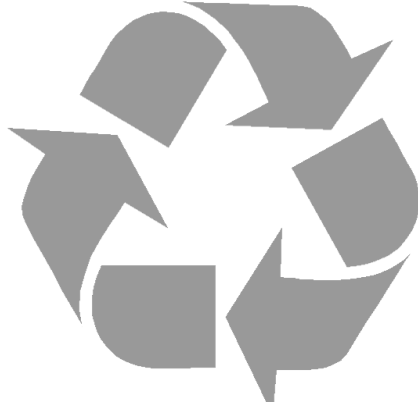




# Safety Manual

Issue Date: April 2021



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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<b>REVISION HISTORY</b>			
<b>Section</b>	<b>Description of Change</b>	<b>Author</b>	<b>Effective Date</b>
2.1 Emergency Response	Included Emergency Protocols and Notifications for work at Global Foundries Site. Vehicle Accident reporting. Included basic Spill Response protocols.	D. Haas T. Follensbee A. Fitch	4/16/2021
2.2 Injury/Illness/ Incident Reporting	Updated Notification Chart to report work related injuries and illnesses, property damage, vehicle/equipment damage	A. Fitch	4/16/2021
2.3 Aerial Buckets & Lifts	Update to ANSI A92 for all Mobile Elevating Work Platforms (MEWPs), added Risk Assessment steps	A. Fitch	4/16/2021
2.4 Asbestos	Asbestos location documentation available on Safety Page of Interact	A. Fitch	4/16/2021
2.5 All-Terrain Vehicle	JHA VELCO 003 ATV & ROV Loading-Unloading-Transport-Operation update 2021. Trailer inspections	A. Fitch	4/16/2021
2.7 Climbing & Structure Inspection	Inspection methods, Osmose inspections, Tailboard sections, annual training	A. Fitch M. Fiske S. Massie N. Lasai A. Stebenne	4/16/2021
2.9 Confined Space Entry	Decision chart for confined space, and permit-required vs non-permit required	A. Fitch	4/16/2021
2.15 Fall Protection	Arc flash requirement. 100 % fall protection over 4 feet above ground for climbing or changing location on poles, towers or structures.	A. Fitch	4/16/2021
2.18 Forklifts / PIT	Only trained and qualified personnel may operate forklifts.	A. Fitch	4/16/2021
2.27 PPE	Included High-visibility apparel requirements	A. Fitch	4/16/2021
2.33 Ticks, Insects, Poisonous Plants & Animal Encounters	New section added to safety manual	A. Fitch	4/16/2021
2.36 Trenches and Excavations	Warning systems for equipment working near trenches & excavations. Added Trench Inspection & Entry Authorization Form	A. Fitch	4/16/2021
2.37 Vehicle Safety	Reference to vehicle safety requirements in Employee Manual and Vehicle Norms. Trailer inspections.	A. Fitch	4/16/2021
3.7 Grounding for the Protection of Workers	Comprehensive review of section, with references to OSHA and Equipotential grounding & bonding. Included diagrams and charts.	A. Fitch M. Fiske S. Massie T. Veysey J. Harvey A. Stebenne	4/16/2021
3.17 Working on or Near Exposed Energized Parts	Included new subsection 11. Energized Work Permit to include decision chart and permit.	A. Fitch M. Fiske T. Veysey J. Harvey D. Riesterer	4/16/2021
1.0 Introduction	Updated incident reporting to be consistent with current Learning Opportunity Process. Review and misc. non-substantive edits.	A. Fitch	1/13/2020
2.1 Emergency Response	Added statement to call 911 immediately if someone is non-responsive or responsive with a medical emergency.	A. Fitch	1/13/2020
2.2 Injury/Illness/ Incident Reporting	Updated Contact info to report work related injuries and illnesses	A. Fitch	1/13/2020

2.3 Aerial Buckets & Lifts	New update to ANSI A92 effective December 2019 requires Fall Protection equipment use and a site risk assessment for Mobile Elevating Work Platforms (MEWPs) including Scissor Lifts.	A. Fitch	1/13/2020
2.9 Confined Space Entry	Added clarification between confined and enclosed spaces. Updated to include; A Tailboard and documented Confined Space Entry form shall be used prior to any individual(s) entering a confined space.	A. Fitch	1/13/2020
2.5 All-Terrain Vehicles	Updated section to be consistent with current policies/practices.	A. Fitch	
2.27 Personal Protective Equipment (PPE)	Switching PPE: added note to refer to Arc Flash Tables or Labels on electrical equipment for specific PPE requirements.	A. Fitch	1/13/2020
2.28 Pre-Work Summary Documentation Process and Preliminary Hazard Analysis	Updated section to be consistent with current process/practices.	A. Fitch M. Fiske T. Follensbee D. Haas D. Nelson S. Massie	1/13/2020
2.36 Vehicle Safety	Updated section to be consistent with current policies/practices.	B. Connaughton T. Follensbee A. Fitch	1/13/2020
2.30 Rigging & Hoisting	Updated section to be consistent with current policies/practices.	A. Fitch	1/13/2020
3.7 Grounding & Bonding for the Protection of Workers	Added language to clarify the requirement to use Class 2 insulating rubber gloves when installing/removing system safety grounds. Added flagging/barricading requirement. Added Bonding Non-Insulated Aerial Equipment.	M. Fiske S. Massie A. Fitch	1/13/2020
3.13 Qualified Worker	Updated Non-qualified Worker Working Limits Table	S. Massie A. Fitch	1/13/2020
3.17 Working on or Near Exposed Energized Parts and Use of Electrical Protective Equipment and Tools	Major update to the Two-Person Rule for Switching Activity	D. Haas R. Welch M. Fiske A. Fitch	1/13/2020
5.0 Tele-communications	Grounding considerations for OPGW - Edited grammar and included work practice that had been previously developed.	S. Massie A. Fitch	1/13/2020
Safety Manual All Sections	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, and an Appendix was added to contain written programs and other supplemental documents.	A. Fitch M. Fiske B. Connaughton D. Haas D. Nelson C. Root	01/07/19
Introduction	Removed strategic plan text. Misc. non-substantive edits.	D. Sawyer	08/30/13
General Practices	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.	D. Sawyer	08/30/13
Personal Equipment	Added statement about visitors requiring escorts consistent with current policy. Removed stipend amounts. Review and misc. non-substantive edits.	D. Sawyer	08/30/13
Hazard Communication	Changes related to new GHS requirements, and substantial updates clarifying policy and responsibilities.	D. Sawyer	08/01/14
Lockout/Tagout	Updated 7(b)(3) to three employees per current practice and recent training. Review and misc. non-substantive edits.	D. Sawyer	08/30/13
Vehicle Safety	Updated Vehicle Accidents section to be consistent with current practices and forms. Review and misc. non-substantive edits.	D. Sawyer	08/30/13
Vehicle Safety	Added Section 8 on vehicle tagout.	D. Sawyer	12/09/15
Traffic Control	Updated all sections clarifying responsibilities, adding traffic	D. Sawyer	08/01/14

	control plans, and adding sections on Equipment and Flaggers.		
Traffic Control	Updated section regarding truck drivers must be tail-boarded and guided by a spotter.	P. Kearney	04/06/16
Compressed Gas	Added <i>Material Handling and Storage</i> . Review and misc. non-substantive edits.	D. Sawyer	08/30/13
Barricades and Spotters – Changed to Work Area Protection	Added clarifying text regarding use of barricades, tape and spotters.	N. Boutwell	05/19/14
Barricades and Spotters– Changed to Work Area Protection	Added section on Person in Charge signage.	M. Fiske	01/02/15
Facility Access	Added Substation Access section.	D. Sawyer	08/01/14
Tailboard	Section edited for clarity.	N. Boutwell	01/10/14
Portable Ladders	Minimum Approach Distances updated to be consistent with the 2012 revision of the NESC. Review and misc. non-substantive edits.	D. Sawyer	08/30/13
Working Near Energized Parts	Minimum Approach Distances in Table 1 were updated to be consistent with the 2012 revision of the NESC. Review and misc. non-substantive edits.	D. Sawyer	08/30/13
Working Near Energized Parts	115 KV Minimum Approach Distance in Table 1 was updated to include the Transient Over Voltage factor.	P. Kearney	12/30/16
Grounding for Worker Protection	Review and substantial edit.	M. Fiske, P. Kearney	12/09/15
Grounding for Worker Protection	TPG Sizing Chart	P. Kearney	05/08/17
Mechanical Equipment	Minimum Approach Distances in Table 1 in Electrical Safety, Section 11 (which is referenced in this section) updated to be consistent with the 2012 revision of the NESC. Review and misc. non-substantive edits.	D. Sawyer	08/30/13
Overhead Lines	Added (3) <i>Demolition of Equipment, Structures, or Poles</i> . Review and non-substantive edits.	D. Sawyer	08/30/13
Overhead Lines	Added requirement to contact the Director of Transmission Assets or the Asset Engineer before an uncontrolled drop if a controlled drop is not feasible.	D. Sawyer	08/01/14
Tree Trimming	Minimum Approach Distances in Table 1 were updated to be consistent with the 2012 revision of the NESC. Review and misc. non-substantive edits.	D. Sawyer	08/30/13
Tree Trimming	115 KV Minimum Approach Distance in Table 1 was updated to include the Transient Over Voltage factor.	P. Kearney	07/13/17



# **Section 1.0**

## **Introduction & Commitment to Safety**

# 1.0 INTRODUCTION

## VELCO HEALTH & SAFETY MISSION & VISION

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 or Company representative 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)

The STAR protocol requires you to STOP, THINK, ACT & REVIEW to make sure what you are about to do is indeed what you intend to do to perform a task safely. 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; verbal 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 but are not limited to:

- 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. Working 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 culture and incorporated into job performance evaluations as a critical competency.
6. VELCO's Learning Opportunity process will be used as a means for continuous learning and improvement, and to strengthen the culture and practices of the organization. The process will be used for event analysis, tracking and trending, and follow-up action items for continuous learning and improvement.

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.*

# **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. If electrical hazards are present, immediately contact the VELCO Emergency Line.
- b. If an employee or contracted resource is non-responsive, or they are responsive and there is a medical emergency, 911 shall be called immediately; 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 caller's 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).

#### Response for Emergencies at Global Foundries Site (Right-of-way line work and IBM 86 & IBM 87 Substations)

The response for emergencies at the Global Foundries site should be handled differently due to the secured facility and the fact that they have their own Emergency Response Team (ERT) on-site.

For any emergency at the Global Foundries site:

- Report the Emergency to the Global Foundries Security Control Center (SCC) by dialing 802-769-3333 from a cellular phone or 3-3333 from a GF substation phone.
  - When reporting the emergency, provide your name and the specific location of the incident.
  - Provide as much information about the incident as possible.
  - Stay on the line until Security tells you to disconnect.
- The SCC will activate their Emergency Response Team.
- The Emergency Response Team has the resources necessary to respond to all potential emergency situations and is responsible for contacting and coordinating actions with all public emergency responders.
- Notify the VELCO Control Center once health and/or safety conditions are secured.

### GENERAL STEPS TO TAKE IN AN EMERGENCY:

- ❖ STAY CALM & ASSESS SITUATION TO MAKE SURE YOU ARE SAFE
- ❖ CALL FOR HELP & PROVIDE YOUR LOCATION
- ❖ PROVIDE PROTECTION FOR INJURED & MANAGE USING FIRST AID/CPR TECHNIQUES
- ❖ GUIDE EMERGENCY SERVICES
- ❖ PROTECT YOURSELF FROM EXPOSURE TO OTHER HAZARDS INCLUDING; ELECTRICAL, MECHANICAL, BLOOD-BORNE PATHOGENS, ETC.
- ❖ DOCUMENT THE SITUATION AFTER THE EMERGENCY HAS BEEN ADDRESSED

## 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 911 and as soon as possible notify the Manager/Supervisor who in turn shall notify the Safety Manager and Department Director.

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 have to file a state accident report ([Vermont Crash Report, Operator: Motor Vehicle](#)) in which someone is injured or there is total property damage of \$3,000.00 or more. If applicable, the report must be filed within 72 hours. This is the responsibility of the Operator of the vehicle, a copy of this report shall be made available to Safety & HR.

## 4. Facility Evacuation, Control Center - Refer to VELCO Emergency Response Plan & Evacuation Plan Located on VELCO Interact Safety Page

## 5. Spill Response

- Employees whose duties would require them to respond to a spill or release of oil or hazardous materials (OHM), shall receive annual OSHA HAZWOPER First Responder Operations level training at a minimum. This training provides guidance on;
  - Defensive Actions
  - Containing Spill
  - Minimizing Harm
  - PPE Requirements
- Larger spills or spills that present a safety hazard beyond the level of training will be managed by a qualified response team designated by VELCO's Environmental Department.
- All spills shall be reported to the VELCO Environmental Department or a designated representative.
- For more information regarding spills, spill response procedures and notifications, please refer to the Spill Response section of the VELCO Environmental Guidance Manual and VELCO's Spill Prevention Control and Countermeasures Plan.



## SECTION 2.2 INJURY / ILLNESS / INCIDENT REPORTING

Refer to Appendix I for Reporting Forms

### 1. Injury / Illness / Incident Investigating

The VELCO Safety Manager or their designee 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.”). VELCO’s Learning Opportunity program is used for incident investigation, tracking and trending, and follow-up action items for continuous improvement. In its most basic form the LO process provides a consistent means to detect, prevent, and correct or mitigate consequences of observations or events to ensure the safe and reliable execution of VELCO’s mission, vision, and values. The LO process focuses on improving processes, tools, and techniques; not blame.

### 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. [State of Vermont Form 1](#).



Form01.pdf

- 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. Notifications for Injury/Illness/Incident Reporting

Notification Chart

Injury / Illness		Property Damage	Vehicle / Equipment Damage	
Supervisor / Manager		Supervisor / Manager	Supervisor / Manager	
Human Resources	Safety Manager	ROW & Legal for Insurance Claims	Safety & Fleet Manager	Legal for Insurance Claims
Department Director				
ETeam Member				

## SECTION 2.3 AERIAL BUCKETS & LIFTS


### 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

- New update to ANSI A92 effective December 2019 requires Fall Protection equipment use and a site risk assessment for Mobile Elevating Work Platforms (MEWPs) including Scissor Lifts.

#### How to Perform a Site Risk Assessment\*

<b>01</b> Define the work.	<ul style="list-style-type: none"><li>• Task: What specific tasks do you need to do to complete the job?</li><li>• Location: Where will you be working? Will you need to transport machines?</li></ul>	<ul style="list-style-type: none"><li>• Timing: When does the work need to be finished? Are there times of day you can't work?</li></ul>
<b>02</b> Select a MEWP.		<ul style="list-style-type: none"><li>• Boom Lift</li><li>• Scissor Lift</li><li>• Vertical Lift</li></ul>
<b>03</b> Evaluate risks.	<ul style="list-style-type: none"><li>• MEWP-related: Working at height, staying within rated capacity</li><li>• Job-specific: Avoiding power lines, accessing hard-to-reach areas</li></ul>	<ul style="list-style-type: none"><li>• Additional: Keeping workers on the ground safe, preventing unauthorized use of equipment</li></ul>
<b>04</b> Identify controls.	<ul style="list-style-type: none"><li>• Safe work procedures: Use correct PPE, ensure understanding of fall arrest systems</li><li>• Proper training: For operators, occupants, supervisors and maintenance personnel</li></ul>	<ul style="list-style-type: none"><li>• Smart scheduling: Organize the work in ways that minimize exposure to hazards</li><li>• Rescue planning: May include self-rescue, assisted rescue and/or technical rescue</li></ul>
<b>05</b> Communicate.	<ul style="list-style-type: none"><li>• Operator is trained and authorized to operate the MEWP</li><li>• Occupant has basic knowledge of MEWP use and safety</li></ul>	<ul style="list-style-type: none"><li>• Supervisor monitors use of MEWP to ensure safety plan is followed</li><li>• Technician performs MEWP maintenance in line with manufacturer's requirements</li></ul>

\*The steps listed above are several of the necessary steps when performing a site risk assessment. Consult your site supervisor for a full list of required steps.

- 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. A complete list of know sites and corresponding documentation is maintained on the Safety page of Interact. 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, which for the purpose of the Safety Manual are defined as motorized off-highway vehicles including; 4-Wheelers, Recreational Off-road Vehicles (ROVs) and Snowmobiles.

### 1. Training

Employees shall successfully complete the required hands-on training prior to operating ATVs and ROVs. Refresher training is required every 2 years. Prior to the operation of ATVs and ROVs, employees must; have completed the VELCO required training, reviewed the operator's manual for the equipment they will operate, inspect the equipment / ramps / trailers, and have approval from their supervisor to operate this equipment.

### 2. JHA

The JHA VELCO 003 ATV & ROV Loading-Unloading-Transport-Operation update 2021 shall be reviewed prior to operation of All-Terrain Vehicles which includes loading/unloading & transport. Note: JHA 003 ATV & UTV Operation and JHA 006 Towing Unloading of ATV or UTV have been combined into a single JHA referenced above.

### 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.
- Do not overload the equipment or operate it beyond its limitations.
- Inspect the equipment before each use. If damage or defects are found, do not operate the equipment and notify the Fleet Manager to coordinate repairs.

## **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.

Osmose inspections are on an 8-year cycle

- Any poles identified at 80% or below are scheduled to be replaced
- Any poles identified at 66% or below are rejected and shall be identified as “Do Not Climb”

Pole inspection training shall be conducted as part of the annual pole-top rescue training.

Tailboard discussions shall include pole / structure inspection and address any concerns when poles or structures are to be climbed.

When the condition of poles / structures is in question, the STAR protocol shall be used.

### **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. (Note: All confined or enclosed spaces mentioned shall be considered permit-required confined spaces until the space has been evaluated and the atmosphere has been found to be safe for entry via proper testing, evaluations and visual inspections. An enclosed space only contains an electrical hazard and is considered enclosed for routine entry. A space cannot be classified as enclosed if any other hazard or abnormal condition is identified. Proper inspection and testing procedures required by the OSHA standards are the only acceptable methods that can be used to reclassify the space as enclosed). The attendant may never enter the space.

#### 1. Inventory of Confined Spaces

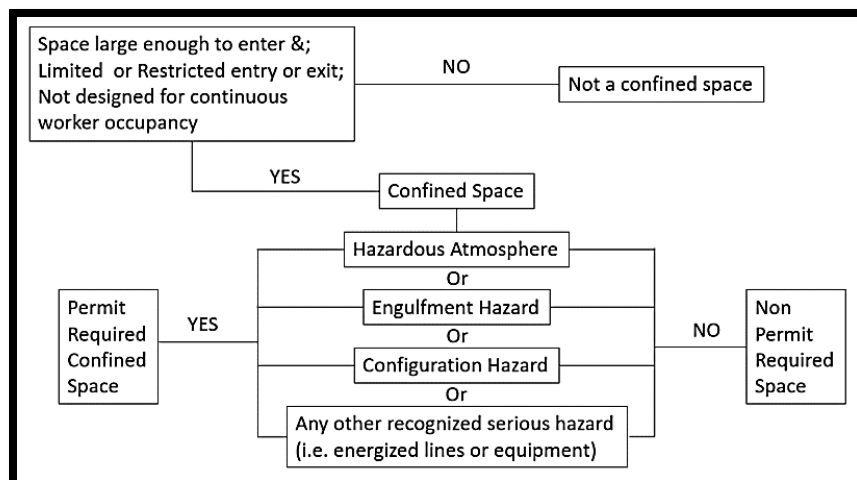
Supervisors, assisted by the VELCO Safety Manager, will inventory and list confined spaces in work areas under their responsibility. Confined spaces are those spaces that:

- are large enough and so configured that a person can enter and do work;
- have limited or restricted means of entry or exiting; and
- are not designed for continuous worker occupancy.
- 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:

- atmospheric (oxygen contents, flammability, toxicity);
- engulfment (water);
- mechanical/electrical; and
- 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) A Tailboard and documented Alternative Entry or Reclassification Entry form for confined space entry will be completed and discussed with all involved prior to entry.

## **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 or extension #261 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 6 pm and 6 am 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. If electrical hazards are present, immediately contact the VELCO Emergency Line.
- c. If an employee or contracted resource is non-responsive, or they are responsive and there is a medical emergency, 911 shall be called immediately; notify the Control Center once health and/or safety conditions are secured.
- d. 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) Where there is a potential for an arc flash while working near energized lines or components, the fall protection devices must be Arc Rated.
- c) Lifelines shall be protected against being cut or abraded.
- d) 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.
- e) Starting April 1, 2015, there will no longer be an exception for qualified employees climbing or changing location. On and after that date, “each qualified employee climbing or changing location on poles, towers, or similar structures any time they are more than 4 feet above the ground, must use fall protection equipment unless the employer can demonstrate that climbing or changing location with fall protection is infeasible or creates a greater hazard than climbing or changing location without it.” [29 CFR 1910.269\(g\)\(2\)\(iv\)\(C\)\(3\)](#).
- f) 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.
- g) 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.
- h) If vertical lifelines or drop lines are used, only one worker may be attached to any one lifeline.
- i) 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**

Only trained and qualified personnel may operate forklifts or other powered industrial trucks. 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 work place. 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
- c) Safe work practices to prevent exposure.

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).

Minimum Working Approach Distances for Vehicular and Mechanical Equipment	
Voltage in kilovolts	Minimum Clearance in feet
≤50 kV	10 feet
115 kV	15 feet
230 kV	20 feet
345 kV	20 feet
450 DC	25 feet



## **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.

## Hot Work Permit

**Before initiating hot work, can this job be avoided? Is there a safer way?**

This Hot Work permit is required for any temporary operation involving open flames or producing heat and/or sparks. This includes, but is not limited to: Brazing, Grinding, Soldering, Thawing Pipe, Torch Applied Roofing and Welding.

**Instructions:**

1. Verify precautions listed below or do not proceed with work.
2. Complete this permit and issue to person(s) performing the work.
3. Retain this copy in the project file.



Permit #:	Date:	Shift:	Work Order #:
Location of Work:			
Equipment Number:			
Purpose of work:			
Name of person(s) doing the work:			
Name of fire watch person:			

I verify the above location has been examined, the precautions checked on the Precautions Checklist below to minimize the chance of fire.

Supervisor's Name: \_\_\_\_\_ Signature: \_\_\_\_\_

Duration (Hrs): \_\_\_\_\_ Start Time: \_\_\_\_\_ Stop Time: \_\_\_\_\_

**Hot Work Permits may not be authorized for more than one shift!**

Yes	No	N/A	Item
			Are water hoses or fire extinguishers available and in good repair?
			Is hot work equipment in good repair?
			Have flammable liquids, dust, lint and oily deposits within 35 ft. been removed?
			Have explosive atmosphere been eliminated? Test results:
			Has the work surface area been cleaned of grease, paint, etc.?
			Have combustible floors been wet down, covered with damp sand or covered with fire resistant sheets?
			Have surface areas below work area been protected?
			Have access ways below work area been barricaded?
			Are UV shields in place?
			Has enclosed equipment been cleansed of all combustibles?
			Have all containers been purged of flammable liquids and vapors?
			Will fire watch be provided during and for 60 minutes after work, including coffee and/or lunch breaks?
			Has fire watch been provided with suitable fire extinguishing devices?
			Has the fire watch person been trained in use of fire extinguishing devices and in sounding alarm(s) or other emergency communications?
			Has additional fire watch been assigned to adjoining areas, above and below?
			Hot work area will be monitored for 4 hours after completion of work?
			Other:
			Other:

## 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 with in 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 Contactor 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/Tag out 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.

## 7. General Provisions

- 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. High-Visibility Safety Apparel

The need to be seen is critical for worker safety. This is especially true for employees who work around moving vehicles or equipment. In an effort to prevent injuries and fatalities from “struck-by” hazards, workers wearing high-visibility safety apparel (such as high-visibility vests, clothing or rain gear) help alert vehicle operators to their presence, especially in low-light environments.

- Workers are required to wear high-visibility safety apparel when working within 15 feet of roadways (see Class requirements for road MPH below) and when working near vehicular construction equipment.
- Garments should be worn properly, meaning they should be the right size for the person wearing it. Vests and jackets should be kept closed on the front and sides to ensure visibility from 360 degrees.
- High-visibility safety apparel shall be replaced when it becomes dirty or faded.
- When working on or near energized lines or equipment, high-visibility garments must be labeled as flame resistant and be free from any flammable or oily material that could compromise its flame resistant properties.

Performance Class	When to Wear	Examples
<p><b>Class 1</b> Provides the lowest recognized coverage and good visibility</p>	<p>Intended for locations where the worker is not exposed to vehicle traffic however wearing high-visibility safety apparel can alert others of their presence and enhance safety. Examples include Right of Ways and Warehouse.</p>	<p>This apparel should have a bright yellow or orange color and should have a minimum of 155 square inches of reflective tape.</p>
<p><b>Class 2</b> provides moderate body coverage and superior visibility</p>	<p>Intended for workers who must work near vehicle traffic not exceeding 50 mph. During inclement weather. Construction sites where moving heavy equipment poses a hazard.</p>	 <p>Type R Class 2 FR ASTM F1506-19</p>
<p><b>Class 3</b> provides the greatest body coverage and visibility under poor light conditions and at great distance</p>	<p>Intended for workers who must work near vehicles exceeding 50 mph. When outside construction work is performed at night.</p>	 <p>Type R Class 3</p>

## 5. 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.

## **6. 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.

## **7. 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.

## **8. 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.

## **9. 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

## **10. 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.
- d) Refer to Arc Flash Tables or Labels on electrical equipment for specific PPE requirements.

## **SECTION 2.28 PRE-WORK SUMMARY DOCUMENTATION PROCESS AND PRELIMINARY HAZARD ANALYSIS**

### **1. Purpose**

Ensure that pre-planning of all work requested and by VELCO or upon lands where VELCO has a vested interest, excluding work listed in the exemptions under section 4 (which follow other internal processes) are identified, work is scoped appropriately, affected departments are notified in advance, and risks are identified and mitigated before work starts.

Specifically, through proper planning, the Person In Charge (PIC) can ensure that:

- a) work is adequately staffed with qualified individuals;
- b) adequate VELCO oversight of Work Crew is defined and scheduled, as necessary;
- c) necessary regulatory permitting or authorizations have been acquired, or an appropriate timeline has been developed and incorporated into the Project schedule;
- d) hazards are identified and precautions can be taken in advance to eliminate or mitigate hazards;
- e) appropriate coordination is accomplished between applicable VELCO departments;
- f) appropriate landowner/stakeholder notifications or collaborations have been completed;
- g) advanced notice is provided to VELCO Operations for the coordination of required system outages, do not reclose orders 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**

Person in Charge (PIC): The VELCO individual who is requesting and/or coordinating the performance of the identified Work in the Pre-Work Scoping document. This individual is responsible for completion, revisions, and/or updates of the Pre-Work Scoping document.

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 PIC in the completion of the Pre-Work Scoping and/or other project documentation/reporting. To the extent possible, the SME should remain the same person through the course of the work.

Pre-Work Scoping Document/Checklist: A document that is completed during the project planning phase, and its appropriate completion will ensure the Job Scope, Schedule, Risks and any necessary mitigating aspects are identified and thoroughly vetted in advance of the work. (This document is located on the Interact Safety Page under Forms)

Work Crew: Any person or group conducting Work. This includes but is not limited to 1) municipalities and utilities, 2) contractors and consultants; 3) subcontractors; and 4) 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 identified phases of VELCO construction projects and Maintenance activities that are not covered by other VELCO planning, scoping and notification processes, or that rely on outside parties to perform the work. These activities include but are not limited to pre-construction reconnaissance, field survey, exploratory borings and testing, tree clearing outside of typical substation, line and ROW vegetation maintenance, line construction, substation construction, road building, site restoration, and other field activities.

### **3. Roles & Responsibilities**

#### a) Person in Charge

- 1) Accountable for all aspects of the Work and responsible for the execution of the Pre-work scoping documentation.
- 2) Ensure qualified/competent individual(s) are assigned to oversee the work.
- 3) Ensures that the Work Crew(s) have received safety and environmental training.
- 4) Consults periodically with the affected departments to ensure that this procedure is being executed appropriately and effectively for the Work. Additionally, the PIC 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).
- 5) Ensures that Work Crew(s) have completed VELCO's safety and environmental training
- 6) Updates the Pre-Work Summary document and re-distributes when significant changes in work scope are identified.

#### b) VELCO Qualified Person or Subject Mater Experts (SME)

- 1) Assists the PIC with the completion of the Pre-Work Scoping Document. 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.

#### c) 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 and qualified to perform all aspects of the Work.
- 4) Assess Work to determine mean and methods in coordination with VELCO's SME(s).

- 5) For VELCO initiated work or work being performed for VELCO, must ensure, in coordination with the PIC, that all individuals of Work Crew have received VELCO's safety and environmental training.

#### **4. Applicability and Submittal Requirements**

The Pre-Work Scoping, Documentation and Notification Process shall be followed if any of the Activities of Concern are proposed as part of the Work; AND the proposed Work is not covered under any of the exemptions listed below.

Activities of Concern: Work that is not covered by other VELCO planning, scoping and notification processes.

Asset Maintenance:

- Any work that poses a potential risk to impact or damage VELCO properties, facilities, or assets; including, but not limited to:
  - Excavation around VELCO substations, transmission/telecommunications lines and structures, and radio sites
  - Work tasks that have the potential to contact/damage energized equipment and/or telecommunication equipment
  - Work proposed at the VELCO Pinnacle Ridge and Wenlock facilities that could affect critical infrastructure.

Telecommunications:

- Excavation around VELCO telecommunications lines and structures, and radio sites
- Work tasks that have the potential to contact/damage telecommunication equipment
- Assets owned by VELCO on other's infrastructure

Operations:

- Any work that poses a potential risk of impacting VELCO's transmission assets, operation of those assets, or operation of VELCO's Control Center
- Any work that poses a potential risk of impacting the operation of another utility's assets, operation of those assets, or operation of their Control Centers
- \*Note - Work may require an outage or Do Not Reclose order on VELCO assets

ROW:

- Any work that requires landowner or other stakeholder notifications
- Any work that has the potential to impact landowner or other stakeholders
- Any work that has the potential to impact Real Property owned, leased, licensed, controlled, under easement, or under other vested interest by VELCO

Safety:

- Any work that poses a potential risk to human life, health, or safety; including but not limited to:

- Working from an elevated position with a potential fall hazard
- Working within 20 feet of energized equipment over 600 volts
- Confined Space Entry
- Operation of heavy equipment
- Operation of power equipment
- Working or exposure to hazardous materials
- Working steep or uneven terrain

Environmental:

- Ground disturbance/excavation/underground installations
- Travel and operation of heavy equipment off maintained roads
- Stringing of new wires
- Tree clearing outside of normal ROW/substation vegetation management activities
- Any work in or around known protected resources
- Handling, transportation, disposal, or potential exposure to hazardous material or contaminated media, by untrained VELCO employees or any contractors (excluding hazardous waste disposal contractors)
- Demolition/decommissioning of buildings and assets
- Construction/installation of new assets; or
- The operation of ATVs, UTVs or other light equipment by contractors, not confined to existing gravel roads, and not directly overseen by VELCO

Exemptions:

- VELCO Projects that have obtained a Section 248 Certificate of Public Good (CPG) or Act 250 permit, have a designated representative from each of the VELCO Departments listed above, and the proposed Work and schedule have been fully vetted with each.
- VELCO Projects/Programs/Activities that have a designated representative from each of the VELCO Departments listed above and the proposed Work and schedule have been fully vetted with each.
- VELCO Projects that follow the “Look-Ahead” Procedure outlined in the VELCO Environmental Guidance Manual and the proposed Work and schedule have been fully vetted with each of the VELCO Departments listed above.
- The proposed Work is being performed solely by VELCO Subject Matter Experts (SMEs) or VELCO employees and the work is being supervised by SMEs, and the work has been fully vetted with applicable departments.
- Activities that require approval under the ROW Usage Procedure.

**5. Procedure**

The Pre-Work Scoping procure will be as follows:

- 1) The need for Work activities is identified
- 2) A PIC is assigned to scope and manage the Work
- 3) The PIC develops a preliminary SOW

- 4) The PIC reads and understands this Pre-Work Scoping, Documentation and Notification Process
- 5) The PIC compares the preliminary SOW to the list of Activities of Concerns for each for each of the VELCO departments listed in Section 4 above
- 6) If the preliminary SOW proposes any of the activities listed as an Activity of concern, then proceed to 7 below. If not, the work can proceed without further review.
- 7) When the proposed Work, will include any of the Activities of Concern, than the PIC then compares the Work to the exemptions listed in Section 4 above.
- 8) If the proposed Work falls within one or more of the exemptions listed in Section 4 above, than the Work can continue in accordance with the VELCO policies and procedures that govern that type of work. If the proposed work does not fall within one of the exemptions listed in Section 4 above, proceed to 9.
- 9) If the proposed Work includes Activities of Concerns and does not fall within Exemptions listed in Section 4 above, then the PIC completes the Pre-Work Scope Documentation and Notification process, at least two weeks before the start of Work (The PIC must understand that if it is determined that Permits, additional Safety precautions, outages, oversight, or other mitigation factors are required, work will need to be delayed until the appropriate mitigation factors can be implemented).
- 10) Representatives from the applicable VELCO departments receive and review the Pre-Work Scope documentation, seek clarity and additional information, as needed and either sign off to allow the work to proceed; or require additional mitigation factors to minimize risk exposure to the employees and the company.
- 11) If additional mitigation measures are needed, the PIC will work with the applicable VELCO department representatives to adjust and finalize the SOW to include the necessary mitigation measures.
- 12) Once complete the applicable VELCO representatives will sign off on the Pre-Work Scope Document and the Work and proceed in accordance with the finalized SOW.

In order to facilitate a smooth and timely review and approval of the Pre-Work Scoping Document and/or to determine if the Pre-Work Scoping Document is required, it is highly recommended that the PIC review the Work with the SMEs and applicable VELCO department representatives to discuss and develop the preliminary SOW, prior to initiating the this procedure.

## **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 only use line hardware as it is designed and within its rated capacity.
- 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) Ropes used for rigging applications shall be inspected for wear, damage and/or defects that would require its removal from service. Ropes shall be used within their rated capacities and protected from sharp edges or other objects/conditions that may cause damage. The rope manufacturer info with SWL will be 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 when it is safe and practical 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 construction 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 TICKS, INSECTS, POISOUS PLANTS & ANIMAL ENCOUNTERERS

### 1. Ticks

Fourteen different species of tick have been identified in Vermont. Of these 14 species, five are known to bite humans and can transmit diseases. However, over 99% of all tick-borne diseases reported to the Vermont Department of Health are caused by only one tick: the blacklegged tick also referred to as the deer tick.

Lyme disease is the most commonly reported tick-borne disease in Vermont. In 2017, Vermont had the highest rate of reported confirmed and probable Lyme disease cases in the U.S.

In Vermont, tick-borne illnesses are most often transmitted between early spring and late fall since ticks are most active during warm months. Be Tick Smart - take action against bites to prevent Lyme and other diseases.

#### PROTECT

- When possible try to avoid areas where ticks live, i.e. grassy, brushy, or wooded areas.
- Use EPA-registered tick repellents. Read label, follow all directions and warnings.
- Cover up to keep ticks off your body.

#### CHECK

- Complete an initial check of your clothes and body.
- After your shift check your whole body for ticks.

#### REMOVE

- Remove the tick as soon as you can, grasp tick as close to skin as possible with removal device and pull out. Try to identify the type of tick.
- Clean the bite area with soap, water and an antiseptic.
- **Report all work related tick attachments to your Manager/Supervisor and the Safety Manager.**

#### WATCH

- Watch for symptoms of tick-borne illness.
- Tell your health care provider if you do get symptoms. Discuss with Safety and HR to help manage any work restrictions.

### 2. Insects

Stinging insects have a sting (or stinger) at the posterior end of their abdomen. This group of insects includes honey bees, bumble bees, wasps, hornets, yellow jackets, and ants. Generally, most stings will only result in a temporary injury - pain, swelling, and skin redness around the sting. However, sometimes the effects can be more severe – even life-threatening, depending on where you are stung and what allergies you have.

If you are stung in the throat area of your neck, it may cause edema (swelling caused by fluid build-up in the tissues) around the throat and may make it difficult to breathe.

Remember, if you are startled or stung while you are driving, working with power tools or machinery, or are on a ladder, be aware of your surroundings – pull over, climb down the ladder, or stop working until you have assessed the situation and determine if it is safe to continue.

In rare cases, a severe allergic reaction can occur. This situation is serious and can cause "anaphylaxis" or anaphylactic shock. Symptoms of anaphylaxis can appear immediately (within minutes) or up to 30 minutes later.

- **People who have known allergic reactions and carry an Epi-pen should self-administer and get immediate medical attention.**
- **If you see any signs of severe reaction, or even if you are not sure, call or have a co-worker call emergency medical services (e.g., 911) right away. Also, get medical help if the sting is near the eyes, nose or throat.**
- **Stay with the person who has been stung to monitor their reaction. Notify the Manager/Supervisor and the Safety Manager.**

### **3. Poisonous Plants**

Vermont is home to a number of poisonous plants, including poison ivy, poison sumac, poison oak, poisonous parsnip and giant hogweed. (Visit [www.cdc.gov/niosh/topics/plants/default.html](http://www.cdc.gov/niosh/topics/plants/default.html) for descriptions and images.) Problems arise when workers come in contact with the sap oil of these plants. The oil, called urushiol, is released when the plants are disturbed, bruised, damaged or burned. About 80 to 90 percent of workers who get this oil on their skin will experience an itchy red rash with bumps and blisters. For most people, this rash can be treated by using over-the-counter medication. However, some workers experience more severe reactions that may require medical attention.

#### **Prevention**

Workers can take a number of steps to protect themselves from poisonous plants, these include:

- Identify any poisonous plants and stay clear.
- Wear long-sleeved shirts, pants and gloves. Wash any exposed clothing separately to prevent contamination of other clothing.
- Consider using barrier creams that contain bentoquatam – a lotion that helps prevent poison oak, poison ivy and poison sumac rashes.
- **If exposure to poisonous plants occurs, rinse the affected skin immediately with soap and water and use a post-contact poison plant lotion. Report the reaction to your Manager/Supervisor and the Safety Manager.**

## 4. Animal Encounters

Dogs attacks, wildlife encounters and encountering an animal with rabies are rare but could pose a significant risk to employee safety.

- Use your situational awareness to identify any animals that could pose a risk before exiting your vehicle. Do not exit your vehicle if you observe an animal that could pose a risk. If the animal does not leave or the situation does not resolve itself, contact your Manager to discuss options. In some cases, making contact with a landowner or animal control will be required.
- Do not try to interact with or engage with animals, even if an animal seems tame it may still bite or attack. It is best to leave all animals alone while at work.
- Wildlife will generally stay away from people unless threatened or if they are physically or mentally distressed. Staying calm and moving to a safe location will generally resolve the issue. However, if the animal is acting aggressive or in a strange manner, grab an object to defend yourself, get to a safe location immediately and notify your Manager and Safety Manager.
- If you are confronted by a dog:
  - Resist the urge to run away from a dog. Instead while facing the dog, use a calm but loud voice and back away.
  - Find anything to put between you and the dog. If possible, get in a vehicle, go inside a building or get behind a fence.
  - If a dog becomes aggressive or begins to attack, grab an object to defend yourself, get to a safe location immediately.
- As noted, avoiding animals is the best prevention, but if you are bitten or scratched wash the area with soap and water immediately. If it is possible and safe to do so, try to take a picture to identify the animal. Notify your Manager and Safety Manager and seek medical treatment right away.
- Report all incidence or near misses of animal encounters to your Manager and the Safety Manager so that these situations can be investigated and communized with others.

## SECTION 2.34 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 2.35 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 2.36 TRENCHES AND EXCAVATIONS

For Additional Guidance Reference OSHA 29 CFR 1926 Subpart P [1926.651](#) & [1926.652](#)

### 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 trenches or 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) Provide a warning system (such as barricades, hand or mechanical signals, or stop logs) when mobile equipment is operated adjacent to an excavation, or when such equipment must approach the edge of an excavation, and the operator does not have a clear and direct view of the edge.
- j) Before entering any trench or excavation over 5 feet in depth, 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. The form below shall be completed to document this inspection prior to trench entry.

### 2. Requirements for Protective Systems

- a) Persons working in trenches 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 trenches excavations deeper than 5 feet, the sides of the trench or excavation will be sloped to 30 degrees or less, or benched or a predesigned and engineered support system (trench box) will be used.

c) The competent person on-site must inspect and evaluate the protective system to ensure it is safe and must correct any safety concerns.

TRENCH INSPECTION AND ENTRY AUTHORIZATION FORM						
LOCATION:					DATE:	
TIME OF INSPECTION(S)						
WEATHER CONDITIONS:				APPROX. TEMP.:		
CREW LEADER:			SUPERVISOR:			
DIMENSIONS:		DEPTH =		Yes	No	
		TOP =	W	L		
		BOTTOM =	W	L		
SOIL TYPE:		TESTED:				
<input type="checkbox"/> Solid rock (most stable)		<input type="checkbox"/> Yes		<input type="checkbox"/> <input type="checkbox"/> ..... Saturated soil / standing or seeping water		
<input type="checkbox"/> Average soil		<input type="checkbox"/> No		<input type="checkbox"/> <input type="checkbox"/> ..... Cracked or fissured wall(s)		
<input type="checkbox"/> Fill material				<input type="checkbox"/> <input type="checkbox"/> ..... Bulging wall(s)		
<input type="checkbox"/> Loose sand				<input type="checkbox"/> <input type="checkbox"/> ..... Floor heaving		
				<input type="checkbox"/> <input type="checkbox"/> ..... Frozen soil		
				<input type="checkbox"/> <input type="checkbox"/> ..... Super-imposed loads		
				<input type="checkbox"/> <input type="checkbox"/> ..... Vibration		
				<input type="checkbox"/> <input type="checkbox"/> ..... Depth greater than 10'		
PROTECTION METHODS:			PLACEMENT OF SPOILS & EQUIPMENT			
<i>(Walls MUST be vertical—NO voids)</i>			<input type="checkbox"/> <input type="checkbox"/> ..... Spoils at least 2 feet from edge of trench			
SHORING			<input type="checkbox"/> <input type="checkbox"/> ..... Equipment at least 2 feet from edge			
<input type="checkbox"/> Timber			<input type="checkbox"/> <input type="checkbox"/> ..... Backhoe at end of trench			
<input type="checkbox"/> Pneumatic			<input type="checkbox"/> <input type="checkbox"/> ..... Compressor, etc. at remote location			
<input type="checkbox"/> Hydraulic			LADDER LOCATION			
<input type="checkbox"/> Screw Jacks			<input type="checkbox"/> <input type="checkbox"/> ..... Located in protected area			
<input type="checkbox"/> Trench Shield			<input type="checkbox"/> <input type="checkbox"/> ..... Within 25 feet of safe travel			
UNEVEN, IRREGULAR WALLS			<input type="checkbox"/> <input type="checkbox"/> ..... Secured			
<input type="checkbox"/> Trench Box			<input type="checkbox"/> <input type="checkbox"/> ..... Extends 36 inches above the landing			
Sloping: <b>q 1:1 (45°)</b> <b>q 1 ½:1 (34°)</b>			<input type="checkbox"/> <input type="checkbox"/> ..... Leads to safe landing			
Yes	No	ENVIRONMENTAL CONDITIONS:		OTHER:		
<input type="checkbox"/>	<input type="checkbox"/>	Gas detector used?		<input type="checkbox"/> <input type="checkbox"/> Shoring equip. & materials inspected prior to use?		
<input type="checkbox"/>	<input type="checkbox"/>	Confined space permit issued?		<input type="checkbox"/> <input type="checkbox"/> Is trench SAFE to enter?		
COMMENTS:						
				Work Order #		
<b>N O T E</b>	All unsafe conditions must be corrected prior to trench entry. If any hazardous conditions are observed, the trench must be immediately evacuated and no one allowed to re-enter until corrective action has been taken.				TO BE FILLED OUT BY COMPETENT PERSON	
					Excavation Entry Authorized By:	

## **SECTION 2.37 VEHICLE SAFETY**

VELCO's vehicle safety requirements are documented in the Employee Manual, Vehicle Norms and here within the Safety Manual. Employees and Contractor Employee who operate vehicles for company business are expected to know and understand the requirements within these documents. If there are any questions, they should be brought to the Manager, Safety Manager, Fleet Manager, or Human Resources.

### **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.
- Monitor weather and road conditions, it is expected that the driver will assess the conditions and if they feel them to be unsafe for travel, they will not drive and notify their manager.
- Do not operate vehicles/equipment 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 will be maintained through the direction of the fleet manager, however it is the responsibility of all employees to report potential safety or maintenance needs of pool vehicles to the fleet manager. Never operate a vehicle that is unsafe to use. If an employee determines or suspects that a vehicle or piece of equipment is unsafe for any reason, the employee shall contact the fleet manager and follow vehicle lockout/tag out procedure below.

Operators shall inspect safety equipment at least monthly 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.

### **3. Daily Vehicle Inspection Report (DVIR)**

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 “Do Not Operate” tag shall be filled out and securely affixed to the steering wheel of the vehicle. (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 ATV/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 properly 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 (or combination of a vehicle and trailer) with a Gross Vehicle Weight Rating (GVWR) of 10,000 Lbs. or greater requires the use of wheel chocks.

## **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; Driver/operator shall stop if sight/communication is lost with the spotter, or
- b) If a spotter is not available, visually 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, all vehicles with obstructed views (such as a utility/maintainer bodies, standard bodies regularly carrying ATV's or other items

that obstruct rear views) and heavy equipment shall be equipped with back up alarms.

## 9. Trailering

- a) Trailers shall be maintained in good working order.
- b) Inspect trailers before each use. Pay special attention to the condition of trailers that have not been routinely used. Brakes may be frozen, hubs may need grease, lights may not be working, and tires may be dry rotted. If any damage or defects are found that affect the safe operation, do not use the trailer, red tag it out-of-service and notify the Fleet Manager.
- c) Trailers shall not be loaded beyond their indicated rating or registered rating, whichever is less.
- d) Loads should be properly secured.
- e) Caution shall be exercised when lowering trailer ramps and proper lifting techniques shall be used.
- f) Be careful of slips, trips and falls when walking on or near a trailer. Affix traction tape, or equivalent to steps.
- g) Use proper backing techniques (see backing).
- h) Ensure trailer hitch is appropriately connected to an adequately rated connection, cargo is properly secured, lights are in working order and safety chains are properly attached.
- i) Verify trailer brakes are functioning properly when equipped.
- j) The vehicle and trailers capacity shall not be exceeded.

## 10. Towing Poles & Oversize Loads

Trucks towing poles and oversize loads 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.
- e) All necessary permits shall be with the driver of the vehicle.

## 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.
- e) Portable containers of fuel, flammable material or other substance that could release noxious fumes, shall not be stored or transported in the cab of vehicles/equipment.

## **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. Traffic Violations, Tickets and Reporting**

VELCO is not responsible for any traffic violations or parking tickets acquired by violation of city ordinance, state or federal laws regarding your driving habits and operation of your motor vehicle. Any ticket issued is the employee's responsibility, even if the ticket is issued while conducting business for us. It is the employee's responsibility to notify HR of any incident in which a traffic violation was issued.

## **14. Vehicle Accidents - Immediate Actions**

Report all serious company related vehicle crashes to 911 and as soon as possible notify the Manager/Supervisor who in turn shall notify the Safety Manager and Department Director.

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, the Safety Manager and Fleet 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 Learning Opportunity Process will be used for incident investigation, tracking and trending, and follow-up action items for continuous learning and improvement.

## **15. Locking Unattended Vehicles**

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

## **16. Cell Phone Policy**

This policy applies to use of company cell phones while driving a vehicle at any time and the 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 may 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).

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 2.38 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 1-5**  
Maximum Use Voltages for Insulating Equipment

Class of Equipment	Maximum-Use Voltage* a-c rms
00	500
2	17,000

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**

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

(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

To work on lines or equipment as de-energized, they must be isolated from all known sources of electrical energy, tested for absence of nominal voltage and grounded. However, if it can demonstrate that installation of a ground is impracticable or that the conditions resulting from the installation of a ground would present greater hazards to employees than working without grounds, the lines and equipment may be treated as deenergized provided that the employer establishes that all of the following conditions apply:

- Deenergized. The employer ensures that the lines and equipment are deenergized under the provisions of § 1926.961.
- No possibility of contact. There is no possibility of contact with another energized source.
- No induced voltage. The hazard of induced voltage is not present.

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 of system grounding and equipotential bonding for the protection of employees used on transmission lines.

The rules and regulations regarding temporary grounding are set forth in [29 CFR 1910.269\(m\)](#) *Deenergizing lines and equipment for employee protection and Grounding for the protection of the employees* [29 CFR 1910.269\(n\)](#). When all conditions and/or procedures are not fully understood by the employees performing the work, the work shall be suspended and discussed with the immediate supervisor regarding the safest way to handle that particular situation. If further guidance is needed, the Construction Manager, Safety Manager and Director of Asset Maintenance shall be contacted for guidance.

### 1. 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 bonded at the same potential and meeting the requirements found in [29 CFR 1910.269](#) and [Appendix C -- Protection From Hazardous Differences in Electric Potential](#).

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 (i.e. if 4/0 system safety grounds are used, a 4/0 PPJ is required).

Step Potential: The voltage difference between two points on earth's surface, separated by a distance of one pace (assumed to be one meter/approximately 3 feet) in the direction of the maximum voltage gradient.

System Safety Grounds – Ground leads and clamps with a current carrying capacity, for the time necessary to clear a fault (a Minimum of 15 Cycles), designed to carry the maximum fault current until the system protection takes out the circuit.

Touch Potential: The voltage difference between an object which the worker may touch, and the earth upon which the worker is standing. This voltage difference could be hazardous and could result from energizations, induction or faults.

## 2. Equipotential Zones

Temporary protective grounds shall be placed at such locations and arranged in such a manner to prevent each employee from being exposed to hazardous differences in electric potential as required by [29 CFR 1910.269, Appendix C \(Protection from Hazardous Differences in Electric Potential\)](#) sets out methods that may be used to establish an equipotential zone.

The concept of equipotential grounding and bonding is to place a low resistance path around the worker to limit the amount of current that will flow across the worker's body should the circuit become accidentally energized. To accomplish equipotential bonding, a worker shall configure their personal protective grounds in such a manner so that they have an approved, adequately sized ground lead in parallel with their body to make anything they can touch, contact, or stand on, be at the same voltage potential as the conductor being worked.

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.

## 3. Flagging & Barricading for System Safety Ground Locations

When system safety grounds are installed on transmission lines, a high-visibility flag or marker shall be installed at each structure after grounds are installed and prior to work being performed. The flag/marker shall remain until the grounds are removed.

Workers must stay well clear from the pole or temporary ground rod where system grounds are installed, to avoid hazardous step and touch potentials if a fault were to occur or if induction is present. Cone off the ground rod or structure to remind workers of the hazard. If system safety ground will be left in place overnight, the ground rod or structure must be barricaded with warning or danger tape to alert others of this hazard (not applicable to system safety grounds installed within substation fences).

Flags or markers shall be installed with an approved and tested live-line tool unless they have been attached prior to installing the system safety grounds. When a flag/marker 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. Each system safety ground location for the circuit to be worked shall be documented on the job briefing/tailboard form.

## 4. 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, a Minimum of 15 Cycles under maximum fault. Protective grounds must have a compressed ferrule and heat shrink covered conductor clamp on each end and impedance low enough to cause immediate operation of protective devices in case of accidental energizing of the lines or equipment. Conductors or grounding clamps that are visibly dirty or have excessive oxidation shall be cleaned prior to installation. Grounding clamp connections shall be tightly connected and ensure that it is a good electrical connection.

Grounding materials shall be selected in order to provide a safe work zone while considering practical applications. Consider the ability for grounds to move violently if the circuit becomes inadvertently energized and take the appropriate mitigation measures.

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.

All protective grounds must be electrically tested at least annually. If protective grounds fail the visual or electrical test, they shall be removed from service and either repaired or replaced. Temporary protective grounds will be labeled with a standardized labeling system. If grounds are subject to a fault they shall be removed from service.

### b) Bundled Conductor Ground Jumper

For bundled conductor, an appropriate length of grounding jumper (as short as reasonably possible and kept clear of the immediate work area) must be used to tie each sub-conductor together.

- Bundled Conductor spacers should not be depended on for fault protection because there is no "Fault Rating" on spacers.
- Bundled breaker, strain bus and disconnect taps are excluded from this requirement.


### c) Cluster Brackets

Cluster brackets are an important component for establishing an equipotential zone when working from the pole. A cluster bracket shall be used on wood, tubular steel, and concrete structures, and must be installed on each pole from which work will be performed. They are supplied with standard wheel chain tighteners that should be hand tightened to provide a secure fit. Cluster brackets shall be installed just below where the employees working are on pole. if work is to be performed. On steel tubular poles, a connection from the cluster bracket to the vang with the appropriate style of clamp (flat clamp with T-handle).

## 5. Grounding Procedures

### a) General

Grounding inside the fence of a substation requires a minimum of 4/0 stranded copper grounds or parallel grounds depending on available fault current at work location. Refer to temporary protective ground sizing chart. Note that this chart outlines the minimum sizing requirements and some locations require larger grounding assemblies or the added protection of double opens between the work and energized equipment.

	<b>AC Temporary Protective Grounds (TPG)</b> Transmission Line & Substation Application Table		<b>TPG-1</b>
Voltage (kV)	Circuit Location	Minimum TPG Cable Size (2 x size = parallel cables) (AWG) ++	Notes
345	All	1 x 2/0	
230	All	1 x 2/0	
120	**	1 x 2/0	** Newport and Highgate HQ Block
115	All	1 x 4/0 or 2 x 2/0	
69	All	1 x 2/0	
48-46	All	1 x 4/0 or 2 x 2/0	
34.5	All	1 x 4/0 or 2 x 2/0	
18	Ascutney SVC	1 x 2/0	
13.8	All**	1 x 4/0 or 2 x 2/0	** Exception Granite RPD
13.8	Granite RPD**	2 x 4/0	** Requires two open points
12.47	All	1 x 4/0 or 2 x 2/0	
3.2	Essex STATCOM**	2 x 4/0	** Requires two open points

++ 2/0 TPG's have minimum rating of 3H, and 4/0 TPG's have minimum rating of 5H.

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Bracket grounding with equipotential worksite bonding shall be used to ground de-energized power lines so they can be worked safely. This method requires a minimum of two sets of grounds (one on each side of the work location), a cluster bracket or a continuous ground from the driven ground rod to the lowest phase, and at least one driven ground rod (if not grounding at a structure with an established ground in place) to complete the System Safety Grounds. Equipotential worksite bonding shall be established for the scope of work to be performed, to ensure workers are protected from second points of contact with difference of electrical potential. Considerations for equipotential bonding shall be made for the protection for workers on the ground for tasks such as conductor installation, removal and repair (i.e. splicing).

When bracket grounding is installed, another set of systems grounds and cluster band may be needed at work location to ensure equipotential bonding required to protect the workers. Examples where this applies is at a distribution crossing adjacent to the work area.

For grounding and bonding of other de-energized lines, parts or equipment, the qualified Person in Charge shall determine the method that gives the best protection for the job to be done. 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.

b) Prior to Grounding

Before any ground is installed, lines (all conductors) and equipment must be de-energized, then tested for absence of voltage with an approved voltage detector attached to a live-line tool while maintaining the minimum approach distance for the nominal voltage.

- 1) Only Electrically Qualified Personnel per 29 CFR 1910.269(a)(2) shall be assigned to test for absence of voltage and install grounds. Following the 2-Man rule per VOSHA  
[https://labor.vermont.gov/sites/labor/files/doc\\_library/Appendix%20A.pdf](https://labor.vermont.gov/sites/labor/files/doc_library/Appendix%20A.pdf)
- 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 and approved rated Voltage Testing instrument attached to a tested and approved hot line tool of sufficient length to maintain the required minimum approach distance (MAD) by the worker wearing Class 2 Rubber Insulating Gloves to test each phase conductor or circuit part to verify it is de-energized. Test each phase conductor to ground and 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 tested and approved live-line tool.

When a ground is to be removed, the grounding device shall be removed from the line or equipment using a tested and approved live-line tool before the ground-end connection is removed. Rubber Gloves are not a "Live Line Tool".

3) Tools and Methods

All System Grounds must be installed and removed with a tested and approved live-line tool of sufficient length (no less than an 8-foot stick) to maintain the required minimum approach distance by the worker wearing Class 2 Rubber Insulating Gloves, and as prescribed for the voltage of the

equipment to be grounded. The connection should be made by hand-tightening using the live-line tool. (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 where they could be inadvertently contacted. Possible work practices include;

- Securing the unattached clamp in a live-line tool and use a hand line to help secure ground leads. A grounding bar can also be used to park the ground conductor clamps so that they can be installed or removed with a live-line tool.

#### 4) Removal of Grounds for Tests

Grounds may be removed temporarily for tests. During the test procedure, workers shall use tested and approved live-line tools and appropriately rated insulating equipment, while maintaining the minimum approach distance on all previously energized equipment and conductors. Other methods shall be used as necessary to protect exposed workers in case the previously grounded lines and equipment become energized.

#### 5) Additional Information

- a) At locations where System safety grounds have been installed (outside of substations and where the hazard of induction is present) the ground rod or location where ground connection is made shall be flagged and barricaded to prevent inadvertent step or touch potential contact.
- b) **Bonding Non-Insulated Aerial Equipment**  
It is recommended that a quick release bond be placed from the elevated working platform to any de-energized and grounded conductor that will be contacted when the hazard of induction is present. Alternately, rubber insulated gloves are used and any second points of contact are insulated or isolated.
- c) All three phases of the transmission system must always be connected together at a common point and connected to ground.
- d) The work area must be kept at the same potential.  
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.
- e) If the System Safety Grounds and/or Personal Protective Jumpers are subjected to a fault, they must be discarded.
- f) The grounding conductor leads must not be only connected to an overhead ground wire for the purpose of grounding a transmission line. On transmission circuits which have a static/shield wire(s) present, this static/shield wire(s) shall be connected with a single



approved grounding jumper to a phase conductor. This shall become part of the common ground source. If there is a fiber optic cable, (OPGW- Optical Ground Wire), contained within the static/shield wire, the connections shall be made with an approved ground lead. Care should be taken not to over tighten the ground lead connection on the OPGW.

- g) 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. To establish an equipotential work zone additional grounding Personal Protective Jumpers and Pole bands shall be installed at work structures within Bracket Grounds.
- h) 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.
- i) 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.
- j) 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.
- k) A suitable container shall be selected for transportation and storage of the grounding equipment.

#### d) Personal Protective Jumpers (PPJs)

- 1) PPJs will be installed with an approved and tested live-line tool. Rubber gloves are not required as long as the system grounds have been verified to be installed before applying the PPJ.

#### 2) PPJ Connection to the Structure

##### a) 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.

##### b) 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.

##### c) Wood and Concrete Poles

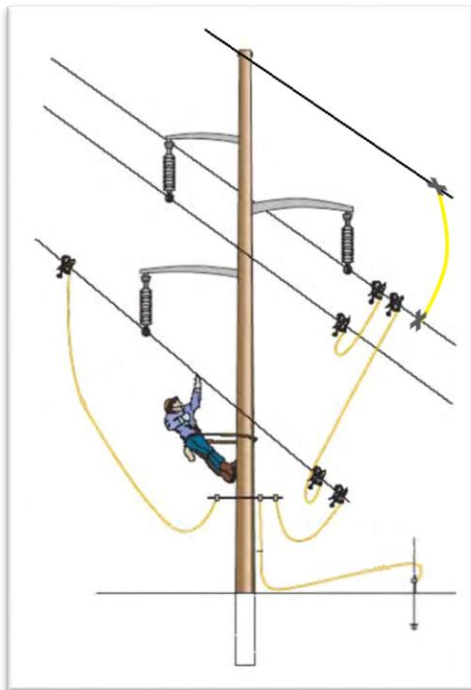
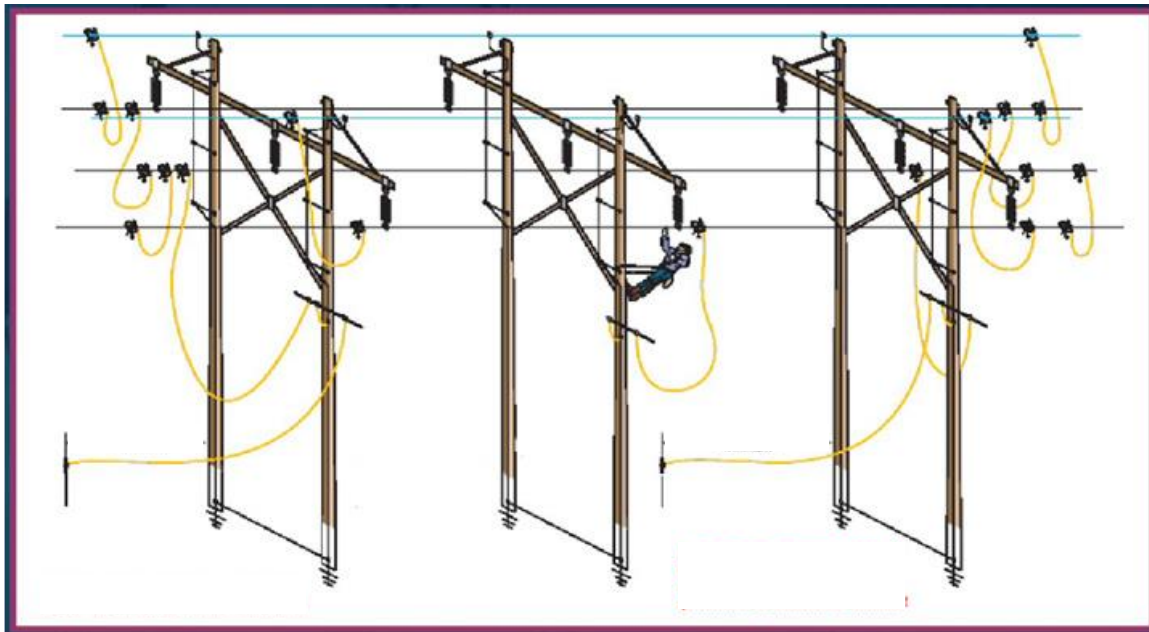
A pole grounding bar must be installed on the pole and connected to the pole down lead, using an appropriately sized ground lead, three to six feet below the pole grounding bar. The PPJ can then be connected to the pole grounding bar.

## 6. Installing System Safety Grounds on 450 DC

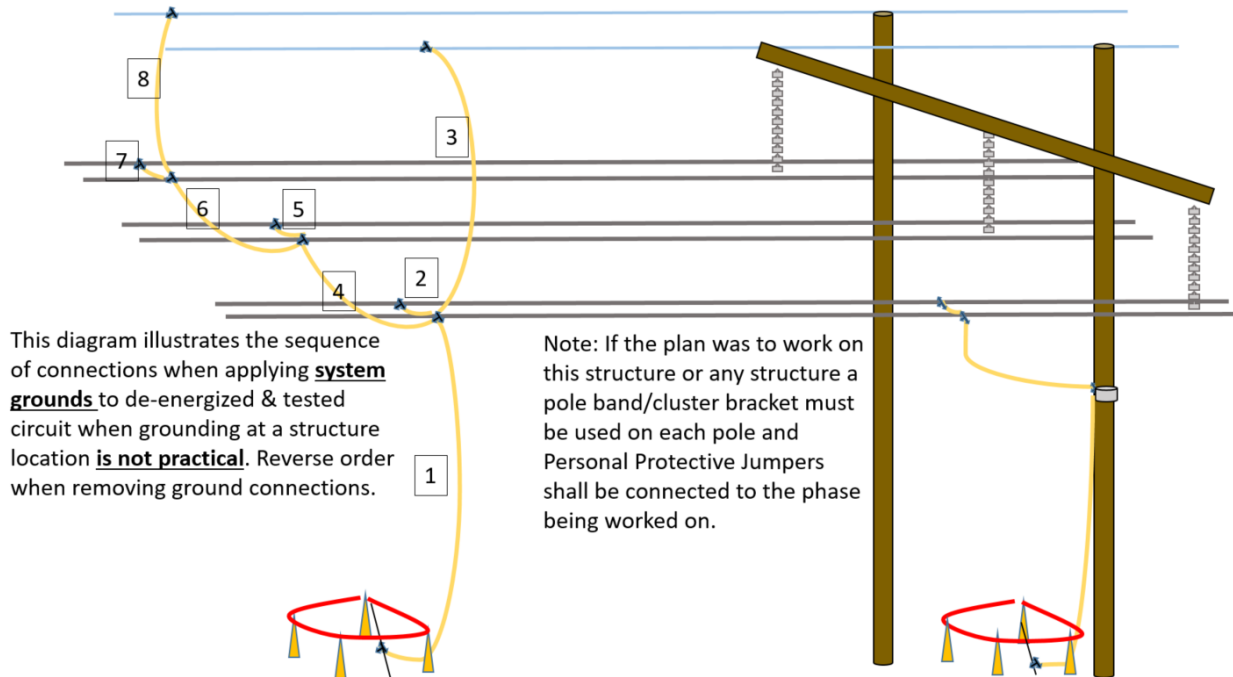
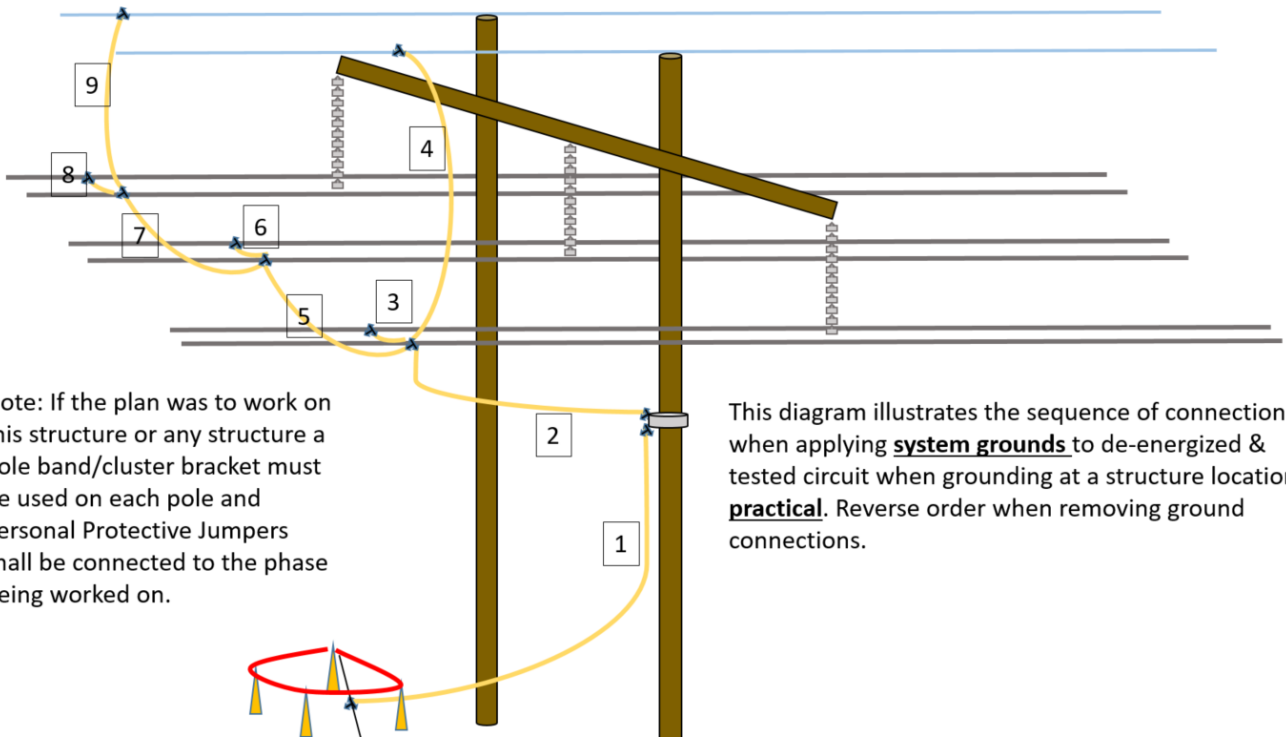
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## 7. Bracket Grounding and Equipotential Diagram

The following diagram show examples of how System Safety Grounding and Equipotential bonding shall be installed on the transmission system.



Equipotential grounding on a single pole structure



## **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**

Phase to Phase Voltage	Phase to Ground Voltage	Max. Allowed Leakage Current
115 kV	66.6 kV	66.6 microamps
230 kV	132.9 kV	132.9 microamps
345 kV	199.4 kV	199.4 microamps
500 kV	289 kV	289 microamps

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)**

Limit Voltage Range	MAD to Live Conductors Distance (FT-IN)		MAD for Barehand Work Above 3,000' Altitude	
	Phase to Ground	Phase to Phase	Phase to Ground	Phase to Phase
115	3 ft. 9 in	5 ft. 2 in	4 ft. 3 in	6 ft. 3 in
230	5 ft. 8 in	9 ft. 2 in	10 ft. 9 in	17 ft. 1 in
345	9 ft. 11 in	14 ft. 3 in	14 ft. 4 in	23 ft. 8 in

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.

Attachment A

**INSULATED BOOM AERIAL DEVICE DIELECTRIC TEST DAILY REPORT**

Location: \_\_\_\_\_ Crew Leader: \_\_\_\_\_  
 Class A Truck # \_\_\_\_\_ Von Meter Serial # \_\_\_\_\_

Date/Time	Weather and Temp	Voltage	Air Gap Test (3 minutes)	Contact Test (3 minutes)	Von Meter Alarm Setting	Test by (Initial)

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**

Phase to Phase Voltage	Phase to Ground Voltage	Max. Allowed Leakage Current
115 kV	66.6 kV	66.6 micro amps
230 kV	132.9 kV	132.9 micro amps
345 kV	199.4 kV	199.4 micro amps
500 kV	289 kV	289 micro amps

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

	2 <sup>nd</sup> Person <sup>1</sup> in two person bucket performing aerial work inside the non-qualified approach distance (lines energized)	2 <sup>nd</sup> Person <sup>1</sup> on a pole performing aerial work inside the non-qualified approach distance (lines energized)	Working Grounded Conductors	Switching from Ground Position	2 <sup>nd</sup> Person <sup>1</sup> on two person crew with a qualified <sup>4</sup> worker working inside the non-qualified approach distance
1 <sup>st</sup> or 2 <sup>nd</sup> year electrical line worker with less than 4000 hours <sup>5</sup>	NO	NO	YES <sup>3</sup>	YES <sup>1</sup>	NO
3 <sup>rd</sup> year electrical line worker with More than 4000 hours <sup>5</sup>	YES <sup>1</sup>	YES <sup>1</sup>	YES	YES	YES <sup>1</sup>
	Performing Live Line Bare Hand Work <sup>6</sup> or Sticking Energized Conductors as part of a minimum 4 person crew with at least 3 qualified <sup>4</sup> workers	Setting Poles Near Energized Conductors	2 <sup>nd</sup> Person <sup>1</sup> Testing, Applying and Removing Grounds	Working with and splicing ADSS Fiber from the splice rack position below to the ground	OPGW once grounds have been installed by a qualified <sup>4</sup> 2 person crew
1 <sup>st</sup> or 2 <sup>nd</sup> year electrical line worker with less than 4000 hours <sup>5</sup>	NO	NO	NO	YES	YES
3 <sup>rd</sup> year electrical line worker with More than 4000 hours <sup>5</sup>	YES <sup>2</sup>	YES	YES	YES	YES

<sup>1</sup> The other worker is fully qualified<sup>4</sup>, provides direct supervision, and approves

<sup>2</sup> With approval of Foreman

<sup>3</sup> Cannot act as 2<sup>nd</sup> person installing grounds

<sup>4</sup>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.

<sup>5</sup>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

<sup>6</sup> For Live Line Bare Hand work the workers need to be “Live Line Bare Hand” certified according to OSHA 1926.950b

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. Two-Person Rule for Switching Activity**

Two people shall be present during switching activities performed:

- on equipment normally energized over 600 volts,
- racking of switchgear breakers regardless of voltage (at all times, including de-energized),
- testing a circuit to be de-energized with the use of a switch stick and high voltage tester,
- when applying and removing grounds, (when working from a bucket or structure 2<sup>nd</sup> person must meet the qualifications outlined in the Non-qualified Worker Working Limits Table)
- One person must be qualified; the other person must be; trained in First Aid/CPR, familiar with the safety aspects of energized equipment and emergency communications procedures.

Exceptions (only one person required when):

1. When operating equipment from the control building.
2. Decoupling / coupling motorized devices i.e. air break or circuit switcher.
3. In the case where an emergency situation exists with immediate concern for life and safety.
4. With review and agreement with the Qualified Switch Person, their Supervisor and the VELCO System Operator that the switching activity can be performed safely.

Note: If at any point the worker feels there should be another worker present to safely carry out the switching activity, they must stop and notify the VELCO System Operator and their Supervisor so additional workers can be assigned to assist.

### **2. 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)

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

NOTES:

1. Refer to 2012 National Electrical Safety Code, Rule 441 for more details on Minimum Approach Distances.
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.

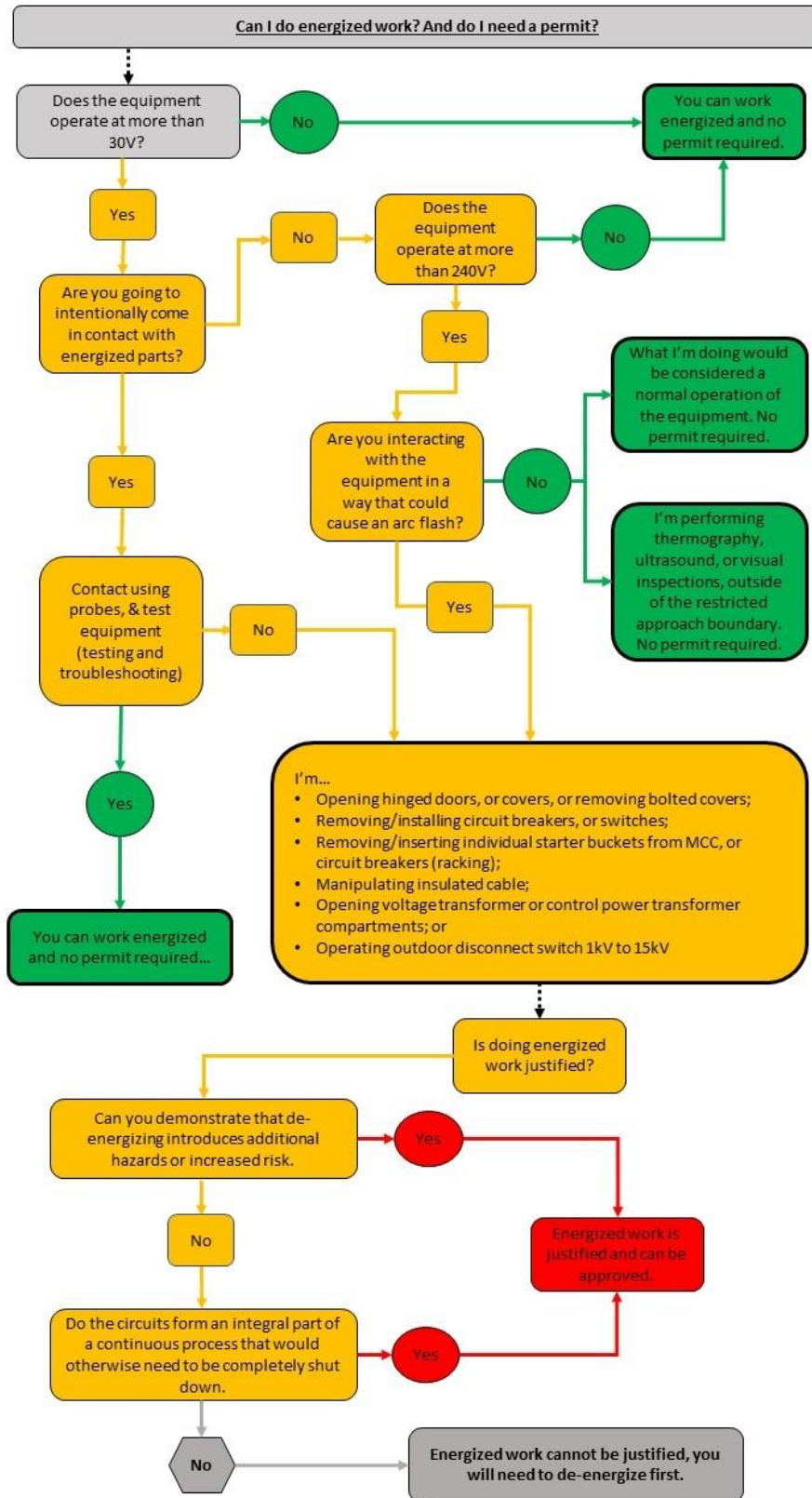
## 10. Use of Insulating Live-Line Tools

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.

# 11. Energized Work Permit

When possible work should be planned to be performed on de-energized electrical equipment. If work is planned to be performed on energized low or medium voltages, use the flow chart below to determine if an Energized Electrical Work Permit is required.



## Energized Electrical Work Permit (Page 1 of 2)

<b>Part I: To be completed by the requester or supervisor of the job</b>	
(1) Identify requester: Name: _____ Work Unit: _____	
(2) Job location:	
(3) Description of work to be done:	
(4) Explain why the circuit/equipment cannot be de-energized or the work delayed until the next scheduled outage:	
(5) Description of circuit and equipment:	
(6) Detailed description of procedure to be used in performing the above work: <b><u>No work on energized equipment shall be performed alone</u></b>	
(7) Safe work practices to be used: (Check all that apply)	
<input type="checkbox"/> Barriers/Boundaries	<input type="checkbox"/> Non-conductive covers/blankets
<input type="checkbox"/> Voltage rated tools	<input type="checkbox"/> Attendant
<input type="checkbox"/> PPE	<input type="checkbox"/> OTHER – (Describe)
<input type="checkbox"/> LOTO other circuits/tools	
(8) Maximum Voltage that will be exposed:	
(9) What rating is the upstream protective device? (Amperage):	
(10) Limited and Restricted Boundaries for <u>shock hazard</u> : <input type="checkbox"/> Refer to the arc flash label (if present), <input type="checkbox"/> Tasks not listed must be calculated by Electrical Engineer. <ul style="list-style-type: none"> <li>• Limited Approach Calculation Results: ____ Ft ____ inches</li> <li>• Restricted Approach Calculation Results: ____ Ft ____ inches</li> </ul>	
(11) Determination of <u>flash protection boundaries</u> : <input type="checkbox"/> Refer to the arc flash label (if present), <input type="checkbox"/> Tasks not listed must be calculated by Electrical Engineer. <ul style="list-style-type: none"> <li>• Arc Flash Boundary Calculation Results: ____ Ft ____ inches</li> </ul>	

## Energized Electrical Work Permit (Page 2 of 2)

(12) Arc flash PPE Category:

**NFPA 70E Table 130.7(C)(II) (Simplified)**

Hazard/Risk Category (HRC)	Required Minimum Arc Rating of PPE
0	--
1	4 cal/cm <sup>2</sup>
2	8 cal/cm <sup>2</sup>
3	25 cal/cm <sup>2</sup>
4	40 cal/cm <sup>2</sup>

(13) PPE required to safely perform the task:

- **Check all that apply.**
- **Circle class of PPE and minimum calorie rating where applicable.**

- Voltage rated gloves – class 00, 0, 1, 2, 3, 4
- Voltage rated tools
- Safety glasses or goggles
- Hearing protection
- Arc Rated clothing- Calorie rating 4, 8, 25, 40
- Arc Rated jacket or rainwear- Calorie rating 4, 8, 25, 40
- Flash suit- Calorie rating 4, 8, 25, 40
- Flash hood - Calorie rating 4, 8, 25, 40
- Arc rated face shield & Balaclava – Arc flash PPE Category 2
- OTHER:

(14) Method used to restrict access to the work area:

- Safety Signs and Tags (tape, physical barrier)
- Attendant

(15) Will a job briefing be completed that covers all of the following items?  Yes

- |  |   |
|--|---|
| <input type="checkbox"/> Hazards associated with the job | <input type="checkbox"/> Energy source controls   |
| <input type="checkbox"/> Work procedures involved        | <input type="checkbox"/> PPE  |
| <input type="checkbox"/> Special precautions             | <input type="checkbox"/> Tools (Insulated fuse holder handling equipment, insulated hand tools, ETC). |
| <input type="checkbox"/> Other                           |   |

Do you agree the above work can be done safely?  Yes  No (Return to requester)

Qualified Person performing work: \_\_\_\_\_ Date: \_\_\_\_\_

Qualified Person performing work: \_\_\_\_\_ Date: \_\_\_\_\_

Attendant: \_\_\_\_\_ Date: \_\_\_\_\_

Qualified Person's Supervisor: \_\_\_\_\_ Date: \_\_\_\_\_

**Part II: To be completed by department Director**

- Approved**                       **NOT Approved**

# **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 assumes 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.

#### Qualifications to complete this grounding:

Any worker(s) involved in grounding must have knowledge and training in all of the below:

- 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 pre-cautionary techniques (insulate and isolate - use of rubber gloves, grounding and bonding - equal potential grounding methods); personal protective equipment necessary for difference 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.)

### ACCESS TO WORK-SITE & SETUP:

#### Prior to Setup.

- Install traffic control measures if you will be blocking a public road, working within the State or Town right-of-way, or impacting traffic flow as you are entering or leaving the right-of-way.
- Wear appropriate PPE, including visibility vest upon leaving your vehicle.
- Once van or trailer is parked. Establish a barricade around the work area. You can use cones and/or a combination of stacks and ribbon. You want to keep any curious passerby from walking in on your operation.

### ESTABLISH AN EQUAL-POTENTIAL WORK-ZONE:

- You want to establish an equal-potential zone wherever the crews (workers) will be handling the two ends of the OPGW conductor. There is risk of lethal gradient voltage potential. The OPGW is a grounded static wire and is capable of carrying lethal current.
- Install temporary ground mats in front of the trailer or van doorway where workers will be accessing and egressing the trailer or van. Install ground mats where the workers will be handling the conductor (without the use of hot-sticks). There should be a continuous path of ground-mats from the area where the workers first handle the OPGW on the ground to where workers enter the trailer or van. Those ground mats must be bonded together with at least 1/0 copper ground conductor with approved grounding clamps (do not use "hot-line clamps") and then attached to a single source ground conductor (structure ground, steel lattice, etc.). Wear tested, Class II or III rubber gloves when attaching the ground lead to the single source ground conductor, or use an insulated hot-stick. Install an insulated rubber blanket (class I minimum) where the workers will step from the ground to the ground mats. This is an isolating barrier, so a worker is not subject to a difference in potential between the grounding mat potential and the earth ground potential.
- Ground the trailer or van. Attach one end of a ground-set to the trailer or van frame and the other end of the ground to the single point ground already established. Wear tested, Class II or III rubber gloves when attaching the ground lead to the single source ground conductor, or use an insulated hot-stick.
- Workers now need to install personal grounds on both ends of the OPGW to be spliced. First, attach one end of the ground set to an established ground

source on or near the ground. Wear tested, Class II or III rubber gloves when attaching the ground lead to the single source ground conductor, or use an insulated hot-stick. Then, wearing rubber gloves and the use of a hot-stick, connect the other end of one set of ground to one OPGW conductor and secure clamps. Then connect the other end of the second set of grounds to the other remaining end of the OPGW conductor and secure clamps. NOTE: These grounds sets must never be removed until the splicing is complete. Also, if the workers have to go up in an aerial lift or work off a ladder to lower the OPGW conductors to the work area, the workers should first install personal grounds just above the cans (first clip area) and connect to structure ground. This grounding should be done wearing rubber gloves and using and insulated hot-sticks.

The workers are now set to splice the two OPGW conductors. If lightning should be moving into the work area, STOP WORK. Do not continue to handle the conductor until at least 30 minutes after the storm passes their work area. Workers should not stay in a vehicle parked under or adjacent to a transmission lines or in a substation, nor stand under or adjacent to transmission lines with lightning is in the area.

## **5. Positron Isolator**

The Positron Isolator is a grouping of protective equipment at a site where high voltage may be impressed on a telephone type circuit. The grouping of protective equipment is contained in a NEMA rated enclosure mounted within the VELCO substation control building. The VELCO JHA TEL-006 shall be reviewed and understood before performing any work on a Positron Isolator. This is due to an electrical hazard that is possible if any conductive object bridges the gap between differing potentials.

## **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](http://www.isa-arbor.com)

Occupational Safety and Health Administration (OSHA) 29 CFR 1910.269 (a)(1)(i)(E) Electric Power Generation, Transmission and Distribution Line-clearance tree-trimming operations; Website: [www.osha.gov](http://www.osha.gov)

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 3. Minimum approach distances (MAD) from energized conductors for qualified line-clearance arborists and qualified line-clearance arborist trainees.**

Voltage Range (Phase-to-Phase)	Altitude Correction Factor Sea Level to 5,000 ft (0–1,524 m)*		Altitude Correction Factor 5,000 to 10,000 ft (1,524–3,048 m)*		Altitude Correction Factor 10,000 to 14,000 ft (3,048–4,267 m)*	
	Phase-to-Ground		Phase-to-Ground		Phase-to-Ground	
	kV	ft-in      m	ft-in      m	ft-in      m	ft-in      m	
0.050 to 0.300	<i>Avoid contact</i>		<i>Avoid contact</i>		<i>Avoid contact</i>	
0.301 to 0.750	1-02	0.356	1-04	0.407	1-06	0.458
0.751 to 5.0	2-03	0.686	2-06	0.762	2-09	0.839
5.1 to 15.0	2-03	0.686	2-07	0.788	2-10	0.864
15.1 to 36.0	2-08	0.813	3-01	0.940	3-04	1.016
36.1 to 46.0	2-11	0.889	3-04	1.016	3-08	1.118
46.1 to 72.5	3-06	1.067	4-00	1.220	4-04	1.321
72.6 to 121.0	3-11	1.194	4-06	1.372	4-10	1.474
121.1 to 145.0	4-06	1.372	5-02	1.575	5-07	1.702
145.1 to 169.0	5-01	1.550	5-09	1.753	6-03	1.905
169.1 to 242.0	7-00	2.134	7-11	2.413	8-07	2.617
242.1 to 362.0	11-09	3.582	13-06	4.115	14-07	4.445
362.1 to 420.0	14-08	4.471	16-09	5.106	18-02	5.538
420.1 to 550.0	17-06	5.334	20-00	6.096	21-08	6.604
550.1 to 800.0	23-09	7.239	27-02	8.281	29-05	8.967

\*From 29 CFR 1910.269 Tables R-6 & R-7 altitude corrected (R-5) for 1,500 m, 3,000 m, & 4,200 m.