONS

For Additional Guidance Reference OSHA 29 CFR 1926 Subpart P

1. General Requirements

a) A competent person shall be designated for all trenching and excavation activities.

b) Before digging, excavating or trenching, **Dig-Safe** shall be notified and an active Dig-safe ticket shall be maintained through the duration of the digging activity.

c) The estimated location of underground installations, such as sewer, telephone, fuel, water lines, electric, or any other underground installations that reasonably may be expected to be encountered during excavation work shall be determined prior to opening an excavation.

d) When excavating operations approach the estimated location of underground installations, the exact location of the installation shall be determined by safe and acceptable means.

e) When an excavation is open, underground installations shall be protected, supported or removed as necessary to safeguard workers.

f) A ladder, ramp, stairway or other safe means of egress shall be provided for workers if the excavation is 4 feet or deeper. They shall be positioned so as to require no more than 25 feet of lateral travel to exit an excavation.

g) Persons shall not work in excavations that are accumulating water unless adequate precautions have been taken to protect the workers. Such precautions will vary but may include pumps or shields to protect against cave-ins, water removal to control the level accumulating, or use of safety harnesses and lifelines.

h) Excavated material shall not be placed closer than 2 feet from the edge of an excavation.

i) Before entering an excavation, the site shall be inspected daily by the competent person for evidence of a situation that could result in possible cave-ins, failure of protective systems, or other hazardous conditions.

2. Requirements for Protective Systems

a) Persons working in excavations shall be protected from cave-in by adequate protective system except when:

   1) excavations are less than 5 feet deep and examination of the ground provides no indication of potential cave-in; or
   2) excavations are made entirely of stable rock.

b) To protect workers from cave-in for excavations deeper than 5 feet, the sides of the excavation will be sloped to 30 degrees or less, or a predesigned and fabricated support system (trench box) will be used.
SECTION 2.36 VEHICLE SAFETY

1. General Operation
Company vehicles, which includes ATVs, trailers, trucks, cars and heavy equipment, shall be operated in accordance with all applicable laws in the state or municipality of operation. Handheld operation of cell phones is not allowed. Seat belts shall be utilized in all company vehicles, if equipped.

Avoid operation during inclement weather and do not operate in situations that are unsafe and exceed your training level of training. Do not operate vehicles in a manner that exceeds their designed use.

Smoking is not allowed in company vehicles. Workers shall not pick up hitchhikers.

2. Inspections and Reporting
Operators shall perform routine vehicle safety inspections and address any maintenance needs, including manufacturer recalls. Pool vehicles shall be maintained by asset maintenance. Do not operate a vehicle that is unsafe to use.

Operators shall inspect safety equipment for usability and ensure at a minimum, the following equipment is available for use: first aid kit, roadside triangles and a fire extinguisher. Other equipment shall be provided, as applicable to the use of the vehicle.


Drivers shall also complete a pre-operation vehicle inspection and report for vehicles 10,000 pounds gross weight and greater used for interstate (out-of-state) travel. In addition, drivers shall complete a pre-operation vehicle inspection and report for vehicles 26,000 pounds and greater used for intrastate (in-state) travel.

4. Licenses
Workers must have the correct type of license for the vehicle(s) they are assigned to operate. For special vehicles that may not require a specific license, workers must be trained in the vehicle’s unusual operating and handling characteristics and limitations.

5. Vehicle Lockout/Tagout

When a vehicle has a condition making it unfit for use, it shall be tagged out of service. A white “Do Not Operate” tag shall be filled out and affixed to the steering wheel of the vehicle using a wire tie. (White tags and wire ties are located near the pool car keys.) The unit shall not be used until the condition is resolved.

If the vehicle is an assigned vehicle, the tagout procedure is not necessary, and the Individual to whom the vehicle is assigned shall schedule any necessary repairs.
6. **Warning Devices and Vehicle Load Securing**

Loads shall be secured using properly rated fastening equipment affixed to proper tie down locations. Proper securing techniques and equipment (e.g. properly rated ratchet straps, binders and chains) shall be used. Inspect all fastening equipment prior to use and dispose of and replace any defective items. Secure equipment as well as ATU/UTVs in accordance with manufactures recommendations, which at a minimum shall include four points of anchoring. The winch shall not be used as the only means of securement device (it can be used to help prevent back and forth movement); additionally rated straps shall be used to secure the equipment.

Load extending more than 4 feet beyond the rear of a vehicle shall be marked with an 18” x 18” red warning flag visible from the side and rear of the load. At night and during periods of poor visibility, red lights shall be used.

When a vehicle hauling long poles must enter congested areas or heavy traffic, escort vehicles displaying suitable warning signs shall be used.

7. **Parking Brakes and Wheel Chocks**

Parking brakes shall be used on all vehicles for which they are equipped. Vehicles over 1 ton that are standing or parked must have their wheels chocked.

8. **Backing**

When possible, and safe to do so, drivers shall either pull through or back into parking spots upon arriving, to avoid blind backing when leaving. To avoid backing accidents drivers shall:

a) Have a spotter stationed at the back of the vehicle, using hand signals to guide him or her when backing; or
b) If a guide is not available, walk around the vehicle and inspect the area he or she is planning to back into before backing; and
c) Back slowly, watch both sides, and not depend entirely on mirrors, sensors or cameras.
d) Utilize backup alarms, if equipped.

9. **Trailering**

a) Trailers shall be maintained in good working order.
b) Trailers shall not be loaded beyond their indicated rating.
c) Loads should be properly secured.
d) Caution shall be exercised when lowering trailer ramps and proper lifting techniques shall be used.
e) Be careful of slips, trips and falls when walking on or near a trailer. Affix traction tape, or equivalent to steps.
f) Use proper backing techniques (see backing).
10. Towing Poles

Poles and trucks towing them shall be marked as follows:

a) The ends of poles shall be marked with two 18"x18" red flags and an “OVERSIZED LOAD” sign.
b) Each rear corner of the truck shall be marked with an 18"x18" red flag.
c) An “OVERSIZED LOAD” sign shall be affixed to the front of the truck.
d) An approved portable light set (including stop, directional, etc.) may be used in place of the flags.

11. Fueling

Fueling of company vehicle and equipment shall be performed in the following manner.

a) Engines shall be stopped and operators shall monitor all fueling operations.
b) Utilize fuel as recommended by the vehicle manufacturer.
c) Smoking is prohibited.
d) Liquid fuels not handled by pump shall be handled and transported only in portable containers or equivalent means designed for that purpose. Portable containers shall be metal, have tight closures with screw or spring covers and shall be equipped with spouts or other means to allow pouring without spilling. Leaking containers shall not be used and should be removed from service.

12. Commercial - Vehicle Moving Citation

A driver of a placarded vehicle or a gross weight vehicle or gross weight vehicle combination of 10,000 pounds or greater that has been issued a moving vehicle citation in connection with an accident must submit to a post-accident drug test within 32 hours and an alcohol test within 2 hours after an accident.

13. Vehicle Accidents - Immediate Actions

Report all serious company related vehicle crashes to the VELCO Operators (802) 770-6260 or 911.

For all vehicle accidents, workers shall follow these immediate actions (consistent with the Vehicle Accident Kit instructions in your vehicle’s glove box):

k) Pull over to a safe location.
l) Determine if there are any injuries, and notify emergency services (ambulance and police) for help.
m) Assist others if it is safe to do so.
n) Take pictures of the accident scene.
o) Exchange information with the other driver(s) and any witness(es) using the Liberty Mutual Vehicle Accident Kit that should be in the vehicle’s glove box.
p) If the owner of the damaged property is not available, leave your name and company phone number.
q) Report the accident to the Person in Charge (if applicable), your immediate supervisor, and the Safety Manager as soon as possible.
r) Do not accept blame or discuss the accident with anyone other than the police officer, your supervisor, or other VELCO representatives.
s) Document the incident through the VELCO insurance portal.
t) Return the Vehicle Accident Kit forms to your supervisor as soon as practical in accordance with the VELCO Incident Reporting Process.

Operators of vehicles involved in a crash may have to file a state accident report (Vermont Uniform Crash Report) depending on the amount of property damage involved. The amount of property damage that triggers a state accident report changes often; operators involved in accidents must check with the state for the latest figures. If applicable, the report must be filed within 72 hours.

The VELCO Incident Reporting process will be used for incident investigation, tracking and trending, and follow-up action items for continuous learning and improvement.

14. Locking Unattended Vehicles

Any vehicle, which is unattended or outside of visible line of sight, shall be locked and secure.

15. Cell Phone Policy

This policy applies to use of company cell phones while driving a vehicle at any time and to use of personal cell phones while driving a company car or driving any vehicle on company business:

1. Cellular telephones may not be used in any way that interferes with the safe operation of a motor vehicle.
2. Drivers are allowed to use push-to-talk mobile communications equipment provided the driver is able to touch the button needed to operate the push-to-talk feature from a normal seated position with the safety belt fastened. For example, if a mobile phone is mounted in a cradle to allow a driver to communicate without reaching for, dialing, or holding the actual mobile telephone in his hands while driving, the equipment may be used.
3. Dialing a mobile phone while driving is prohibited. A driver can initiate, answer, or terminate a call by touching a single button on a mobile telephone, earpiece, steering wheel, or instrument panel.
4. Hands free use of a mobile phone is allowed using either a wired or wireless earpiece or the speakerphone function of the mobile phone.
5. Texting and internet use is prohibited while driving (includes e-mail).
6. Applies to all VELCO vehicles and personal vehicles used for company business regardless of phone ownership.

If conditions are not safe for hands-free use of your phone, wait to initiate or answer calls until the vehicle is stopped in a safe location. If your vehicle is equipped with a VELCO radio, consider using it in place of a cell phone.

Drivers shall avoid distractions, such as eating, writing, and reading while driving.
SECTION 2.37 WORK AREA CONTROL MEASURES

Barricading or Spotter controls shall be implemented to protect workers and members of the public from hazards and issues such as, but not limited to:

a) Unauthorized access to a work area;
b) Flying particles and materials;
c) Fall zone (falling objects);
d) Environmental incident (e.g. oil or chemical spill);
e) Contact with moving machinery, equipment, or vehicles;
f) Restricted access work areas (tight locations);
g) Risk of contact with structures, wires, or hardware; and
h) Demolition activities.

1. Temporary Barricades

The extent of a temporary barricade depends on the nature of the identified hazards and activity in the area. A temporary barricade may include:

a) a physical restraint or barrier, such as tape or rope – tape may be red indicating “danger” or yellow indicating “warning,” or specialty tape such as for buried electric line hazards as appropriate;
b) warning signs;
c) flashing lights; and
d) spotters.

2. General Barricade Guidelines

a) When working in the vicinity of vehicular or pedestrian traffic that may endanger workers, warning signs or flags and other traffic control devices shall be placed in conspicuous locations to alert and channel approaching traffic. See VELCO General Safety Practices Traffic Control.
b) Where additional worker protection is necessary, barricades shall be used. See General Safety Work Area Protection Measures.
c) Excavated areas shall be protected with barricades.
d) The barricade should be appropriate for the hazard.
e) The placement of the barricade should not create a new hazard.
f) Barricades and barrier tape should be positioned far enough from the hazard to allow for warning and protection.
g) Barrier tape should remain in place and in good condition until the hazard no longer exists.
h) At night, warning lights shall be prominently displayed.
i) Barricades in low light areas or for night use need to be lit to ensure that they are visible.
j) Barrier tape should be securely mounted and clearly visible.
k) The barrier should be appropriate for the situation. (I.e., you should not use a permanent concrete barricade for a temporary pedestrian hazard.)
l) Barricades must be accurate, visible and easy to understand. Only authorized personnel may be present inside of barricaded areas.
3. Barricade Types

a) Barrier Cones
Barrier cones should be used when channeling of pedestrian or vehicular traffic is temporary, to provide a temporary warning of work in progress, and to alert vehicular or pedestrian traffic that a hazardous situation is ahead.

b) Barrier Tape
Barrier tape used in a substation shall be non-conductive and secured to prevent contact with energized equipment.

Red Danger Tape restricts access to high hazard work areas. Only the work party and personnel authorized by the person in charge of the barricaded area as indicated on the tailboard are permitted access through the barricade.

Yellow Caution Tape shall be used to highlight minor hazards to other personnel that may need to access the area. Any person may access a caution barricaded area as long as they have familiarized themselves with the hazards detailed on the tailboard and implemented any controls indicated on the tailboard. Use specialty tape, such as for buried electric line hazards, as appropriate.

c) Spotter
A dedicated spotter shall be used when all other barriers have been reviewed and deemed infeasible or impractical. The spotter’s responsibility in the safe and efficient completion of a task is critical. No two tasks are the same, and the decisions made by a spotter are essential to the safety of the crew. Spotters must possess the necessary knowledge, skills and abilities to assess each situation, evaluate the risks, and make sound decisions under stressful conditions. The dedicated spotter:
   1) must wear high visibility clothing (vest);
   2) must maintain a safe distance from the hazard area;
   3) must be positioned to effectively gauge/monitor the hazard area;
   4) cannot have any other responsibilities; and
   5) may not use personal mobile phones, personal headphones, or other items that could pose a distraction during spotting activities.

Work requiring a barricade or spotter shall not begin until the requirements of this procedure have been satisfied.

Barricades or spotters shall be removed when work has been completed or when the hazard is controlled.
This guidance applies to spotter use in lieu of a barricade; multiple OSHA/VOSHA standards contain specific spotter requirements. When in doubt, ask about additional spotter requirements during the pre-work scoping process, during a tailboard, or when a concern arises.
4. “Person in Charge” Sign Practices

The intent of the “Person in Charge” (PIC) sign is to provide a single point of contact for all visitors entering a VELCO worksite where multiple crews are working to maintain an increased level of site safety.

For every job site, someone assumes the following role:
- Provides the safety briefing
- Informs VELCO operations/security of manpower/location for all crews
- Provides awareness of job activities
- Identifies crews/work tasks for the job site.
- Requests all work teams/crews to perform separate tailboards for work
- Is the clearance/tag holder for electrical work
- Is the point of contact for visitors

a) When required to use the PIC sign:

1) When multiple contract crews (different companies or different disciplines) are working on the ROW and a site supervisor is assigned. In this case, the PIC sign shall be located at the nearest access point of the ROW.
2) When multiple contract crews (different companies or different disciplines) are working inside a substation and a site supervisor is assigned. In this case, the PIC sign shall be mounted on the main access gate.
3) Any other time deemed necessary by the Person in Charge or site supervisor due to job site circumstances.

b) When not required to use the PIC sign:

1) VELCO Line Crew working in the ROW with no contracted resources or site coordinator assigned; or
2) VELCO Substation, Telecom and System Protection crews working in substations with no contracted resources or site coordinator assigned.

c) Information required on the PIC sign:

1) Name of the individual acting as the Person in Charge; and
2) Contact number for the PIC.
Section 3.0

Electrical Safety Practices and Standards
SECTION 3.1 ELECTRICAL SAFETY – GENERAL

For Additional Guidance Refer to Electrical Safety Program – Appendix E

Purpose
The Electrical Safety program is designed to prevent electrically related injuries and property damage. This program also provides for proper training of maintenance employees to ensure they have the requisite knowledge and understanding of electrical work practices and procedures. Only employees qualified in this program may conduct adjustment, repair or replacement of electrical components or equipment. Electricity has long been recognized as a serious workplace hazard, exposing employees to such dangers as electric shock, electrocution, fires and explosions. References: NFPA 70E, Electrical Safety Requirements for Employee Workplaces, National Electrical Code (NEC) and OSHA Standard (Electrical Safety) 29 CFR 1910.331 to 1910.339 , 1910.269 (General Industry) and 1926 Subpart V (Construction)
SECTION 3.2 ARC FLASH PROTECTION

Shock hazard exists for equipment energized at 50 volts or greater. Minimum Approach boundaries are established based on voltage levels; NESC Rule 41, table 441-1, table 441-5; NFPA table 130.4(D)a for AC voltages or 130.4(D)b for DC voltages and documented in Section WORKING ON OR NEAR EXPOSED ENERGIZED PARTS and USE OF ELECTRICAL PROTECTIVE EQUIPMENT and TOOLS of safety manual.

Arc Flash occurs when energized electrical equipment makes connection thru air to either another conductor or ground. Examples of triggering an arc flash could be: dust, dropping tools, failure of the device/equipment, and accidental contact by a worker. The results of arc flash are: blast pressure, sound blast, high heat, fire, burns, flying objects molten metal or failed device

Detailed arc flash studies are performed on transmission lines and substation equipment. Results document the arc flash incident energy, duration, distance to the employee and the PPE level and identifies the equipment.

Shock risk assessments are performed and documented via the VELCO tailboard practice.

The best way to mitigate Shock/Arc Flash is to avoid by performing work de-energized.

For work being done to equipment energized, NESC rule 441 section A must be met for work in substations. For work in NFPA facilities, an energized work permit is required. Transmission lines and equipment with substation fences follow NESC rules and recommendations. For VELCO general access locations; Pinnacle Ridge, MSF, Wenlock, NFPA 70E rules and practices are followed.

Identifying the hazard and risk can only be accomplished by qualified electrical workers, those who can identify the equipment, work activities and risk listed below.

- Equipment voltage
- Proximity of work activities considered for approach distances; minimum approach distance from employee to energized equipment. Distances will consider altitude, maximum per unit overvoltage and utilizing insulated live line tools with clear live line distance in which no hands are allowed.
- Use one of the following to determine appropriate PPE
  - Equipment Label which identifies either the PPE/Risk category or the distance/arc flash incident energy (NFPA 70E equipment) Arc Flash Assessment results; distance and arc flash incident energy values (refer to charts of Incident energy for Equipment/voltage levels)

Open Air Switching (Substations or Lines) or grounding of equipment the following applies:

- Arc Flash Hazards for VELCO Transmission Lines >100kV: This chart identifies the incident energy for operating of permanent switches and application of workman grounds or hot line work. See table 1
- Switching of >15kV Incident Energy: substation devices which exceed 8 cal/cm arc flash energy are identified additional PPE requirements. See table 2
- Battery Systems – For batteries 8000 amps or less, clothing with an arc flash rating of 5 cal/cm will be used. Battery systems that exceed this value, table X will be referenced for incident energy.
SECTION 3.3 BATTERIES

1. SAFETY EQUIPMENT:
   Battery Apron
   Acid resistant rubber gloves
   Face Shield and Safety Glasses
   Portable or Stationary eye-wash stations (Check eye-wash station for proper operation before starting inspection)

   NOTE: While using the Alber Corp Cell Corder to measure internal and interconnection resistances the Battery Apron, Face Shield and Acid Resistance Gloves are not required.

2. PRECAUTIONS:
   Use only insulated tools
   Prohibit smoking and open flames
   Ensure proper ventilation
   Ensure unobstructed escape from battery area
   Avoid wearing metallic jewelry
   Neutralize personal static of personnel
   All test equipment should have short circuit protection

   For additional information, refer to manufacturers’ product information and Safety Data Sheet (SDS).

3. PROCEDURES:
   a) When workers are handling batteries or electrolyte, they shall wear acid resistant gloves, an apron, eye protection, and a face shield.
   b) Smoking, flames, sparks, and open lights are prohibited from battery storage and charging cabinets and rooms.
   c) Facilities for quick drenching and flushing eyes shall be located within 10 seconds of the hazard and on the same level; the path of travel to such facilities shall be unobstructed.
   d) Batteries shall be charged in spaces and rooms designed for that purpose and will be posted “NO SMOKING.”
   e) Vent caps shall be left in place during changing and handling to prevent and avoid electrolyte spray. Care shall be exercised to ensure that vent caps are functioning properly.
   f) When making up electrolyte for batteries, employees shall always pour the acid slowly into the water, not water into the acid. The wrong procedure can cause an explosion.
SECTION 3.4  CARE OF ELECTRICAL PROTECTIVE EQUIPMENT

1. Care & Inspection of Insulating Protective Equipment

a) Maximum use voltages will conform to those listed in Table 1-5 below.

<table>
<thead>
<tr>
<th>Class of Equipment</th>
<th>Maximum-Use Voltage* a-c rms</th>
</tr>
</thead>
<tbody>
<tr>
<td>00</td>
<td>500</td>
</tr>
<tr>
<td>2</td>
<td>17,000</td>
</tr>
</tbody>
</table>

*On multiphase circuits, the phase-to-phase voltage is the maximum use voltage. Phase-to-ground voltage is the maximum use voltage where no multi-phase exposure exists.

b) Insulating equipment shall be inspected before each use and immediately following any incident that can reasonably be suspected of having caused damage. Insulating gloves shall be given an air test with this inspection.

c) Insulating equipment with any of the following defects may not be used:

1) a hole, puncture, tear, or cut;
2) an embedded foreign object;
3) swelling, softening, hardening, inelasticity, or stickiness; or
4) any other defect that damages the insulating properties.

d) Insulating equipment shall be cleaned as needed to remove foreign substances.

e) Insulating equipment in long-term storage shall be protected from light, temperature extremes, excessive humidity, ozone, and other injurious conditions.

f) Protector gloves must be worn over insulating gloves.

g) Electrical protective equipment shall be subjected to periodic electrical tests. Intervals between tests shall be in accordance with Table 1-6 below.
### Table 1-6
Insulating Equipment Test Intervals

<table>
<thead>
<tr>
<th>Type of Equipment</th>
<th>When to Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Line Hose</td>
<td>Removed from service upon indication that insulating value is suspect</td>
</tr>
<tr>
<td>Covers</td>
<td>Removed from service upon indication that insulating value is suspect</td>
</tr>
<tr>
<td>Gloves</td>
<td>(1) Before first issue and every 6 months thereafter.</td>
</tr>
<tr>
<td>Bucket Liners</td>
<td>(1) Before first issue and every 1 year thereafter</td>
</tr>
<tr>
<td>Booms, Baskets, Inserts, Hoses</td>
<td>(1) Before first issue and every 1 year thereafter</td>
</tr>
</tbody>
</table>

(1) If equipment has been tested but not issued for service, it must not be placed into service unless it has been electrically tested within the previous 12 months.

- **h)** Insulating equipment failing to pass inspection or electrical tests may not be used by workers.
- **i)** Repairs to gloves and sleeves are not permitted.
- **j)** Asset Maintenance shall certify the testing of electrical insulating equipment by logging the test results and dates.
SECTION 3.5 CARE OF LIVE-LINE TOOLS

1. Checks Before Each Use

Live-line tools shall be wiped down and inspected for defects before use each day. If defects or contamination is found that could affect insulating or mechanical integrity, the tool shall be removed from service, examined and tested.

2. Two-Year Checks

Every 2 years, live-line tools shall be removed from service and examined for defects, cleaned, repaired and tested. Tools having defects shall be removed from service, repaired, and refinished or replaced.

3. Tools Removed From Service

Tools removed from service that are repaired must be cleaned, waxed, and factory tested before being returned to service.

4. Labels

Tools that have passed the two-year check or have been returned to service should have a label attached to the tool to record the date of the examination and test.
SECTION 3.6  DE-ENERGIZING LINES & EQUIPMENT

1. Lines, Equipment and Disconnecting Means Under the Control of the VELCO System Operator
   a) The worker requesting the System Operator to de-energize a line or equipment is the Worker in Charge of the clearance. Other crews may work under the Worker in Charge’s clearance if they directly coordinate their work with him/her, or they may obtain their own clearance from the Power System Controller.
   b) All means through which known sources of energy can be supplied to the de-energized lines or equipment shall be opened and made inoperable and tagged, unless its design does not so permit.
   c) Automatic and remotely controlled switches shall be made inoperable and tagged at the point of control.
   d) After clearance is given by the Power System Controller, lines and equipment shall be tested and grounded.
   e) When responsibility for a clearance needs to be changed to a new Worker in Charge, the work crews and the Power System Controller will be notified. The Power System Controller will then authorize the removal of the old Worker in Charge’s tag and the placement of the new Worker in Charge’s tag. The Power System Controller will then issue a new clearance to the new Worker in Charge.
   f) To release a clearance, the worker responsible for the clearance shall:
      a. notify workers under his or her direction that the clearance is to be released;
      b. determine that all workers are clear of lines and equipment;
      c. determine that grounds have been removed; and
      d. report this information to the Power System Controller and release his or her clearance.
   g) Tags may not be removed unless clearance has been released.
   h) The person releasing a clearance shall be the same person that requested the clearance unless responsibility has been transferred as in (e). If a Worker in Charge of a clearance is physically unable to release his or her clearance, the worker’s supervisor may release the clearance provided he or she ensures that the steps in (f) are performed.
   i) The Power System Controller will not reenergize the lines or equipment until:
      a. protective grounds have been removed;
      b. crews have released their clearances;
      c. workers are clear of lines and equipment; and
      d. tags have been removed.

2. Lines, Equipment and Disconnecting Means Not Under Control of the Power System Controller
   a) When only one crew is working on lines or equipment, and if the means of disconnection is accessible and visible under the sole control of the Worker in Charge, clearance may be obtained by opening and tagging the disconnecting means and installing protective grounds.
   b) Only one worker will be designated as the Worker in Charge of the clearance.
SECTION 3.7 GROUNDING FOR THE PROTECTION OF WORKERS

1. General

To work on lines or equipment as de-energized, they must be grounded. However, grounding is not required when working on lines that are separated from other energized portions of a line by a line section that is absent of conductors, is not subjected to induced voltage from adjacent energized lines and is free of service drops and communication conductors (except for freely supported fiber-optic cables).

Freely supported fiber-optic cables are cables that are not supported by conductive communication lines. Fiber-optic cables wrapped concentrically around telephone lines are not freely supported.

The purpose of this section is to outline the proper tools, equipment, materials, and procedures to safely ground a de-energized transmission line. This section provides information for the standardization of temporary grounding materials and methods used on transmission lines.

The rules and regulations regarding temporary grounding are set forth in 29 CFR 1910.269(m) Obtaining Clearances and Grounding De-energized Lines. When all conditions are not fully understood by the employees performing the work, the work shall be discussed with the immediate supervisor regarding the safest way to handle that particular situation.

2. Definitions

Bracket Grounding – System Grounds connected at different ground locations on each side of the worker. (Not more than one mile apart.)

Chain Grounding (Phase-to-Phase) – Grounding leads connected at the ground point to the grounding bar, grounding bar to an individual phase, and phase-to-phase-to-phase.

Equipotential Work Zone – A work area with all points of contact at the same potential and meeting the requirements found in 29 CFR 1910.269(q)(4) Notes 1 and 2.

Parallel Grounding (Phase-to-Ground) – Grounding leads connected at the ground point to the grounding bar from the bar to each individual phase.

Personal Protective Jumper (PPJ) – A jumper used to establish an equipotential zone. It must be equal in size to the System Safety Grounds.

System Safety Grounds – Ground leads and clamps with a current carrying capacity, for the time necessary to clear a fault, greater than the available fault current.

3. Equipotential Zones

Temporary protective grounds shall be placed and arranged to prevent each worker from being exposed to hazardous differences in electrical potential. If there are any questions on this arrangement the work shall stop, the Construction Manager, Safety Manager and Director of Asset Maintenance shall be contacted for guidance.
4. Flagging for All Ground Locations

When System Safety Grounds are installed on transmission lines, a 24in. by 24in. lime green flag shall be installed at each ground structure after grounds are installed and prior to work being performed. The flag shall remain on the conductor until the grounds are removed.

Flags shall be installed on the conductor at the location of the ground clamp. Flags cannot be placed on conductors by hand until the line is properly grounded. When a flag is installed at a grounded location, care shall be taken to ensure that the flag location does not present a hazard to the work or jeopardize other energized sources in the work area. The ground locations shall be documented on the job briefing/tailboard form with attention given to the prior job briefing/tailboard to note ground movement.

5. Protective Grounding Equipment

a) General

Protective grounds shall be capable of conducting the maximum fault current flowing to the point of grounding for the time necessary to clear the fault. The protective grounding conductor must have an impedance low enough to cause immediate operation of protective devices in case of accidental energizing of the lines or equipment.

Grounding materials have been selected in order to provide a safe work zone while considering practical applications.

All ground materials shall be inspected prior to use and kept clean and in good working order. Due to their importance to worker safety, grounds shall be visually inspected prior to each use. If materials become damaged or broken, they must be discarded or returned to the manufacturer for repair.

b) Bundled Conductor Ground Jumper

For bundled line or strain bus conductors, a 36 in. length of grounding conductor with a compressed ferrule and heat shrink covered conductor clamp on each end must be used to tie each sub-conductor together. Bundled breaker and disconnect taps are excluded from this requirement.

c) Cluster Brackets

A cluster bracket shall be used on wood, tubular steel, and concrete structures. They are supplied with standard wheel chain tighteners.

6. Grounding Procedures

a) General

Grounding inside the fence of a substation requires a minimum of 4/0 stranded copper grounds. Some locations require larger grounding assemblies or the added
protection of double opens between the work and energized equipment.

Bracket grounding shall be used to ground transmission lines. This method requires a minimum of two sets of grounds, one cluster bracket, and one driven ground rod to complete the System Safety Grounds.

For grounding other equipment, the Person in Charge shall determine the method of grounding that gives the best protection for the job to be done.

b) Prior to Grounding

Before any ground is installed, lines (all conductors) and equipment must be de-energized, tested de-energized, and grounded. An approved voltage tester shall be used.

1) Only Electrically Qualified Personnel shall be assigned to test and install grounds. Following the 2-Man rule per VOSHA
http://labor.vermont.gov/vosha/vosha-osharules/#line

2) The Person In Charge (PIC) shall receive RED TAG Clearance and Document the Clearance number per VELCO’s Switching and Tagging Rules prior to testing the line.

3) Use an adequately rated test instrument to test each phase conductor or circuit part to verify it is de-energized. Test each phase conductor or circuit part both phase-to-phase and phase-to-ground. Before and after each test, determine the test instrument is operating satisfactorily through verification on a known voltage source.

c) Installing System Grounds

1) Connection Options

Grounding connections can be: a permanent ground, e.g. a driven ground or counterpoise system; or temporary driven grounds outside of the normal work area around the pole.

2) Order of Connection and Removal

When a ground is to be attached to a line or equipment, the ground-end connection shall be attached first, and then the other end shall be attached by means of a live-line tool.

When a ground is to be removed, the grounding device shall be removed from the line or equipment using a live-line tool before the ground-end connection is removed.

3) Tools and Methods

All System Grounds and Personal Protective Jumpers must be installed and removed with an approved hot line tool of sufficient length to maintain the required minimum approach distance by the worker, no less than an 8-foot stick and as prescribed for the voltage of the equipment to be grounded.
The connection should be made by hand-tightening using the clamp stick. (Refer to the clamp manufacturer’s tables for the recommended amount of torque. Using tools to gain additional leverage can damage equipment resulting in reduced integrity and lowering the rating.)

Caution: When installing or removing System Safety Grounds, keep the ground leads and conductor clamps away from the body. Do not hold clamps or leads in your hand, lay them across your body belt, or place them in an aerial basket. Use a hand line to help install ground leads. A modified grounding bar can be used to park the ground conductor clamps so that they can be installed or removed with a clamp stick.

4) Removal of Grounds for Tests

Grounds may be removed temporarily for tests. During the test procedure, workers shall use insulating equipment and be isolated from any hazards involved. Other methods shall be used as necessary to protect exposed workers in case the previously grounded lines and equipment become energized.

5) Additional Information

i. All three phases of the transmission system must always be connected together at a common point and connected to ground.

ii. The work area must be kept at the same potential.

iii. Where conductors or switches are to be opened, or open conductors or switches are to be closed, two additional ground leads must be installed to bridge the opening and keep the work area at the same potential.

iv. If the System Safety Grounds and/or Personal Protective Jumpers are subjected to a fault, they must be discarded.

v. The grounding conductor leads must not be only connected to an overhead ground wire for the purpose of grounding a transmission line.

vi. Install System Safety Grounds as close to the work area as practical. At no time shall bracket grounds be spaced more than one mile apart.

vii. When grounding leads are installed and drooping in congested or inconvenient locations, such as near distribution under build, they must be tied in the clear with a clean poly rope.

viii. If equipment grounds and System Safety Grounds are connected to the same ground point, the two grounds shall have a distinctive method to identify them. Tags shall be used for identification to help prevent accidental removal of the System Safety Ground connection.

ix. Grounding material must not be thrown or dropped from the structures. Grounding clamps must not be removed and allowed to drop from the clamp stick.

x. A suitable container shall be selected for transportation and storage of the grounding equipment.

d) Personal Protective Jumpers (PPJs)
1) PPJ Connection to the Structure

i. Lattice Steel Structures
If the barrel has step bolts, remove a step bolt and install a grounding stud to connect the PPJ to the structural steel. If no step bolt location is available, install a pole grounding bar. The pole grounding bar must be bonded to the structure ground using an appropriate ground lead. The PPJ can then be connected to the pole grounding bar.

ii. Tubular Steel Poles
A pole grounding bar must be installed to the tubular pole, and the PPJ shall be connected to the pole grounding bar.

iii. Wood and Concrete Poles
A pole grounding bar must be installed on the pole and connected to the pole down lead, using an appropriately sized ground lead, three to six feet below the pole grounding bar. The PPJ can then be connected to the pole grounding bar.

e) Installing System Safety Grounds on 345kV

1) General
On 345kV lines, the recommended position of the worker while installing System Safety Grounds on the conductor is on the cross arm or bridge directly above the conductor. This position enables the worker to maintain maximum control of the equipment being used while maintaining a maximum distance from phase conductors. The worker must keep himself clear of grounding conductor leads during installation by using hot line tools and/or clean and dry approved rope.

2) Order of Connection and Removal

i. First, install the 25ft. or 50ft. leads (25ft. for suspension towers, 50ft. for dead-end towers) used for bonding across the bridge of the structure.
ii. Second, install grounding equipment connected from the tower bridge (ground potential) to all three phase conductors.
iii. When removing temporary grounds on 345kV lines, simply reverse the above procedure.

7. Bracket Grounding Diagram
The following diagram shows an example of how System Safety Grounding shall be installed on the transmission system.

8. Sizing of Temporary Grounds, AWG & Number
<table>
<thead>
<tr>
<th>Voltage (kV)</th>
<th>Circuit Location</th>
<th>Minimum TPG Cable Size (2 x size = parallel cables) (AWG)</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>345</td>
<td>All</td>
<td>2 x 2/0 or 1 x 4/0</td>
<td></td>
</tr>
<tr>
<td>230</td>
<td>All</td>
<td>2 x 2/0 or 1 x 4/0</td>
<td></td>
</tr>
<tr>
<td>120</td>
<td>All</td>
<td>4/0</td>
<td></td>
</tr>
<tr>
<td>115</td>
<td>All</td>
<td>4/0</td>
<td>Exception Granite 115kv</td>
</tr>
<tr>
<td>115</td>
<td>Granite</td>
<td>2 x 4/0</td>
<td></td>
</tr>
<tr>
<td>69</td>
<td>All</td>
<td>4/0</td>
<td></td>
</tr>
<tr>
<td>48-46</td>
<td>All</td>
<td>4/0</td>
<td>Exception Ascutney, Newfane, New Haven</td>
</tr>
<tr>
<td>48-46</td>
<td>Ascutney, Newfane, New Haven</td>
<td>2 x 4/0</td>
<td></td>
</tr>
<tr>
<td>34.5</td>
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<td>All</td>
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<td>Exception Granite RPD</td>
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<td>12.47</td>
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<tr>
<td>3.2</td>
<td>STATCOM</td>
<td>2 x 4/0</td>
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</tbody>
</table>
SECTION 3.8  LIVE-LINE / BARE HAND SAFE WORK PRACTICES
[Ref. 29 CFR 1910 Subpart R, 1910.269(q)(3)]

The crew shall ensure that all work activities take place in accordance with all applicable workplace safety rules and regulations, including 29 C.F.R. 1910.269(q)(3) and/or 29 C.F.R. 1926.964(c). Non-compliance may result in corrective action procedures according to VELCO policies.

1. Before work begins:
   a) A documented pre-job planning meeting shall be conducted before the start of the work and then at least once every day at the beginning of the workday on site, until the bare-hand work has been completed. A job briefing form shall be completed and review all elements of this section before work begins.
   b) Written procedures should not be changed while work is in progress. If due to unforeseen circumstances a minor change is required, the job shall be halted, and only after consultation with the whole crew, ensuring that everyone fully understands the required change, may work proceed. ANY member of the crew may halt work at any time. If a substantial change is contemplated, the supervisor or foreman must be consulted and approve of such change.
   c) Before work begins, the crew must ascertain:
      1) the nominal voltage rating of the circuit on which the work is to be performed;
      2) the minimum approach distances to ground of the lines and other energized parts at a difference in potential on which work is to be performed; and
      3) the voltage limitations of the equipment to be used.
      4) Whether lightning is possible using lightning testing devices.

2. Training/Crew Components:
   a) Employees must be trained, qualified and certified by an instructor qualified in bare-hand techniques and procedures. Employees in training are allowed to work under the direct supervision of a qualified instructor, or journeyman who has been trained and certified in live line bare-hand techniques.
   b) The minimum bare-hand crew shall consist of three bare-hand-certified linemen. One bare-hand certified Line Worker will be in charge. A qualified, designated employee must be positioned on the ground to observe and help maintain safe work practices. Two line workers shall be in the aerial lift any time bare-hand work is being performed.
   c) To provide direct supervision of bare-hand operations, the supervisor must be trained, qualified and certified by company standards to perform bare-hand work.
   d) Each qualified bare-hand Line Worker shall be observed by a qualified bare-hand designee at least once annually, and documented, to ascertain that safe work practices are followed.

3. Conditions for bare-hand work:
   a) Live-line bare-hand work shall not be performed during adverse weather conditions (such as thunderstorms, high winds, or ice storms).
b) The Power System Controller shall be notified at least 24 hours in advance of conducting bare-hand work on a transmission line. The Power System Control shall not reclose the circuit where work is performed if an unscheduled outage occurs until the bare-hand person-in-charge reports all are clear and lines are safe to re-energize. (If available,) The automatic reclosing feature of circuit interrupting devices must be made inoperable before working on any energized line or equipment. Use of air gaps for conductor and ground clearance requires approval and consensus between VELCO Engineering and a qualified bare-hand worker.

4. Bucket Truck Bare-hand Equipment:

a) *Bucket liners and electrostatic shielding.* Employees shall use a conductive bucket liner or other conductive device for bonding the insulated aerial device to the energized line or equipment.

b) Periodic electrical testing of bucket trucks and insulated equipment for live line bare-hand work must be performed no less than once every year. Testing must also be performed when repairs are made to the aerial device or insulated equipment that may impact their insulating capabilities. These repairs could include hydraulic hose repair, hydraulic oil contamination, fiberglass boom or basket repairs.

c) All aerial lift equipment that is scheduled for live-line bare-hand work on circuits must be electrically certified by the most recent edition of ANSI/SIA Standard for the voltage to be worked on.

d) No modifications or additions that may affect the stability, mechanical, hydraulic, or electrical integrity and safe operation of live-line equipment without the written authorization of the manufacturer.

e) All aerial devices must be category A and have corona rings and collectors.

f) All conductive components shall be bonded together by an appropriately gauged cable and either have a wand or cable clamps in place to pick up charging current.

5. Tools/Testing:

a) Only tools and equipment intended for live-line bare-hand work shall be used, and such tools and equipment must be kept clean and dry, inspected before each use and tested accordingly. VELCO employees will check bare-hand monitors for integrity before testing the truck. The lower boom insert shall be bonded across to allow the monitor to work properly.

b) Before the boom is elevated, the outriggers on the aerial truck must be positioned on suitable outrigger pads and adjusted to level to stabilize the vehicle. The vehicle frame must be grounded with a 4/0 copper ground cable attached to an effective source of ground. The structure ground or system ground is the preferred grounding method. Where driven ground rods are used there shall be two rods bonded together at least 6 ft. apart. A barricade should be placed around the ground rod area or structure, and the aerial lift vehicle to avoid approaching too close.
c) When equipment grounding is impractical or when it poses a hazard to employees, equipment, or the general public, the equipment must be barricaded and considered as energized. Do not approach the vehicle until the boom is clear of the line.

d) Before moving the aerial device into the working position, all controls, (upper and lower) must be checked to ensure that they are in proper working condition. Aerial lifts to be used for live-line bare-hand work must have dual controls, (upper and lower). The upper controls must be located within easy reach of the employee in the basket. If a two-man basket lift is used, access to the controls must be within easy reach from either basket. The lower set of controls must be located near the base of the boom and must provide override operation of equipment at any time. Lower level lift controls must not be operated unless permission has been obtained from the employee in the basket, (except in an emergency).

e) Boom leakage tests shall be made and documented using the INSULATED BOOM AERIAL DEVICE DIELECTRIC TEST REPORT (attachment A) before starting work each day and the boom must be monitored for leakage when linemen are aloft and bonded to the circuit, or whenever conditions change, such as when the weather changes or the work involves voltages higher than the initial test voltage. In such cases, further testing of boom leakage must be conducted.

f) Aerial baskets used for live bare-hand work must be subjected to an arm current test. This test consists of placing the basket in contact with an energized voltage equal to the voltage of the circuit to be worked on. The bucket must be in contact for a minimum of three minutes and the leakage current must not exceed 1 microampere per kilovolt of nominal phase-to-ground voltage.

g) Work operations shall be suspended immediately upon any indication of a malfunction in the equipment.

```
Table 22-1. Maximum Allowable Leakage Currents

<table>
<thead>
<tr>
<th>Phase to Phase Voltage</th>
<th>Phase to Ground Voltage</th>
<th>Max. Allowed Leakage Current</th>
</tr>
</thead>
<tbody>
<tr>
<td>115 kV</td>
<td>66.6 kV</td>
<td>66.6 microamps</td>
</tr>
<tr>
<td>230 kV</td>
<td>132.9 kV</td>
<td>132.9 microamps</td>
</tr>
<tr>
<td>345 kV</td>
<td>199.4 kV</td>
<td>199.4 microamps</td>
</tr>
<tr>
<td>500 kV</td>
<td>289 kV</td>
<td>289 microamps</td>
</tr>
</tbody>
</table>
```

Note: Industry standards recommend maximum allowable leakage currents of 1 microampere per kV of Phase to Ground voltage for a 3-minute test.

h) When approaching, exiting, or bonding on to an energized circuit, the minimum approach distances shall be maintained between all parts of the insulated boom assembly and any grounded parts, included the lower boom or portions of the truck. When positioning the basket alongside an energized bushing or insulator string, the minimum phase-to-ground clearances in must be maintained between all parts of the of the basket and the grounded end of the bushing or insulator string. Note, for circuits mounted on wood poles or attached to wooden structures, all wood members shall be considered to be at ground potential.
i) During bare-hand contact with live electrical lines and/or apparatus, the limits of approach of all persons, tools, equipment and material they may be handling with respect to objects at ground potential or phase-phase potential shall be as specified in the following chart; but in no case less than Minimum Approach Distance. This includes poles, towers, cross-arms, or conductors other than the one on which they are working.

j) Corona rings are energized when bonded on. MAD must be maintained from ring to differences in potential such as poles etc.

Table 22-1. Minimum Approach Distance (Phase-to-Phase Voltage)

<table>
<thead>
<tr>
<th>Limit Voltage Range</th>
<th>MAD to Live Conductors Distance (FT-IN)</th>
<th>MAD for Barehand Work Above 3,000’ Altitude</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Phase to Phase</td>
<td>Phase to Ground</td>
</tr>
<tr>
<td>Phase to Phase</td>
<td>Phase to Ground</td>
<td>Phase to Ground</td>
</tr>
<tr>
<td>115</td>
<td>3 ft. 9 in</td>
<td>4 ft. 3 in</td>
</tr>
<tr>
<td>230</td>
<td>5 ft. 8 in</td>
<td>10 ft. 9 in</td>
</tr>
<tr>
<td>345</td>
<td>9 ft. 11 in</td>
<td>14 ft. 4 in</td>
</tr>
</tbody>
</table>

Note 1: These distances take into consideration the highest switching surge an employee will be exposed to on any system with air as the insulating medium and maximum voltages shown.

Note 2: The clear live-line tool distance shall equal or exceed the values for the indicated voltage ranges.

Note 3: The above chart includes the correction factor of 1.20 applied to OSHA’s minimum approach distances. This is a requirement at elevations greater than 3,000 ft. but not more than 10,000 ft. above mean sea level.

6. Personal Protective Equipment

a) When conducting bare-hand work, the qualified Line Worker shall wear a conductive clothing kit including pants, shirts, socks, conductive jacket, hood, and gloves. Conductive clothing can only be cleaned and maintained with other conductive material. Class E Hard Hat, Safety Glasses and 100% cotton or FR undergarments are also required.

b) Conductive clothing shall be worn on the outside of personal clothing, with the exception of leather protective gloves; when used as part of the bare-hand kit, they shall be worn over the conductive gloves.

c) Employees shall wear a full-body harness and a shock-absorbing lanyard that is anchored to the bucket, boom, or spacer cart (if applicable). In a spacer cart, all safety chains shall be in working condition and secured. Employees must ensure that they maintain their bond and utilize 100% fall protection when entering and exiting the spacer cart.

d) Line Workers involved in bare-hand procedures, though not bonded to the line but performing work on the structure, may wear conductive clothing to eliminate the discomforting effects from static discharges.
7. Procedures:

a) Where minimum approach distances are questionable, measuring sticks shall be used to verify distances.

b) Before an employee can contact an energized conductor or apparatus, the conductive basket liner must be bonded to the energized conductor or apparatus by means of a positive connection that must remain attached to the energized conductor or apparatus until the work is completed.

c) When positioning baskets over an energized circuit, clearances must take into account the length of the bonding wand and clamps, should they inadvertently hang free. The wand and clamps at any time cannot hang more than 20 inches from the bottom of the basket.

d) The employee shall be connected to the bucket liner or other conductive device by the use of conductive shoes, leg clips, umbilical cord tied to the basket liner or metal basket, or other means. Where differences in potentials at the worksite pose a hazard to employees, the employer shall provide electrostatic shielding designed for the voltage being worked.

e) Before the qualified employee contacts, the energized part, the employee shall bond the conductive bucket liner or other conductive devices to the energized conductor by means of a positive connection. This connection shall remain attached to the energized conductor until the employee completes the work on the energized circuit.

f) When preparing to install a bond to a circuit, approach the conductor within a safe limit. The distance must be far enough away so that inadvertent contact will not be made, yet close enough that the Line Worker bonding on can easily reach the conductor and, with a positive movement, install the bonding wand. The Line Worker not responsible for operating the aerial device installs the wand to make initial bond to the circuit. NOTE: Communication between employees is critical; bonding actions shall not be initiated unless all employees acknowledge the action will begin.

g) The Operator of the aerial device then installs the bonding clamp when in the working position and ensures that the bonding clamps remains connected to the circuit by grasping it by hand. The second bonding clamp is then installed. The bonding wand is removed, and work may proceed.

When moving a short distance and the bonding clamps must be moved, one Line Worker shall always retain his bonding clamp to the circuit by grasping it by hand while the other Line Worker moves the bonding clamp to the new position.

h) When removing a bond from the circuit, the Operator of the aerial device retains his bonding clamp to the circuit by grasping it by hand. The rider Line Worker installs the wand and removes his bonding clamp. The operator's bonding clamp is removed. Back the aerial device away from the work area and remove the wand from the circuit.

i) Only non-conductive rope that has been tested electrically to ensure its integrity may be used for bare-hand work. Non-conductive rope used as hot rope in bare-hand work shall be stored in approved, appropriately marked containers. Non-conductive rope shall be tested daily, or whenever there is any concern as to its dielectric integrity. Non-conductive rope shall not be permitted to contact the ground in order to prevent the accumulation of dirt and moisture between the fibers. Approved storage containers and tarps are required in the handling of
rope. Ropes used for live-line bare-hand work may not be used for other purposes.
j) The baskets and upper insulated boom shall not be used to lift or support weights in excess of its rated capacity. To protect the fiberglass parts, none of the basket parts or upper arm shall be used as a fulcrum for prying or lifting. Calculate the conductor weight prior to supporting the conductor in the jib. Ensure that the boom capacity is not exceeded when handling a conductor with the jib.
k) When moving a conductor to a different location, prior to attaching the jib to a conductor, move the boom to the extreme location in which you intend to move the conductor and check the load chart for that position. Make sure the capacity of the boom will not be exceeded at any point.
l) Load carrying bypass jumpers shall be equivalent to or greater in size/capacity than the conductor being bypassed. Wire brush the conductors and make the connection to the conductor with the required size ampacity connector or equivalent. On excessively long jumpers a conductor support device (matching T) shall be used to support one end of the jumper. This prevents the moving of an energized jumper while being held by a line worker in the basket.
m) Insulated jumpers shall not be used.
n) Employees shall not pass uninsulated equipment or material between a pole or structure and an aerial lift while an employee working from the bucket is bonded to an energized part.
INSULATED BOOM AERIAL DEVICE DIELECTRIC TEST DAILY REPORT

Location: _________________________ Crew Leader: _______________________
Class A Truck #___________________ Von Meter Serial #_____________________

<table>
<thead>
<tr>
<th>Date/Time</th>
<th>Weather and Temp</th>
<th>Voltage</th>
<th>Air Gap Test (3 minutes)</th>
<th>Contact Test (3 minutes)</th>
<th>Von Meter Alarm Setting</th>
<th>Test by (Initial)</th>
</tr>
</thead>
<tbody>
<tr>
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</tbody>
</table>

Boom leakage tests shall be made before starting work each day and the boom must be monitored for leakage when linemen are aloft and bonded to the circuit, or whenever conditions change, such as when the weather changes or the work involves voltages higher than the initial test voltage. In such cases, further testing of boom leakage must be conducted. Work operations shall be suspended immediately upon any indication of a malfunction in the equipment.

Table 22-1. Maximum Allowable Leakage Currents

<table>
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<td>230 kV</td>
<td>132.9 kV</td>
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<td>199.4 kV</td>
<td>199.4 micro amps</td>
</tr>
<tr>
<td>500 kV</td>
<td>289 kV</td>
<td>289 micro amps</td>
</tr>
</tbody>
</table>

Note: Industry standards recommend maximum allowable leakage currents of 1 microampere per kV of Phase to Ground voltage for a 3-minute test.
SECTION 3.9 MATERIAL HANDLING AND STORAGE

Materials may not be stored within the working space around energized lines or equipment where the potential for equipment used to move these materials could violate the minimum approach distance or if their placement poses a hazard to workers or the public entering the worksite. Additionally, materials shall not block access to emergency equipment, e.g. eye washes, fire extinguishers, electrical equipment.

SECTION 3.10 MECHANICAL EQUIPMENT OPERATIONS NEAR ENERGIZED LINES OR ELECTRICAL EQUIPMENT

1) Mechanical Equipment Operations Near Energized Lines or Electrical Equipment

a) Mechanical equipment, other than insulated portions of aerial lifts, shall be operated so that minimum approach distances in Table 1 of Electrical Safety Section (Working on or Near Exposed Energized Parts & Use of Electrical Protective Equipment & Tools) are maintained. Equipment operators must follow minimum approach distances according to their classification i.e. qualified or non-qualified.

b) A worker other than the mechanical equipment operator shall observe the approach distance to exposed lines and equipment and give timely warnings before the minimum approach distance is reached. An observer is not required if the operator can accurately determine that the minimum approach distance is maintained.

c) If mechanical equipment could become energized when operating by contacting an energized line, workers shall:

   a) insulate energized lines exposed to contact;
   b) use equipment that is insulated (provided uninsulated portions of the equipment are so positioned that they do not come closer than the minimum-approach distance);
   c) protect each worker by using the best available ground to minimize fault time, bond equipment to minimize potential differences, use ground mats to extend areas of equipotential, and employ worker insulating protective equipment or barricades to guard against any remaining hazardous potential differences; and
   d) ground large equipment (cranes, boom trucks, diggers, excavators) using the provided, attached grounding cables. These will be used any time the equipment is parked in a substation.
   e) Seat belts will be worn at all times when operating or moving the mechanical equipment.
SECTION 3.11 OVERHEAD LINES

1. General
   a) Before poles are subjected to the stress of climbing or installing or removing lines and equipment, the worker shall determine if the pole is capable of withstanding the additional unbalanced stress. If the pole cannot withstand the loads that will be imposed, it will be braced or supported to prevent failure.
   b) When poles are set, moved or removed near exposed energized overhead lines, the pole shall not be permitted to contact the conductors.
   c) When a pole is set, moved or removed near exposed energized lines workers will:
      1) wear electrical protective equipment or use insulated devices when handling the pole; and
      2) not contact the pole with uninsulated parts of his or her body.
   d) Until poles are set, holes dug to place poles shall be attended or physically guarded whenever anyone is working nearby.

2. Installing and Removing Overhead Lines
   a) Workers shall use the tension stringing method, barriers, or equivalent measures to minimize the possibility that lines and cables being installed or removed will contact energized lines or equipment.
   b) Protective measures applicable to mechanical equipment and workers are applicable to pulling and tensioning equipment if any of the following failures could energize the pulling and tensioning equipment or the lines being installed or removed:
      1) failure of the pulling and tensioning equipment;
      2) failure of the wire or cable being pulled; or
      3) failure of the previously installed lines or equipment.
   c) If conductors being installed or removed cross over lines in excess of 600 volts, the automatic reclosing feature of the circuit interrupting device shall be made inoperable if its design so permits.
   d) Before installing new lines parallel to existing energized lines, workers shall make a determination of the approximate voltage induced into the new line, or work must proceed under the assumption that the induced voltage is hazardous.
   e) Unless the new lines have no hazardous induced voltage, or unless the new lines are treated as energized, the following requirements apply to the new lines:
      1) Each bare conductor shall be grounded in increments so that no point along the conductor is more than 1 mile from a ground.
      2) The grounds must be left in place until the installation is completed between dead ends and will be removed as the last phase of aerial cleanup.
      3) Grounds shall be installed at locations where workers are handling conductors and at all dead-end or catch-off points or the next adjacent structure.
      4) If two bare conductors are to be spliced, the conductors shall be bonded and grounded before being spliced.
f) Reel handling equipment, including pulling and tensioning devices, shall be in safe operating condition and level and aligned.
g) Load ratings of stringing lines, pulling lines, conductor grips, load-bearing hardware and accessories, rigging, and hoists may not be exceeded.
h) Pulling lines and accessories shall be repaired or replaced when defective.
i) Conductor grips may not be used on wire rope unless specifically designed for this purpose.
j) Reliable communications using two-way radios or equivalent means shall be maintained between the reel tender and the pulling rig operator.
k) While the new conductor or pulling line is in motion from a power-driven device, workers are not permitted directly beneath overhead operations or on the cross arm, except as necessary to guide the stringing sock or board over or through the stringing sheave.
l) Pulling rigs may be operated only when it is safe to do so.

3. Demolition of Equipment, Structures, or Poles

In most all situations the demolition of equipment can be accomplished by an aerial device, a crane, hand line or a controlled manual removal and is the preferred method of removal. Porcelain insulators will be lowered to the ground by an aerial device, crane, or hand line.

a) General safety precaution for demolition activities include:
   1) Dedicated spotter assigned;
   2) Verbal or visible communications between the line worker and spotter;
   3) A barricade or a control to prevent unauthorized access to the work zone.

b) The dedicated spotter:
   1) Must wear high visibility clothing (vest);
   2) Must maintain a safe distance from the hazard area;
   3) Must be positioned to effectively gauge/monitor the hazard area;
   4) Cannot have any other responsibilities; and
   5) Must be identified on the tailboard.

c) Uncontrolled Drops
   An uncontrolled drop is the drop of equipment or materials without use of an aerial device, a crane, or a hand line. Additional safety precautions when performing an uncontrolled drop include:
   1) Notifying the Director of Transmission Assets or the Asset Engineer before the drop can occur.
   2) Barricades - a 20' radius around the base of structure/work area where terrain allows.
   3) A new tailboard must take place with all crew members
   4) A dedicated spotter will be assigned
   5) In the event personnel require entry into the drop zone all work will stop until the work zone is clear of personnel.
SECTION 3.12  POWER GENERATION

1. Interlocks and Other Safety Devices

a) Interlocks and other safety devices shall be maintained in a safe, operable condition.
b) No interlock or other safety devices may be modified to defeat its function, except for test, repair, or adjustment of the devices.

2. Access and Working Space

Sufficient access and working space shall be provided and maintained about electrical equipment to permit ready and safe operation and maintenance of the equipment.

3. Guarding of Rooms Containing Electrical Supply Equipment

Rooms and spaces shall be enclosed with fences, screens, partitions, or walls to minimize the possibility that an unqualified person will enter; signs warning unqualified persons to keep out will be posted; rooms and spaces will be kept locked; and unqualified person shall not enter unless escorted if:

a) exposed, live parts operating at 50 to 150 volts are located with 8 feet of the ground or other working surface inside the room;
b) exposed, live parts operating at 151 to 600 volts are located within 8 feet of the ground or other working surface and are guarded only by location; or
c) live parts operating at more than 600 volts are located within the room, unless:

1) live parts are enclosed within grounded metal-enclosed equipment; or
2) live parts are installed such that protection is afforded corresponding to protection provided by an 8 foot height at 50 volts.

4. Guarding Energized Parts

a) Guards shall be provided around all live parts operating at more than 150 volts without an insulating covering, unless the location of the live parts gives sufficient clearances to minimize worker contact.
b) Except for fuse replacement and other necessary access by workers, guarding of energized parts within the compartment shall be maintained during operation and maintenance to prevent accidental contact with energized parts and to prevent tools from being dropped on energized parts.
c) When guards are removed from energized equipment, barriers shall be installed around the work area to prevent workers not involved in the job from contacting exposed live parts.
SECTION 3.13 QUALIFIED WORKER

1. Qualified vs Un-Qualified

Qualified Electrical Workers may work on energized distribution or transmission lines. Qualified electrical workers have:

a) The skills and techniques necessary to distinguish exposed live parts from other parts of electrical equipment.

b) The skills and techniques necessary to determine the nominal voltage of exposed live parts.

c) The skills and techniques necessary to determine the minimum approach distances corresponding to the voltages to which they are exposed.

d) The proper use of the special precautionary techniques, personal protective equipment, insulating and shielding materials, and insulated tools for working on or near exposed energized parts of electrical equipment to prevent the possibility of electric shock or flash.

e) Emergency techniques such as pole top, bucket, and manhole rescue.

f) Skills necessary to perform first aid and CPR.

g) A qualified employee shall also be knowledgeable of the construction and operation of equipment and specific work methods associated with the electrical task.

Unqualified workers:

a) Maintain a minimum approach distance (MAD) appropriate for the voltage of the line in question, with a minimum approach distance of at least 10 feet for any voltage of 50 kV or under. (Add 4 inches per each 10kV over 50 kV.) During the pre-job briefing, unqualified workers will be assigned tasks that ensure they will maintain the MAD noted above.

b) Employees who are not qualified persons shall also be trained in and familiar with any electrically related safety practices not specifically addressed in this document but which are necessary for their safety.

2. Qualification and Dangerous Work Activities:

While working on or adjacent to high voltage lines and substation equipment, inherent risks and hazards differ with each circumstance.

When a worker is faced with the decision of whether to proceed with the work activity or not to proceed, they must assess the activity and question whether they are trained and qualified for the activity, as well as for performing the activity in the specific work location and circumstances (e.g. near electrical facilities), before proceeding.

If the worker cannot make that distinction, he shall stop the work activity and refer to his supervisor for guidance.

It is also the responsibility of coworkers to observe and intercede when an unqualified worker fails to recognize the dangers and attempts to engage in a work activity for which the worker is not trained or qualified.

It is expected that all workers have the authority to stop any job if they are uncomfortable with the safety margins or any other concerns that could impact worker safety.
## NON-QUALIFIED WORKER WORKING LIMITS

<table>
<thead>
<tr>
<th>2\textsuperscript{nd} Person\textsuperscript{1} in two person bucket performing aerial work inside the non-qualified approach distance (lines energized)</th>
<th>2\textsuperscript{nd} Person\textsuperscript{1} on a pole performing aerial work inside the non-qualified approach distance (lines energized)</th>
<th>Working Grounded Conductors</th>
<th>Switching from Ground Position</th>
<th>2\textsuperscript{nd} Person\textsuperscript{1} on two person crew with a qualified\textsuperscript{4} worker working inside the non-qualified approach distance</th>
</tr>
</thead>
<tbody>
<tr>
<td>1\textsuperscript{st} or 2\textsuperscript{nd} year electrical line worker with less than 4000 hours\textsuperscript{5}</td>
<td>NO</td>
<td>NO</td>
<td>YES\textsuperscript{3}</td>
<td>YES\textsuperscript{1}</td>
</tr>
<tr>
<td>3\textsuperscript{rd} year electrical line worker with More than 4000 hours\textsuperscript{5}</td>
<td>YES\textsuperscript{1}</td>
<td>YES\textsuperscript{1}</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>1\textsuperscript{st} or 2\textsuperscript{nd} year electrical line worker with less than 4000 hours\textsuperscript{5}</td>
<td>NO</td>
<td>NO</td>
<td>NO</td>
<td>YES</td>
</tr>
<tr>
<td>3\textsuperscript{rd} year electrical line worker with More than 4000 hours\textsuperscript{5}</td>
<td>YES\textsuperscript{2}</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
</tr>
</tbody>
</table>

\textsuperscript{1} The other worker is fully qualified\textsuperscript{4}, provides direct supervision, and approves

\textsuperscript{2} With approval of Foreman

\textsuperscript{3} Cannot act as 2\textsuperscript{nd} person installing grounds

\textsuperscript{4} As determined by VELCO in its judgment applying the following definition: Each qualified employee shall also be trained and competent in:

- The skills and techniques necessary to distinguish exposed live parts from other parts of electric equipment,
- The skills and techniques necessary to determine the nominal voltage of exposed live parts,
• The minimum approach distances specified in this section corresponding to the voltages to which the qualified employee will be exposed and the skills and techniques necessary to maintain those distances,
• The proper use of the special precautionary techniques, personal protective equipment, insulating and shielding materials, and insulated tools for working on or near exposed energized parts of electric equipment, and
• The recognition of electrical hazards to which the employee may be exposed and the skills and techniques necessary to control or avoid these hazards.

As approved by VELCO in its judgment considering appropriate standards or programs for the Electrical Industry as approved by the U.S. Department of Labor Employment and Training Administration

Non-Qualified Approach Distance means:
   a) 15’ to energized phases up to 115kv; or
   b) 20’ to energized phases at 230kv or 345kv; or
   c) in designated telecommunications space on distribution poles, typically carrying voltages of less than 46kv

Qualified Approach Distance means any work inside or closer to energized phases than as defined in the Non-Qualified Approach Distance description
SECTION 3.14  SPECIAL CONDITIONS

1. Capacitors

a) Before working on capacitors, they shall be disconnected from energized sources, and, after a wait of at least 5 minutes from the time of disconnection, short-circuited.

b) Before capacitors are handled, each unit in series-parallel banks will be short-circuited between all terminals and the capacitor case or its rack. When capacitors are on ungrounded substation racks, the racks shall be bonded to ground.

2. Current Transformer Secondaries

The secondary of a current transformer may not be opened while the transformer is energized. If the primary of the current transformer cannot be de-energized before work is performed on an instrument, a relay, or other section of a current transformer secondary circuit, the circuit shall be bridged so that the current transformer secondary will not be opened.

3. Backfeed

If there is a possibility of voltage backfeed from sources of generation or from secondary voltage sources (e.g., backfeed from more than one energized phase feeding a common load), the requirements of OSHA 1910.269 paragraph (l) Working on or Near Exposed Energized Parts apply if the lines or equipment are to be worked on as energized, and the requirements of OSHA 1910.269 paragraphs (m) De-energizing Lines and Equipment for Employee Protection and OSHA 1910.269 (n) Grounding for the Protection of Employees apply if the lines or equipment are to be worked on as de-energized.

4. Illumination

Sufficient illumination shall be provided to ensure that specific work areas or areas where workers are stationed or passing through are provided with lighting that is sufficient to enable the workers to see hazardous conditions and avoid injury.

5. Hydraulic Fluids

Hydraulic fluids used for the insulated sections of equipment shall provide insulation for the voltage involved.
SECTION 3.15 TAGS AND CLEARANCES

All switching and tagging in the VELCO system will be governed and conducted in accordance with the instruction book titled VELCO Switching and Tagging Rules published by the VELCO Operations Department. Employees that conduct switching, tagging and/or hold clearance shall be trained on the current VELCO Switching and Tagging Rules. A refresher training will be conducted every 3 years at a minimum. The list of employees that have received this training is maintained by the VELCO Operations Department. All other equipment will fall under the VELCO Lockout / Tagout Program.

Brief description of tags and clearances as there are two methods.

1) VELCO Switching and Tagging Rules for transmission lines, substation, the operations department; primary system tagging/clearances which establishes the following:
   - Controlled process for removing equipment from service
   - Detailed, documented process for managing
   - Person in Charge issued work clearance
   - Work zone protection controlled by the person in charge

2) VELCO Lockout / Tagout Program shall apply for work done outside the electrical assets mentioned above.
   - Each worker will apply locks and tags to locally control energy for systems they are working on
   - Person in Charge work process can be utilized; requires group lock box, worker individual locks
SECTION 3.16  TESTING AND TEST FACILITIES
[Ref. 29 CFR 1910 Subpart R, 1910.269]

This section applies to test areas, temporary and permanent, performing high voltage (600 volts or higher) or high power testing, or a combination of both, in labs, shops, substations, and on transmission and distribution lines. It does not apply to routine testing involving continuous measurements as in routine metering, relaying, and normal line work.

1. Guarding of Test Areas

a) Permanent test areas shall be guarded by walls, fences, or barriers designed to keep unauthorized personnel out.

b) In field or temporary sites, the test area shall be guarded to prevent unauthorized persons from entering the test area by using:

   1) distinctly colored safety tape that is supported approximately waist high, to which safety signs are attached;
   2) barriers or barricades that limit access to the test area to a degree equivalent physically and visually to (1); and
   3) one or more observers stationed so that the entire test area can be monitored.

c) Barriers at temporary test areas will be removed when the protection they provided is no longer needed.

d) Guarding in test areas shall be provided to control access to test equipment or to apparatus being tested that may become energized as part of the testing in order to prevent accidental worker contact with energized equipment.

2. Grounding Practices

b) Visible grounds shall be applied with properly insulated tools in high voltage circuits after they are de-energized and before work is performed on the circuit or item being tested. Common ground connections shall be solidly connected to the test equipment and the apparatus being tested.

c) When a test area is entered after tested equipment is de-energized, a ground shall be placed on the high voltage terminal and any other exposed terminals.

   1) High capacitance equipment shall be discharged through a resistor rated for the available energy.
   2) A direct ground shall be applied to the exposed terminals when the stored energy drops to a level at which it is safe to do so.

d) If a test vehicle is used in field testing, its chassis shall be grounded. Protection against hazardous touch potentials with respect to the vehicle, instrument panels, and other conductive parts accessible to workers shall be provided by bonding, insulation, or isolation.
3. Control and Measuring Circuits

a) The routing and connections of temporary wiring shall be made secure against damage, accidental interruptions, and other hazards. To the maximum extent possible, signal, control, ground, and power cables shall be kept separate.

b) If workers are present in the guarded test area during testing, a test observer/spotter shall be present and shall be capable of implementing the immediate de-energizing of test circuits for safety purposes.

4. Safety Check

a) At field or temporary test sites, the Worker in Charge shall conduct routine safety checks at the beginning of each series of tests. He or she shall verify the following conditions:

1) barriers and guards are in workable condition and are properly placed to isolate the hazardous areas;
2) system test status signals, if used, are in operable condition;
3) test power disconnects are clearly marked and readily available in case of an emergency;
4) ground connections are clearly identifiable;
5) personal protective equipment is provided and used as required; and
6) signal, ground, and power cables are properly separated.
SECTION 3.17 WORKING ON OR NEAR EXPOSED ENERGIZED PARTS
and USE OF ELECTRICAL PROTECTIVE EQUIPMENT
and TOOLS

1. Tasks Requiring Only One Worker

a) routine switching when conditions at the site allow this work to be performed safely;
b) live-line tool work if the worker is so positioned that he or she is not within reach of
or exposed to contact with energized parts; and
c) emergency repairs to the extent necessary to safeguard the public.
d) If at any point the worker feels there should be another worker present to safely carry
out the work they must stop and notify their supervisor so additional workers can be
assigned to assist.

2. Tasks Requiring Two Workers

a) installation, removal, or repair of lines energized at more than 600 volts;
b) installation, removal, or repair of de-energized lines if the worker is exposed to
contact with other parts normally energized at more than 600 volts; and
c) installation, removal, or repair of equipment if the worker is exposed to contact with
parts energized at greater than 600 volts.

3. Minimum Approach Distances

Workers shall not approach or take conductive objects closer to exposed energized
parts than the distances set forth in Table 1 (below) unless:

a) the portion of the worker’s body that is closer than the minimum-approach
distance is insulated by using gloves and sleeves; or
b) the energized part is insulated from the worker and from other conductive objects
at a different potential.
### Table 1
AC Live-Line Work Minimum Approach Distances
(Based on Table 441-1 of NESC)

<table>
<thead>
<tr>
<th>Voltage Range (phase-to-phase) kilovolts</th>
<th>Phase-to-ground Exposure (ft.-in)</th>
<th>Phase-to-phase Exposure (ft.-in)</th>
<th>Exposure Non-Qualified Worker * Up to 50kV the approach distance is 10 ft., thereafter add 4 in for every 10kV</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.05 to 0.3</td>
<td>Avoid contact</td>
<td>Avoid contact</td>
<td>Avoid contact</td>
</tr>
<tr>
<td>0.301 to 0.75</td>
<td>1-1</td>
<td>1-1</td>
<td>10 ft.</td>
</tr>
<tr>
<td>0.751 to 15.0</td>
<td>2-2</td>
<td>2-3</td>
<td>10 ft.</td>
</tr>
<tr>
<td>15.1 to 36.0</td>
<td>2-5</td>
<td>2-10</td>
<td>10 ft.</td>
</tr>
<tr>
<td>36.1 to 46.0</td>
<td>2-7</td>
<td>3-1</td>
<td>10 ft.</td>
</tr>
<tr>
<td>46.1 to 72.5</td>
<td>2-11</td>
<td>3-9</td>
<td>10 ft. to 10 ft. 8 in.</td>
</tr>
<tr>
<td>72.6 to 121</td>
<td>3-9</td>
<td>5-2</td>
<td>10 ft. 8 in. to 12 ft. 4 in.</td>
</tr>
<tr>
<td>121.1 to 145</td>
<td>3-10</td>
<td>5-4</td>
<td>12 ft. 4 in. to 13 ft.</td>
</tr>
<tr>
<td>145.1 to 169</td>
<td>4-3</td>
<td>6-3</td>
<td>13 ft. to 14 ft.</td>
</tr>
<tr>
<td>169.1 to 242</td>
<td>5-8</td>
<td>9-2</td>
<td>14 ft. to 16 ft.</td>
</tr>
<tr>
<td>242.1 to 362</td>
<td>9-1</td>
<td>14-3</td>
<td>16 ft. to 25 ft. 4 in.</td>
</tr>
<tr>
<td>362.1 to 550</td>
<td>11-11</td>
<td>19-9</td>
<td>25 ft. 4 in. to 41 ft. 4 in.</td>
</tr>
<tr>
<td>550.1 to 800</td>
<td>15-10</td>
<td>29-2</td>
<td>41 ft. 4 in. to 61 ft. 4 in.</td>
</tr>
</tbody>
</table>

**NOTES:**
2. Arc flash hazard condition may require the distance to the worker to be increased. Refer to equipment label or consult with engineering before proceeding with work.
4. Apparel

When work is performed within reaching distance of exposed energized parts of equipment, each worker shall remove or render non-conductive all exposed conductive articles, such as rings or wrist watches, unless such articles do not increase the hazards associated with contact with the energized parts.

Persons working on or near energized lines or equipment and exposed to potential hazards of electric arc, or the flames caused by electric arc, shall wear clothing that, when exposed to flames or electric arcs, will not increase the extent of injury that could be sustained.

To this end VELCO will supply, and require to be worn, fire retardant clothing for those jobs that put the employee at potential risk. It is the employee's and supervisor's responsibility to ensure compliance. Clothing types required will be as determined by the risk assessment and Arc Flash Exposure level. Failure to comply will subject the employee to VELCO’s Disciplinary Policy.

Examples of tasks exposing workers to the “potential hazards of electric arc or the flame caused by electric arcs” are indoor switching, installing and removing meters, installing and removing grounds, switching on distribution and transmission lines, gloving energized lines, live-line tool work, switching in substations, electrical construction and maintenance tasks, and relay tasks.

5. Fuse Handling

When fuses must be installed or removed where one or both terminals are energized at more than 300 volts or with exposed parts energized at more than 50 volts, the worker must use tools or gloves rated for the voltage present. When expulsion type fuses are installed with one or both terminals energized at more than 300 volts, the worker shall wear eye protection, use a tool rated for the voltage, and remain clear of the exhaust path of the fuse barrel.

6. Covered (Non-insulated) Wire

Noncurrent-carrying metal parts of equipment shall be treated as energized unless the equipment is grounded.

7. Noncurrent-Carrying Metal Parts

Energized, covered (non-insulated) wires are considered exposed live parts and are subject to all rules for exposed live parts.

8. Opening Circuits Under Load

Devices used to open circuits under load conditions shall be designed to interrupt the current involved.
9. Use of Insulating Gloves

a) **The Ground-to-Ground Rubber Glove Rule** - Class 2 insulating gloves and protectors must be worn at all times when ascending, working on, or descending poles, structures, or buildings carrying electrical or communication conductors having a source of potential.

b) Insulating gloves need not be worn when working on the following:

1) energized lines 44kV and above with live-line tools if these lines are absent of distribution lines and all communication conductors (except for freely supported fiber-optic cables); or
2) de-energized lines that are separated from other energized portions of a line by a line section that is absent of conductors; are not subjected to induced voltage from adjacent energized lines; and are free of service drops and communication conductors (except for freely supported fiber-optic cables*).
   * Freely supported fiber-optic cables are cables that are not supported by conductive communication lines. Fiber-optic cables wrapped concentrically around telephone lines are not freely supported.

c) Class 2 insulating gloves and protectors must be worn when:

1) operating disconnects, air-breaks, and ground switches;
2) testing lines and installing grounds;
3) placing poles near energized conductors;
4) installing, removing, or repairing lines, guy wires, or pole grounds near energized conductors;
5) cutting trees near conductors; and
6) opening underground distribution compartments or enclosures, including service pedestals. However, Class 2 gloves need not be worn when making terminations on de-energized underground cable.

d) A worker violating (9) *Use of Insulating Gloves* is subject to immediate dismissal.

10. Use of Insulating Live-Line Tools

If insulating live-line tools are used, they shall be the primary means of insulating the worker from energized parts. When using live-line tools on 33kV or 34.5kV lines, Class 2 gloves are considered as providing secondary protection to the live-line tool in the event of conductor failure or worker error. Leather work gloves will be worn when using live-line tools on line 44kV and above.

On 33kV and 34.5kV lines, Class 2 gloves are considered as only providing secondary protection to live-line tools because the working-voltage for Class 2 insulating equipment is only 17kV, which is less than the actual phase-to-ground potential of these lines.
Section 4.0
Substation Facilities
SECTION 4.0 SUBSTATION FACILITIES

1. Draw-out Type Circuit Breakers

When draw-out type circuit breakers are removed or inserted, the breaker shall be in the open position. The control circuit shall be rendered inoperative if the design of the equipment permits. The use of safety eyewear, face shields, switching coats, hard hats and rubber gloves is required.

2. Substation Fences

Conductive fences around substations shall be grounded. When a fence is expanded or a section removed, fence grounding continuity shall be maintained, and bonding shall be used to prevent discontinuity.

3. Access and Working Space

Sufficient access and working space shall be provided and maintained about electrical equipment to permit ready and safe operation and maintenance of such equipment.

4. Guarding of Rooms Containing Electrical Supply Equipment

Rooms and spaces shall be enclosed with fences, screens, partitions, or walls to minimize the possibility that an unqualified person will enter; signs warning unqualified persons to keep out shall be posted; rooms and spaces shall be kept locked; and unqualified persons shall not enter unless escorted if:

a) exposed live parts operating at 50 to 150 volts are located within 8 feet of the ground or other working surface inside the room;
b) exposed live parts operating at 151 to 600 volts are located within 8 feet of the ground or other working surface and are guarded only by location; or
c) live parts operating at more than 600 volts are located within the room, unless:

1) live parts are enclosed within grounded metal-enclosed equipment; or
2) live parts are installed at a height above ground and any other working surface such that protection is afforded corresponding to protection provided by an 8 foot height at 50 volts.

5. Guarding Energized Parts

a) Guards shall be provided around all live parts operating at more than 150 volts without an insulating covering, unless the location of the live parts gives sufficient clearance to minimize worker contact.
b) Except for fuse replacement and other necessary access by workers, guarding of energized parts within the compartment shall be maintained during operation and maintenance to prevent accidental contact with energized parts and to prevent tools from being dropped on energized parts.
c) When guards are removed from energized equipment, barriers shall be installed around the work area to prevent workers not involved in the job from contacting exposed live parts.
6. Substation Entry

Upon entering a substation, each employee shall report his/her presence to the VELCO Operator and Security. If other workers are present at the station the employee must also report to the Person in Charge in order to receive information on special system conditions or work activities that may affect safety.

When in a substation or switching/terminal station, all gates must be locked or controlled. To be controlled, an employee must have a clear, unobstructed view of the gate and be present near the gate the entire time the gate is open/unlocked.

All gates must be locked when leaving the site.

7. Energizing New Equipment

Qualified personnel in each situation will establish the switching procedures that will be used to energize new equipment for the first time, or re-energize existing equipment that has tripped out because of a blown primary fuse. This equipment will be energized remotely if possible, i.e. from the control house or by SCADA. If it is necessary for the operator to be adjacent to the equipment being energized, see Electrical Safety, Personal Protective Equipment.
Section 5.0

Telecommunications
SECTION 5.0 TELECOMMUNICATIONS

1. Microwave Transmission

a) Workers shall not look into an open waveguide or antenna that is connected to an energized microwave source.

b) If the microwave electromagnetic radiation level within an accessible area associated with microwave communications exceeds the OSHA radiation protection guide, then a warning sign shall be posted for the area.

c) When a worker is in an area where electromagnetic radiation could exceed the radiation protection guide, control must be used to ensure the worker’s exposure is not greater than that permitted by that guide. Such measures may include administrative and engineering controls and personal protective equipment.

d) The radiation protection guide is 10mW/cm as averaged over any possible 0.1-hour period for normal environmental conditions and for incident electromagnetic energy of frequencies from 10MHz to 100GHz.

2. Power Line Carrier

Power line carrier work, including work on equipment used for coupling carrier current to power line conductors, shall only be performed using rules for work on energized lines.

3. Fiber Optics

Only authorized workers may open fiber optic enclosures. Workers shall not look into the end of ANY unterminated fibers.

OTDR testing may be taking place at the far end, or a fiber may have been reconfigured to carry laser-light.

From Manufacturer literature:

"Danger: Exercise caution when handling unterminated fibers. Far end equipment could be active; in such an event, invisible laser radiation will be present at the fiber end. Avoid direct exposure to the beam."

4. Grounding considerations for OPGW

Scope - Accessing OPGW for Splicing purpose only at the junction box (20 feet below the energized transmission circuit). This procedure has nothing to do with accessing the OPGW above the 20-foot barrier. This assume the splicing will be on a structure and not in a substation. If grounding OPGW in substation, Qualified Electrician or Line-worker must complete the grounding because the workers could be with 10 feet of transmission voltage.

Step 1. You must have at least two sets of personal grounds in good condition at the job site.

Step 2. Inspect your personal ground sets - At least 1/0 copper with the proper clamps. If any deficiencies are found, STOP, do not use defective grounds.
Step 3. Install the ground lead clamps of the personal ground sets to a solid ground - This should be the same single point ground source you tied to the grounding blankets and truck/van ground. The point of attachment must be below the can. Attach while wearing insulated Class 2 rubber gloves, hard-hat, and insulated hot stick. Secure. Make sure you have a clean connection (no paint or rust).

Step 4. Attached the other end of both sets of personal grounds to the two ends of the OPGW. Secure the clamp firmly on the conductor.

You now should have an equal potential zone which ties the truck/van, ground grid and both conductors tied to a single ground source.

Qualifications to complete this grounding.

First and foremost, any worker involved in grounding must have knowledge and training in
1) how to distinguish exposed live parts from other parts;
2) skills and techniques to determine nominal voltages;
3) The minimum approach distances for various voltages;
4) The proper use of special precautionary techniques (use of rubber gloves, equal potential grounding methods, Insulate and isolate, ground bonding); personal protective equipment necessary for different tasks (it will vary with voltages and arc flash values),
5) How to inspect and care for insulated protective gear and insulated sticks);
6) Ohms law, Effects of voltage/current on the body, Gradient voltage/current potential; How to properly test for voltage, How to properly use a multi-tester; How a de-energized line can become energized (induction, lightning, transient voltage when a switch is opened and closed, incorrect switching, capacitance, back-feed, etc.)

The workers does not have to be a qualified line worker or qualified high-voltage electrician, but he or she must have the know and skills to perform the tasks (safely setting up an equal potential ground grid and effectively grounding the OPGW).
Section 6.0

Vegetation Management Safety Practices and Standards
SECTION 6.0   VEGETATION MANAGEMENT

1. Tree Removal and Scope

This section identifies Arboriculture and Utility Vegetation Management safety requirements for all tree felling/removal and brush control.

2. Purpose

The purpose of this section is to provide safety criteria for Utility Arborists and other workers engaged in tree felling/removal and vegetation management.

3. Application

This section applies to all employees who work for VELCO as well as contractors and subcontractors.

4. Responsibilities

All workers shall be responsible for their own Safety and Health on any and all job locations of VELCO. They shall comply with all Federal, State and Local occupational safety and health standards rules and regulations and procedures, which ever are more stringent, that are applicable to their own actions and conduct.

5. References

ANSI Z133.1-2006 American National Standard for Arboricultural Operations - Safety Requirements; Website: www.isa-arbor.com


Special attention shall be made to the Electrical Hazards sections of both of the above.

6. Chain Saws

a) Employees and workers must be trained and experienced in chainsaw use.
b) Chain saws shall be inspected daily for safe working condition prior to use.
c) When clearing lines of branches and trees from an aerial lift, hydraulic-driven chain saws shall ordinarily be used. However, gasoline-driven chain saws may be used in an aerial lift when the Worker in Charge determines that:

   1) the limb or tree obstructing the line is of such a size that clearing it with an hydraulic-driven chain saw is not practical; and
   2) the saw is not started until the operator is in the bucket.

d) Saws shall be started only where they are firmly supported or on the ground.
e) Each chain saw shall be equipped with:
1) a control that will return the saw to idling speed when released;
2) a clutch adjusted so as not to engage the chain at idle speed; and
3) a factory original chain brake.

f) Saws shall be stopped for all cleaning, refueling, adjustments, and repairs except as the manufacturer’s servicing procedures require otherwise.
g) When a chain saw is in use, no one other than the operator may be within 6 feet of the saw.
h) When operating chain saws, workers must wear approved **eye, ear, hand, foot and head protection**, and if not in an aerial lift, **chaps** are required.
i) When not in use, chainsaws shall be kept in a case or have bar scabbard in place.

7. Climbing Trees

VELCO Employees are not trained, equipped or authorized to climb trees.

8. Line-Clearance Tree Trimmers

a) Before any line-clearance tree trimmer works around any tree, a determination shall be made of the nominal voltage of the power lines. However, a determination of the maximum nominal voltage may be made instead if all lines are considered as energized at this maximum voltage.
b) There shall be a second tree trimmer within nominal voice communication under any of the following conditions:
   1) if a line-clearance tree trimmer is to approach within 10 feet of any conductor energized at greater than 750 volts; or
   2) if branches or limbs being removed from lines energized at more than 750 volts are closer than the distances listed in **Table 3** (below), or if roping is necessary to remove these branches or limbs.
c) Line-clearance tree trimmers shall maintain the minimum approach distances from energized conductors given in **Table 3**.

d) Branches that are contacting exposed energized lines or that are within the minimum approach distances specified in **Table 3** may be removed only through the use of insulated equipment.
e) Ladders, platforms, and aerial devices may not be brought closer to an energized line than the distances listed in **Table 3**.
f) Line-clearance tree trimming work may not be performed in adverse weather even if the work practices required by this section are employed. Thunderstorms in the immediate vicinity, high winds, snow storms and ice storms are examples of adverse weather conditions that are presumed to make line-clearance tree trimming too hazardous to perform safely. Tree trimmers working in the aftermath of a storm shall be trained in the special hazards related to this type of work.
<table>
<thead>
<tr>
<th>Voltage Range (Phase-to-Phase)</th>
<th>Altitude Correction Factor</th>
<th>Phase-to-Ground</th>
<th>Altitude Correction Factor</th>
<th>Phase-to-Ground</th>
<th>Altitude Correction Factor</th>
<th>Phase-to-Ground</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>ft-in   m</td>
<td></td>
<td>ft-in   m</td>
<td></td>
<td>ft-in   m</td>
</tr>
<tr>
<td>0.050 to 0.300</td>
<td>Avoid contact</td>
<td>1.02    0.356</td>
<td>Avoid contact</td>
<td>1.04    0.407</td>
<td>Avoid contact</td>
<td>1.06    0.498</td>
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<tr>
<td>0.301 to 0.750</td>
<td></td>
<td>2.03    0.686</td>
<td></td>
<td>2.06    0.762</td>
<td></td>
<td>2.09    0.839</td>
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<td>0.751 to 5.0</td>
<td></td>
<td>2.03    0.686</td>
<td></td>
<td>2.07    0.788</td>
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<td>5.1 to 15.0</td>
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<td>3.01    0.940</td>
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<td>15.1 to 36.0</td>
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<td>36.1 to 46.0</td>
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<td>169.1 to 242.0</td>
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<td>13.06   4.115</td>
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<td>3.09    8.281</td>
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<td>29.05   8.967</td>
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</tbody>
</table>

*From 29 CFR 1910.269 Tables R-6 & R-7 altitude corrected (R-5) for 1,300 m, 3,000 m, & 4,200 m.