

Electrical Safety Program (ESP)

Addendum A: Electrical Utility Safety Program

Purpose

This document establishes the E Light Electric Services Inc. Utility Safety Program for work conducted by the Utilities Division.

The program provides requirements as well as safe work practices used by qualified utility workers performing work on the transmission and distribution (T&D) equipment.

This document implements applicable requirements from the following:

- *29 Code of Federal Regulations (CFR) 1910.269, OSHA Electric Power Generation, Transmission, and Distribution*
- *ANSI C2, National Electric Safety Code (NESC)*
- *IEEE 1584*
- *NFPA 70E*

Scope

This program applies to work conducted by the E Light Electric Services Utilities Division.

This program applies to all qualified workers performing any of the tasks allowed by this document.

Employees covered by this program addendum shall also adhere to all provisions of the Electrical Safety Program for all other tasks and activities not covered by this addendum.

Training and Qualifications

Qualified Employees

The following are the training and certification requirements for employees who will be working on medium and high voltage power lines as part of the Electrical Utility Division:

1. **Qualified Electrical Worker (QEW) Certification:** All employees who will be working on medium voltage electrical systems (1,001V-230KV) must be certified as Qualified Electrical Workers.
2. **Journeyman Lineman Certification:** All employees who will be working on high voltage electrical systems (601V - 230KV volts) must be certified as Journeyman Linemen through the Colorado Department of Labor and Employment. Apprentices shall only be permitted to perform work on high voltage electrical systems under the direct supervision of a Journeyman Lineman.

Employees shall be specifically trained and competent in:

- The skills and techniques necessary to distinguish exposed energized parts from other energized parts.
- The skills and techniques necessary to determine the nominal voltage of energized parts.
- The minimum approach distances specified in this document corresponding to the voltages to which the qualified employee will be exposed.
- The proper use of the special precautionary techniques, personal protective equipment, insulating and shielding materials, and insulated tools for working on or near exposed energize parts of electrical equipment.
- Employees working on overhead or underground distribution and transmission circuits.

Supervision is responsible for arranging additional training as needed such as:

- Lockout/Tagout (LOTO).
- National Fire Protection Association (NFPA) 70E Standard for Electrical Safety in the Workplace.
- NESC.
- High voltage electrical training.
- First Aid/Cardiopulmonary Resuscitation (CPR)/Automatic External Defibrillator (AED) training.
- Annual bucket truck and Pole top rescue certifications.

Responsibilities

Management

Management shall:

- Provide leadership and support.
- Make necessary provisions to assist the Program Administrator, Supervisors, and Employees in their compliance with this program.

Program Administrator

The Director of Education and Loss Prevent shall function as the Program Administrator. The Program Administrator shall:

- Identify work tasks that require a Qualified Person
- Arrange, review, and periodically conduct electrical safety inspections.
- Arrange training for employees.
- Review this program annually and make revisions as necessary.
- Maintain a list of all Qualified Persons.

Supervision

- Conduct Job Hazard Analysis and document the JHA on the appropriate iauditor template.
- Complete safe work permits as required.
- Performs an initial pre job briefings.
- Is responsible for ensuring personnel read and follow the requirements of this document.
- Is responsible to ensure crews follow all company safety policies including wearing the proper Personal Protective Equipment (PPE) as it relates to shock and arc flash hazards.
- Ensures that employees only perform work that they are trained and qualified to perform.

Employees

- Read, understand, and adhere to the requirements of this program.
- Follow all E Light Electric Services Inc. safety policies and procedures.
- When performing work on energized equipment, distractions and unnecessary communication will be avoided. Communication will be limited to the task at hand.
- Report any hazardous or potentially hazardous conditions to the supervisor.
- Do not throw or permit anything to be thrown from an elevated position, nor allow anything to be thrown from the ground to an elevated position unless the area below is controlled by signs, barricades or attendant.
- Wear the appropriate PPE in accordance with the Job Hazard Analysis (JHA) and/or procedure.

Cardiopulmonary Resuscitation and First Aid Training

1. When employees are performing work on or associated with exposed lines or equipment energized at 50 volts or more, persons trained in first aid including cardiopulmonary resuscitation (CPR) shall be available as follows:
 - a. For field work involving two (2) or more employees at a work location, at least two trained persons shall be available. However, only one trained person need be available if new employees are trained in first aid, including CPR, within three months of their hiring dates.
 - b. For fixed work locations such as generating stations, the number of trained persons available shall be sufficient to ensure that each employee exposed to electric shock can be reached within four (4) minutes by a trained person. However, where the existing number of employees is insufficient to meet this requirement, all employees at the work location shall be trained. No employees are permitted to work alone.
2. Employees must keep a current certification from an approved course in First Aid and CPR.

Policy

Job Briefings and Job Hazard Analysis (JHA)

Pre-Job Briefing

1. Prior to the start of work, a Job Hazard Analysis shall be completed by the Supervisor.
2. The pre-job briefing shall cover the JHA and communicate to the workers the work scope, hazards, and controls to safely perform the task.
3. Energy source controls and personal protective equipment must also be discussed at pre-job briefings.
4. The work plan shall be covered as part of the pre-job briefing and made available to workers for reference while working in the field. Any active permits and the permit conditions will be covered during the briefing.
5. Pre-job briefings must be conducted before work begins.
6. After any change in work activity that is unique or different from the original scope of work, the JHA shall be updated, and an additional briefing shall be conducted with all members of the work crew. If the task is operating under an open permit and the change to the activity was not covered by the permit, a new permit must be drawn.
7. The following shall also be addressed on the JHA and briefing:
 - a. Work Methods
 - b. Weather
 - c. Emergency Response
 - d. LOTO & Non Reclosing status of line
 - e. Site Conditions
 - f. Roles and Responsibilities
 - g. Equipment Configuration/Non reclosing status

Two-Employee Policy

At least two employees shall be present while any employees perform the following types of work:

- Installation, removal, or repair of lines energized or de-energized at more than 1,000 volts.
- Installation, removal, or repair of deenergized lines if an employee is exposed to contact with other parts energized at more than 1,000 volts.
- Installation, removal, or repair of equipment, such as transformers, capacitors, regulators, reclosers, gang switches disconnect switches and jumpers if an employee is exposed to contact with parts energized at more than 1,000 volts.

- Other work that exposes an employee to electrical hazards greater than, or equal to, the electrical hazards posed by operations listed above.

Exceptions:

- Work performed with live-line tools when the position of the employee is such that he or she is neither within reach of, nor otherwise exposed to contact with, energized parts.

Lockout/Tagout and Clearance Procedures

The Supervisor shall ensure that the electrical utility company or controlling host entity utilizes LOTO to control hazardous energy and to de-energize lines and equipment for employee protection when necessary.

High Voltage Lockout/Tagout

This section applies to the de-energizing of transmission and distribution lines and equipment for the purpose of protecting employees. Control of hazardous energy sources used in the generation of electric energy is covered in this section. Conductors and parts of electric equipment that have been de-energized under procedures other than those required by this section, as applicable, shall be treated as energized.

General

1. If a system operator is in charge of the lines or equipment and their means of disconnection, all of the requirements of this section shall be observed, in the order given.
2. If no system operator is in charge of the lines or equipment and their means of disconnection, one employee in the crew shall be designated as being in charge of the clearance. All of the requirements of this section apply, in the order given, except as provided in the next paragraph, of this section. The employee in charge of the clearance shall take the place of the system operator, as necessary.
3. Any disconnecting means that are accessible to persons outside the employer's control (for example, the general public) shall be rendered inoperable while they are open for the purpose of protecting employees.

De-Energizing Lines and Equipment

1. A designated employee shall make a request of the system operator to have the particular section of the line or equipment de-energized. The designated employee becomes the employee in charge and is responsible for the clearance.
2. All switches, disconnects, jumpers, taps, and other means through which known sources of electric energy may be supplied to the particular lines and equipment to be de-energized, shall be opened. Such means shall be rendered inoperable, unless its design does not so permit, and tagged to indicate that employees are at work.
3. Automatically and remotely controlled switches that could cause the opened disconnecting means to close shall also be tagged at the point of control. The automatic or remote-control feature shall be rendered inoperable, unless its design does not so permit.

4. Tags and locks shall prohibit operation of the disconnecting means and shall indicate that employees are at work. Tagging disconnecting means is mandatory and locks shall be used when applicable.
5. After the applicable requirements in this section have been followed and the employee in charge of the work has been given a clearance by the system operator, the lines and equipment to be worked shall be tested to ensure that they are de-energized by an approved testing device.
6. Protective grounds shall be installed as required by this program.
7. After the applicable requirements of paragraphs (1) through (6) of this section have been followed, the lines and equipment involved may be worked as de-energized.
8. If two (2) or more independent crews will be working on the same lines or equipment, each crew shall independently comply with the requirements in all the paragraphs of this section.
9. To transfer the clearance, the employee in charge (or, if the employee in charge is forced to leave the work site due to illness or other emergency, the employee's supervisor) shall inform the system operator; employees in the crew shall be informed of the transfer; and the new employee in charge shall be responsible for the clearance.
10. To release a clearance, the employee in charge shall:
 - a. Notify employees under his or her direction that the clearance is to be released.
 - b. Determine that all employees in the crew are clear of the lines.
 - c. Determine that all protective grounds installed by the crew have been removed.
 - d. Report this information to the system operator and release the clearance.
11. The person releasing a clearance shall be the same person that requested the clearance, unless responsibility has been transferred under paragraph c. (9) of this section.
12. Tags may not be removed unless the associated clearance has been released under paragraph (10) of this section.

E Light employees engaged in LOTO shall follow E Light's LOTO program.

Confined/Enclosed Spaces

Before entry into a Confined Space the Supervisor shall ensure that the following has been done:

- All requirements of E Light Electrical Inc.'s Confined Space Program are reviewed, and the requirements of the program are adhered to.
- Employees are trained in Confined Space Entry.
- A Confined Space Entry Permit is completed (if required).
- A classification of the space as non-permit or permit required has been requested and received from the host employer. The nature of the work to be conducted could

reclassify the space as permit required in some cases. The Supervisor shall consult with the Director of Education and Loss Prevention for clarification.

Arc Flash Analysis

An assessment shall be performed to determine potential exposure to an electric arc for employees who work on or near energized lines, parts, or equipment.

Arc flash hazards may exist while working on or near the following systems:

- Overhead transmission/distribution lines including 50V – 24.94KV. Any voltage class above this will be de-energized and grounded prior to working on it.
- Outdoor Substations including 50V – 24.94KV. Any voltage class above this will be de-energized and grounded prior to working on it.
- Underground distribution systems including 50V – 24.94KV. Any voltage class above this will be de-energized and grounded prior to working on it.
- Low voltage (below 600 volts [V]) systems including secondary terminals of transformers, metering enclosures, and premise wiring systems in substation facilities.

An arc flash hazard analysis shall be completed and documented to determine the arc flash hazard, protective clothing, and PPE that personnel shall use when working on energized systems.

If the overcurrent device clearing time is 3 cycles or less, the maximum FR rating required will be 8 cal.

Three acceptable methods for performing an arc flash hazard analysis are described below.

1. Arc Flash Hazard Calculations Using Institute of Electrical and Electronics Engineers (IEEE) 1584.

- a. This analysis involves specific calculations where power system parameters, including utility system impedance, line, cable, and transformer impedance are used to determine available three-phase fault currents on portions of the power system.
- b. From this data, arcing fault currents can be calculated, and based on clearing times of protective devices, incident energy (in calories per centimeter squared [cal/cm²]) is calculated at the working distance.
- c. PPE shall be selected based on the incident energy calculations.
- d. This method is applicable to all three phase systems (enclosed or open lines) from 208V to 15kV.

2. Use of NESC Table 410-2

- a. This method is used to determine the applicable clothing calorie rating based on a 15 inch working distance and an open air phase to ground fault (overhead lines).

- b. When using Table 410-2, the available single line to ground fault and maximum protective device clearing time are required.

Table 410-2—Clothing and clothing systems—voltage, fault current, and maximum clearing time for voltages 1.1 kV to 46 kV ac ¹
(See Rule 410A3.)

Phase-to-phase voltage (kV)	Fault current (kA)	4-cal system	8-cal system	12-cal system
		Maximum clearing time (cycles)	Maximum clearing time (cycles)	Maximum clearing time (cycles)
1.1 to 15	5	46.5	93.0	139.5
	10	18.0	36.1	54.1
	15	10.0	20.1	30.1
	20	6.5	13.0	19.5
15.1 to 25	5	27.6	55.2	82.8
	10	11.4	22.7	34.1
	15	6.6	13.2	19.8
	20	4.4	8.8	13.2
25.1 to 36	5	20.9	41.7	62.6
	10	8.8	17.6	26.5
	15	5.2	10.4	15.7
	20	3.5	7.1	10.6
36.1 to 46	5	16.2	32.4	48.6
	10	7.0	13.9	20.9
	15	4.3	8.5	12.8
	20	3.0	6.1	9.1

NESC Table 410-2

- 3. Use of NESC Table 410-1
 - a. This method is used to determine applicable clothing calorie rating based working on or near low voltage equipment (50V to 1000V) and is independent of available fault current and protective device clearing times.

Table 410-1—Clothing and clothing systems (cal/cm²) for voltages 50 V to 600 V (ac) ¹
(See Rule 410A3.)

Equipment type	Nominal voltage range and cal/cm ²	
	50 V to 250 V	251 V to 600 V ¹²
Self-contained meters / cabinets	4 ²	20 ⁴
Pad-mounted transformers	4 ⁷	4 ⁷
CT meters and control wiring	4 ²	4 ⁵
CT compartment/customer switchgear	4 ²	13
Metal-clad switchgear / motor control centers	8 ³	40 ⁶
Pedestals / pull boxes / hand holes	4 ²	8 ¹⁵
Open air (includes lines)	4 ²	4 ¹⁵
Network protectors with transformer energized	4 ⁸	9
Network protectors with transformer de-energized	4 ¹⁴	8 ¹⁴
Panel boards—single phase (all) / three phase (≤100 A)	4 ²	8 ¹⁰
Panel boards—three phase (>100 A)	4 ²	11

NOTE—No value for clothing or clothing systems is specified for voltages between 601 V and 1000 V. See Rule 012C.

NESC Table 410-2

Overhead Lines

1. The arc flash hazard analysis for work on overhead lines may use the IEEE 1584 method (three phase fault) or the NESC Table 410-2 (single phase fault) method.
2. Both methods require engineering analysis to determine available fault current and protective device clearing times.

**NOTE - Ungrounded systems (some 2400V systems) will require IEEE 1584 calculations, since single line to ground faults do not exist.*

Outdoor Substations

1. The arc flash hazard analysis for work on overhead lines, switches, bus work, etc. in substation yards may use the IEEE 1584 method (three phase fault) or the NESC Table 410-2 (single phase fault) method.
2. Both methods require engineering analysis to determine available fault current and protective device clearing times.

Underground Distribution Systems

1. Faults on 2.4KV, 15KV and 25KV underground systems typically will be represented as faults in enclosed equipment, and as such NESC Table 410-2 is not applicable.
2. Arc Flash Hazard analysis for these systems should be based on IEEE 1584 equations.

Low Voltage Systems

1. Arc Flash Hazard Analysis for low voltage systems should be based on IEEE 1584 equations.
2. PPE shall be selected based on working distance and calculated incident energy.
3. If an Incident Energy Analysis has not or cannot be performed, NESC Table 410-1 may be used to determine the calorie rating.
4. 250 VDC Battery Systems:

No arc flash hazards exist on Electrical Utility DC 250-volt systems.

Personal Protective Equipment

General Requirements

1. Electrical PPE includes, but is not limited to, the equipment and clothing necessary to protect personnel performing electrical work from hazards involving electrical shock and arc flash and any other electrical hazards that may be encountered.
2. This section addresses PPE needed to safely perform electrical T&D operations, construction, and maintenance.
3. Electrical PPE and other protective equipment that has an expired testing date or fails visual or functional inspection shall be removed from service.
4. PPE shall be:
 - a. Maintained in a safe, reliable condition.
 - b. Stored in a manner that protects against physical damage, moisture, dust, or other deteriorating agents.
 - c. Regular inspections are necessary to prevent the use of defective personal protective equipment on the job.
 - d. Each worker must inspect protective equipment and clothing prior to use.
 - e. All items must be suitable for their intended use and in good working condition.
 - f. Periodically inspected or tested in accordance with manufacturer's instructions and/or the applicable American National Standards Institute (ANSI) or American Society for Testing and Materials (ASTM) standard(s).
5. All personnel are to be provided and shall use PPE appropriate for potential shock or arc flash hazards to which they may be exposed.
6. All parts of the body inside the arc flash protection boundary shall be protected.
7. Personnel shall be instructed in the proper use and maintenance of PPE prior to use.

Minimum Personal Protective Equipment

Rubber Protective Equipment

1. General

- a. Protective equipment shall not be used at voltages in excess of that for which the manufacturer recommends.
- b. No protective equipment shall be modified, altered, or used for purposes other than those for which it is designed unless the manufacturer has provided written instructions for such modification, alteration, or use.
- c. Before being placed in service, rubber protective equipment (gloves, sleeves, line hose and blankets) shall be uniquely identified.
- d. Test records and assignment shall be documented.
- e. Rubber protective equipment shall not be vulcanized or patched.
- f. Rubber protective equipment shall be dielectrically tested and marked with the test date.
- g. Rubber protective equipment shall be protected from damage.
- h. No equipment shall be stored in a manner which could cause damage to the rubber equipment or goods.
- i. Voltage rated rubber-insulating equipment shall be marked with the expiration date.
- j. Voltage rated rubber PPE shall be subject to periodic electrical tests with the maximum test intervals as identified in Table 2, Rubber PPE Inspection Intervals:

Rubber PPE Inspection Intervals	
Rubber PPE Inspection Intervals	Rubber PPE Inspection Intervals
Rubber insulating covers	Before first issue and every 12 months thereafter
Rubber insulating blanket	Before first issue and every 12 months thereafter
Rubber insulating gloves	Before first issue and every 6 months thereafter. Employees may request testing more frequently based on use. Gloves shall be issued and tested according the table below.
Rubber insulating sleeves	Before first issue and every 6 months thereafter. Employees may request testing more frequently based on use.

January - June	July - December
RED Color-Coded Gloves shall be issued through this period unless additional testing is required based on the pre-use inspection.	Yellow Color-Coded Gloves shall be issued through this period unless additional testing is required based on the pre-use inspection.

2. Rubber Gloves
 - a. Approved rubber gloves and carrying bag shall be provided to each employee who works with or is exposed to energized parts.
3. Inspection of Rubber Gloves
 - a. Before using rubber gloves, give each glove an air test to detect cuts and weak spots.
 - b. This is accomplished by rolling up the glove tightly beginning at the gauntlet end.
 - c. Listen and feel for air escaping through the palm, thumb, or fingers.
 - d. Gloves that show weak spots or air leakage must be destroyed.
 - e. It is recommended that one or more fingers of a defective glove be immediately cut off to ensure no other worker inadvertently uses the glove.
4. Care of Rubber Gloves
 - a. When not in use, rubber gloves must be carried in glove bags.
 - b. When in use, take the following precautions:
 - i. Rubber gloves must be washed when tested in accordance with ASTM standard and kept free from embedded foreign matter.
 - ii. Powder specifically designed for protective rubber gloves can be used after washing rubber gloves to avoid skin irritation and to prevent the rubber from sticking together.
 - c. Protector gloves must be worn over insulating gloves.
 - d. Rubber glove protectors must not be used as work gloves.
 - e. Exception: Protector gloves need not be used with Class 0 gloves, under limited-use conditions, where small equipment and parts manipulation necessitate unusually high finger dexterity. When used without protector gloves, the gloves shall be taken from service until electrically tested.
5. Other Rubber Protective Equipment
 - a. Sleeves must be tested and inspected before use.
 - b. Line hoses shall not be doubled on themselves at any time.
 - c. All blankets must be wiped clean and rolled, not folded, before being stored in the container or box.

Non-Rubber Goods

1. No protective equipment or material other than rubber shall be used unless it provides equal or better (dielectric) electrical and mechanical protection than rubber protective equipment.
2. Manufacturer's data or other data can be used to demonstrate that such non-rubber protective equipment provides equal or better electrical and mechanical protection than approved rubber equipment.
3. Protective line equipment of material other than rubber shall be kept clean and visually inspected before each use.

PPE for Arc Flash Protection

1. The effective arc rating of the arc-rated clothing shall not be less than the incident energy at the working location.
2. All arc rated garments shall meet the requirements of and be labeled in accordance with ASTM F1506, Standard Specification for Flame Resistant Textile Materials for Wearing Apparel for use by Electrical Workers Exposed to Momentary Electric Arc and Related Thermal Hazards.
3. Clothing made from acetate, nylon, polyester, or polypropylene shall not be worn in the arc flash protection boundary unless arc rated. Examples of such articles may include traffic non rated vests.
4. When calculated incident energy exceeds 40 cal/cm² and de-energizing is not feasible, alternate work methods and controls shall be documented and have management authorizations.

Live-line Tools

1. If the tool is made of fiberglass-reinforced plastic (FRP), it shall withstand 328,100 volts per meter (100,000 volts per foot) of length for 5 minutes.

Testing and Maintenance

1. Live line tools shall be tested and maintained in accordance with E Light's Electrical Safety Work Program.

Use

1. Each live-line tool shall be wiped clean and visually inspected for defects before use each day.
2. If any defect or contamination that could adversely affect the insulating qualities or mechanical integrity of the live-line tool is present after wiping, the tool shall be removed from service and examined and tested according to this section before being returned to service. Live line tools shall be routinely removed from service every 2 years and inspected for defects.

3. Live-line tools and rope shall be stored and maintained and used in such a manner as to prevent damage.
4. Live-line tools and ropes shall not be used for purposes other than line work.

Rope

1. Rope shall be inspected before each use and, if unsafe (for example, because of damage or defect), may not be used.
2. Rope shall be stored away from cutting edges and sharp tools.
3. Rope contact with corrosive chemicals, gas, and oil shall be avoided.
4. When stored, rope shall be coiled and piled or shall be suspended so that air can circulate through the coils.
5. A rope that is wet, that is contaminated to the extent that its insulating capacity is impaired, or that is otherwise not considered to be insulated for the voltage involved may not be used near exposed energized lines.

Safety Equipment

Service and Bucket Trucks shall be equipped with, at a minimum, the following items:

- 1 – 40 cal/cm² rated arc flash suit – bib, coveralls, hood.
- 1 – Insulating rubber gloves with protective covers.
- 1 - First Aid Kit.
- 1 – 2.5lbs 1A:10BC Fire Extinguisher.

Service Trucks shall be equipped with, at a minimum, the following:

- Voltage testing equipment
- Phase rotation meter
- Hot stick(s)
- Grounding equipment
- Electrically rated tools
- Hoisting and rigging equipment
- Arc-rated climbing equipment

Bucket Trucks shall be equipped with, at a minimum, the following:

- Rigging equipment.
- ASTM F887-Rated Personal Fall Protection Equipment (lanyard, harness).
- Rubber blankets and non-conductive connecting equipment.
- Hot stick(s).
- Traffic cones.
- Equipotential grounding kit(s).

- Line hose(s).
- Electrically rated tools.

Safe Energized Work Practices

The following documents the hazard analysis to be performed whenever work is planned and specifically when a decision is made to work on electrical systems energized.

1. The work scope is analyzed by Supervision to determine the workplace hazards, the necessary job controls, and the required support needed.
2. Supervision determines the best and safest method to perform the work.
3. An Energized Work Permit will be completed by the Supervisor and submitted for review.
4. Different variables are considered to determine the appropriate work method with employee safety paramount.
5. In addition to employee safety, the magnitude of switching operations, customer outage, and configuration limitations are some of the variables that are evaluated.
6. Safe energized work practice is a specific way of performing work differing from work performed on de-energized and grounded systems.
7. The following are specific areas where adjustments are made in normal work practices:
 - a. Arc flash rated clothing and boundaries are used per arc flash hazard analysis.
 - b. Voltage rated live line tools including periodic testing, pre-use inspection, and maintenance.
 - c. Knowledge of and maintaining approach distances.
 - d. Crew sizes and designated employee as safety watch.
 - e. Use of voltage rated barriers (line, arm, and pole covers).
 - f. Use of voltage rated PPE (rubber gloves, blankets, and mats).

Working On or Near Exposed Energized Parts

This section applies to work on exposed live parts, or near enough to them, to expose the employee to any hazard they present. Parts of electric circuits that are guarded or isolated are not considered as “exposed”.

General

1. Only qualified employees may work on or with exposed energized lines or parts of equipment.
2. Only qualified employees may work in areas containing unguarded, un-insulated energized lines or parts of equipment operating at 50 volts or more.
3. Electric lines and equipment shall be considered and treated as energized unless the requirements of Lockout/Tagout and Clearance Procedures of this program are met.

Minimum approach distances

1. No employee shall approach or take any conductive object closer to exposed energized parts than set forth in the Table 3, AC Live Work Minimum Approach Distance, unless:
 - a. The employee is insulated from the energized part. Electrical protective equipment insulated for the voltage involved such as tools, rubber gloves, or rubber gloves with sleeves shall be considered effective insulation for the employee from the energized line or part being worked on.

OR

 - b. The energized part is insulated from the employee and from any other conductive object at a different potential.

Table 441-1—AC live work minimum approach distance ⁴
(See Rule 441 in its entirety.)

Voltage in kilovolts phase-to-phase ^{1, 2, 3}	Distance to employee ⁴					
	Phase-to-ground		Phase-to-phase			
	(ft-in)	(m)	(ft-in)	(m)		
0 to 0.050	Not specified		Not specified			
0.051 to 0.300	Avoid contact		Avoid contact			
0.301 to 0.750	1-1	0.33	1-1	0.33		
0.751 to 5.0	2-1	0.63	2-1	0.63		
5.1 to 15.0	2-2	0.65	2-3	0.68		
15.1 to 36.0	2-7	0.77	3-0	0.89		
36.1 to 46.0	2-10	0.84	3-3	0.98		
46.1 to 72.5	3-4	1.00	4-0	1.20		
Voltage in kilovolts phase-to-phase	Distance to employee from energized part ^{4, 5, 6, 10}					
	Without live-line tools phase-to-ground		With live-line tools phase-to-ground ^{7, 9}		Without live-line tools phase-to-phase ⁸	
	(ft-in)	(m)	(ft-in)	(m)	(ft-in)	(m)
72.6 to 121	3-6	1.06	3-9	1.13	4-8	1.42
121.1 to 145	4-0	1.21	4-4	1.30	5-5	1.64
145.1 to 169	4-6	1.36	4-10	1.46	6-5	1.94
169.1 to 242	6-2	1.87	6-8	2.01	10-2	3.08
242.1 to 362	10-6	3.19	11-3	3.41	18-2	5.52
362.1 to 420	13-2	3.99	14-0	4.25	22-5	6.81
420.1 to 550	15-9	4.78	16-8	5.07	27-1	8.24
550.1 to 800	21-6	6.53	22-7	6.88	37-5	11.38

¹ For single-phase lines off three-phase systems, use the phase-to-phase voltage of that system.

² For single-phase systems, use the highest voltage available.

³ Inadvertent movement factors used in these tables are as follows:

0.301 kV to 0.750 kV = 1 ft (0.31 m)

0.751 kV to 72.5 kV = 2 ft (0.61 m)

72.6 kV to 800 kV = 1 ft (0.31 m)

⁴ Distances listed are for standard atmospheric conditions defined as temperatures above freezing, wind less than 15 mi per h or 24 km per h, unsaturated air, normal barometer, uncontaminated air, and clean and dry insulators.

⁵ For voltages above 72.5 kV, distances are based on altitudes below 3000 ft (900 m) above sea level. For altitudes above 3000 ft (900 m), Rule 441A6 applies.

⁶ Distances were calculated using the following TOV values:

72.6 kV to 362 kV = 3.5

362.1 kV to 550 kV = 3.0

550.1 kV to 800 kV = 2.5

Initial Determination (Worksite Hazard Evaluation)

1. Before beginning work, an evaluation shall be performed to identify all hazardous conditions.
2. This evaluation shall include the general location, energized circuit parts, support structures, and associated equipment.
3. No work shall be performed on energized lines or parts until the voltage of such equipment and lines is determined.

Working Position

1. Employees should avoid working on equipment or lines in any position from which a shock or slip will tend to bring the body toward exposed parts at a potential different than the employee's body.
2. Work should, therefore, generally be done from below, rather than from above.

Making Connections

1. In connecting de-energized equipment or lines to an energized circuit by means of a conducting wire or device, employees should first attach the wire to the de-energized part.
2. When disconnecting, the source end should be removed first.
3. Loose conductors should be kept away from exposed energized parts.
4. Hot sticks are used while working on energized distribution lines and equipment when it provides greater protection and increases distance from equipment with arc flash potential.
5. Rubber protective gloves shall only be used on 14,400V and less.

Exception: When metal clad switch gear or pad mounted switches have been isolated and tested de-energized, voltage rated rubber protective gloves can be used during the installation of equipment grounds.

6. When using the rubber glove-work method, voltage rated insulating sleeves must be worn in addition to rubber gloves for voltages greater than 481volts.

Exception: Sleeves are not required under the following conditions:

>300-750 Volts	>750-5000 Volts
<ul style="list-style-type: none"> • No other exposed live parts are within the minimum approach boundary <p style="text-align: center;">OR</p>	<ul style="list-style-type: none"> • If exposed parts are covered with insulating protective equipment
<ul style="list-style-type: none"> • When exposed parts are guarded to extent feasible and insulated tools are used 	

7. When one part of a high voltage switch or disconnect is energized the remainder of the switch or disconnect shall be considered energized unless approved barriers are in place.
8. These barriers will prevent employees from coming in direct contact with the energized parts.
9. Conductor support tools such as link sticks, strain carriers, and insulator cradles may be used provided the clear insulation is at least as long as the insulator string or the minimum distance specified in 441.1, AC Live Work Minimum Approach Distance, for the operating voltage.

Apparel

1. ONLY arc rated apparel shall be worn when working on or near energized electrical equipment (e.g., non arc rated vests must be removed). Refer to the Arc Flash/Blast PPE table below.
2. When work is performed within reaching distance of exposed energized parts each employee must remove all exposed conductive articles such as badges, keys, rings, wrist watches/bands, or phones.
3. Shirts or coveralls must have full length sleeves that are rolled down.
4. Employees are required to wear 8 cal/cm² shirt and pants at all times.
5. Dielectric footwear shall be worn when conducting pole switching operations.

Arc Flash/Blast PPE		
Cal/cm ²	Clothing Description	Additional PPE
1-7	8 cal/cm ² apparel at all times.	Leather or rubber gloves
8-24	AR shirt/pants, FR coveralls rated for the cal/cm ²	Leather or rubber gloves, arc rated face shield/balaclava or hood
25-40	AR shirt/pants, or multi-layer flash suit rated for the cal/cm ²	Leather or rubber gloves, arc rated face shield/balaclava or hood
>40	Find alternate means, UNSAFE	

If the overcurrent device clearing time is 3 cycles or less, the maximum FR rating required will be 8 cal.

Fuse Handling

1. When fuses must be installed or removed with one or both terminals energized at more than 300 V or with exposed parts energized at more than 50V, tools or gloves rated for the voltage are used.
2. When expulsion-type fuses are installed with one or both terminals energized at more than 300V, each employee wears eye protection, uses a tool rated for the voltage, and is clear of the exhaust path of the fuse barrel.

Covered (Non-Insulated) Conductors

The hazards of exposed live parts also apply when work is performed in the proximity of covered (non-insulated) wires such as Hendrix cable.

Noncurrent-Carrying Metal Parts

Noncurrent-carrying metal parts of equipment or devices such as transformer cases and circuit breaker housings, shall be treated as energized at the highest voltage to which they are exposed unless the installation has been evaluated and determined that these parts are grounded before work is performed.

Opening Circuits Under Load

Devices used to open circuits under load conditions shall be designated to interrupt the current involved. I.E. a load buster tool

Grounding for the Protection of Employees

This section applies to the grounding of transmission and distribution lines and equipment for the purpose of protecting employees.

This section also applies to the protective grounding of other equipment as required elsewhere in this section.

General

1. For the employee to work lines or equipment as de-energized, the lines or equipment shall be de-energized and shall be grounded.
2. If the Supervisor can demonstrate that installation of a ground is impracticable or that the conditions resulting from the installation of a ground would present greater hazards than working without grounds, the lines and equipment may be treated as de-energized provided ALL of the following conditions are met:
 - a. The lines and equipment have been de-energized.
 - b. There is no possibility of contact with another energized source. Covers will be installed on energized lines and personnel will wear rubber gloves when installing and tying in conductors (i.e., single phase or three phase taps).
 - c. The hazard of induced voltage is not present.
 - d. The operation is approved by the Director of Education and Loss Prevention.

Equipotential Zone Grounding

Temporary protective grounds shall be placed at such locations and arranged in such a manner as to prevent each employee from being exposed to hazardous differences in electrical potential.

Protective Grounding Equipment

1. Protective grounding equipment shall be capable of conducting the maximum fault current that could flow at the point of grounding for the time necessary to clear the fault.
2. This equipment shall have an amp capacity greater than or equal to that of No. 2 American Wire Gauge (AWG) copper.
3. Grounding jumpers shall have approved ferrules and grounding clamps that provide mechanical support for jumper cables independent of the electrical connection.
4. Protective grounds shall have an impedance low enough to cause immediate operation of protective devices in case of accidental energizing of the lines or equipment.

Testing

1. Before any ground is installed, lines and equipment shall be tested and found absent of nominal voltage unless a previously installed ground is present.

2. Inspections before use:
 - a. Grounding equipment shall be visually inspected.
 - b. All mechanical connections shall be checked for tightness.
3. Ground surface cleaning:
 - a. The surface where grounds are to be attached shall be clean before the grounding clamps are installed.

Exception: Use self-cleaning clamps.

Order of Connection

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

Order of Removal

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

Additional Precautions

When work is performed on a cable at a location remote from the cable terminal, the cable may not be grounded at the cable terminal if there is a possibility of hazardous transfer of potential should a fault occur. The cable should still be isolated at both terminal points prior to grounding even if at a remote location.

Removal of Grounds for Test

1. Grounds may be removed temporarily during tests.
2. During the test procedure, each employee must use insulating equipment and be isolated from any hazards involved.
3. Additional measures may be necessary to protect each exposed employee in case the previously grounded lines and equipment become energized.
4. After testing is complete, grounds shall be applied.

Conductor Separation

In cases where the conductor separation at any pole or structure is so great as to make it impractical to apply shorts on all conductors and where only one conductor is to be worked on, only that conductor which is to be worked on needs to be grounded.

Ground Personnel

In cases where ground rods or pole grounds are utilized for personal protective grounding, personnel working on the ground should maintain sufficient distance from such equipment or utilize other approved procedures designed to prevent “touch and step potential” hazards.

Power Cable Grounding

1. A capacitance charge can remain in the high voltage cables after it has been disconnected from the circuit and a static-type arc can occur when grounds are applied to such cables.

2. When work is to be done on cables or equipment of a high-voltage underground system, precautions to prevent back-feed shall be taken.
3. This shall include either isolating or grounding of the secondary conductors.
4. High-voltage cables shall be tested and proven de-energized at each work location (e.g., grounded cable, spike, approved hot cutters, and touch ground with a hot stick as a last option).
5. A tested cable shall be allowed sufficient time to decay below 5kV and then a ground shall be applied for the equivalent test time.

Grounding Vehicle Frames

1. The frames of all motor vehicles equipped with booms or aerial baskets shall be either barricaded or grounded with adequate vehicle equipment when working in the vicinity of energized lines or equipment. Barricading is the approved method to be used at all times. If a vehicle is attached to a reel trailer, pulling device or tensioner, it must be kept at the same potential as the vehicle via bonding even when barricaded.
2. The frames of all reel trailers or pulling devices shall be grounded and barricaded when wire or cable is being pulled on poles or in underground ducts which contain any energized wire, cable or equipment.
3. Frames of transformer trailers and portable substations shall also be grounded with adequate vehicle and/or equipment grounds.

Overhead Lines

This section provides additional requirements for work performed on or near overhead lines and equipment.

General

1. Before elevated structures and adjacent structures such as poles or towers of the adjacent supporting poles, structures, and conductor supporting hardware are subjected to such stresses as climbing or the installation or removal of equipment may impose, the qualified employee shall ascertain that the structures are capable of sustaining the additional or unbalanced stresses.
2. If the pole or other structure cannot withstand the loads which will be imposed, it shall be braced or otherwise supported so as to prevent failure.
3. A visual inspection and hammer test will be done by a qualified person prior to climbing wood poles.
4. When a pole is set, moved, or removed near an exposed energized overhead conductor:
 - a. Overhead lines shall be covered with insulated protective material to prevent incidental contact with overhead lines.
 - b. Employees wear insulating protective gloves or use suitable means where voltages may exceed ratings of gloves while handling poles where conductors energized at potentials above 750 volts can be contacted.

- c. No employee shall contact the pole with un-insulated parts of his or her body.
 - d. Contact with trucks or other equipment that is being used to set, move, or remove poles in or in the vicinity of energized lines shall be avoided by employees standing on the ground or in contact with grounded objects unless employees are wearing suitable protective equipment.
5. To protect employees from falling into holes into which poles are to be placed, the holes shall be attended by employees or physically guarded whenever anyone is working nearby.

Installing and Removing Overhead Lines

The following provisions apply to the installation and removal of overhead conductors or cable:

1. The tension stringing method, barriers, or other equivalent measures shall be used to minimize the possibility that conductors and cables being installed or removed will contact energized power lines or equipment.
2. A traveling ground shall be used to ensure the proper grounding of the conductor being installed.
3. When conductors are being strung in or removed, they shall be kept under positive control and adequate radio communication should be used along with a traveling ground.
4. The protective measures for mechanical equipment shall also be provided for conductors, cables, and pulling and tensioning equipment when the conductor or cable is being installed or removed close enough to energized conductors that any of the following failures could energize the pulling or tensioning equipment or the wire or cable being installed or removed:
 - a. Failure of the pulling or tensioning equipment.
 - b. Failure of the wire or cable being pulled.OR
 - c. Failure of the previously installed lines or equipment.
5. When conductors being installed or removed cross over energized conductors in excess of 600 V, rope nets or guard structures must be installed unless provision is made to isolate or insulate the worker or the energized conductor.
6. Where the design of the circuit-interrupting devices protecting the lines so permits, the automatic-reclosing feature of these devices must be made inoperative. In addition, the line being strung must be grounded on either side of the crossover or considered and worked as energized.
7. Before lines are installed parallel to existing energized lines, the approximate voltage to be induced in the new lines must be determined, or work shall proceed on the assumption that the induced voltage is hazardous.
8. Unless the qualified employee can demonstrate that the lines being installed are not subject to the induction of a hazardous voltage or unless the lines are treated as energized, the following requirements also apply:

- a. Each bare conductor shall be grounded in increments so that no point along the conductor is more than 2 miles (3.22 km) from a ground.
 - b. The grounds required in this section shall be left in place until the conductor installation is completed between dead ends.
 - c. If employees are working on bare conductors, grounds shall also be installed at each location where these employees are working, and grounds shall be installed at all open dead-end or catch-off points or the next adjacent structure.
 - d. If two bare conductors are to be spliced, the conductors shall be bonded and grounded before being spliced, using a live line tool and approved jumper, bond the two sides together making them both at the same potential
9. Reel handling equipment including pulling and tensioning devices, shall be in safe operating condition and shall be leveled and aligned.
 10. Load ratings of stringing lines, pulling lines, conductor grips, load-bearing hardware and accessories, rigging, and hoists may not be exceeded.
 11. Each pull must be snubbed or dead ended at both ends before subsequent pulls.
 12. Pulling lines and accessories shall be inspected prior to each use and replaced or repaired when damaged or when there is a reasonable basis to doubt the dependability of such lines or accessories.
 13. Conductor grips may not be used on wire rope unless the grip is specifically designed for this application.
 14. Reliable communication through two-way radios or other equivalent means, shall be maintained between the reel tender and the pulling rig operator.
 15. The pulling rig may only be operated when it is safe to do so as determined by the lead worker.
 16. While the conductor or pulling line is being pulled (in motion) with a power-driven device, employees are not permitted directly under overhead operations or on the cross arm except as necessary to guide the stringing sock or board over or through the stringing sheave.
 17. Live-line bare-hand work is prohibited.
 18. When winches, trucks, or tractors are being used to raise poles, materials, to pull in wires, and to pull slack or in any other operation, there shall be an operator at the controls unless the machinery or process is stopped.
 19. Lead workers shall designate an employee to give signals when required at pre-job briefing.
 20. Employees shall not crawl over insulator strings but shall use a platform or other approved device to work from when making dead ends or doing other work beyond strings of insulators at such distance that they cannot reach the work from the pole or fixture.
 21. While working on the platform or other device, they shall be secured with safety straps or a rope to prevent falling.

22. The provision of this subsection does not apply to extra high voltage bundle conductors when the use of such equipment may produce additional hazard.
23. Climbing over dead-end assemblies is permissible only after they have been completed and pinned in the final position.

Towers and Structures

The following requirements apply to work performed on towers or other structures which support overhead lines.

1. No employee shall work under a tower or structure while work is in progress except where it can be demonstrated that such a working position is necessary to assist employees working above.
2. Tag lines or other similar devices shall be used to maintain control of tower sections being raised or positioned unless it can be demonstrated that the use of such devices would create a greater hazard.
3. The load line may not be detached from a member or section until the load is safely secured.
4. No one must be permitted to remain in the footing while equipment is being spotted for placement.
5. A designated employee must be utilized to determine that required clearance is maintained in moving equipment under or near energized lines.
6. All conductors, sub conductors, and overhead ground conductors must be bonded to the tower at any isolated tower where it may be necessary to complete work on the transmission line.
7. A transmission clipping crew shall have a minimum of two structures clipped in between the crew and the conductor being sagged.

Patrolling Overhead Lines

1. While patrolling overhead lines at night and operating a motor vehicle, there shall be two qualified employees.
2. If repair to line or equipment is found to be of such nature as to require two line workers, work shall not proceed until additional help has been obtained provided that in cases of emergency where delay would increase the danger to life, limb, or substantial property, then one employee may clear the hazard without assistance.

Adverse Weather Conditions

Except during emergency restoration procedures, work shall be discontinued when adverse weather conditions would make the work hazardous in spite of the work practices required by this section.

Traffic Control, Barricading, And Public Protection

General Rules

1. All applicable federal, state, county and city traffic control laws will be abided by. Most governing agencies require that all traffic plans be submitted to them for approval before the plan is put into use.
2. Each employee must realize that public safety is a major part of their duties and shall conduct their services accordingly.
3. All work on customers' premises, on streets, highways, or other non- company premises shall be carried on with maximum protection of life and property, and with minimum interference with public activities.
4. Precautions must be taken to avoid injury to the public and personnel from arc welding, flying chips or sparks, falling objects, or from tripping over or striking piled material or equipment. Work areas frequented by the public, and below or near work in progress must be barricaded, roped off or otherwise safeguarded against entry by the public.
5. Where traffic is congested, qualified flag persons shall be assigned to direct traffic and protect both the public and the workers. Night watch persons shall be employed at the discretion of the supervisor in charge of the work.
6. The primary goal of traffic control is to eliminate or divert pedestrian or vehicular traffic from the work area. This is accomplished through the strategic placement of warning devices such as signs, barricades, cones, flashers and ribbons.
7. Flagmen - Flagmen are required to be certified or licensed.

Pedestrian Safety

1. Work shall cease immediately when a pedestrian enters a work zone or barricaded area and shall not start again until the pedestrian has left the area.
2. At no time will pedestrians be allowed to walk under overhead workers or equipment.
3. At all times a clear and safe path must be provided for pedestrians. Tools, materials and debris must be kept out of their path at all times.

Aerial Equipment

Aerial Lifts

General Requirements

1. Aerial lifts acquired for use shall be designed and constructed in conformance with the applicable requirements of the American National Standard for "Vehicle Mounted Elevating and Rotating Work Platforms," ANSI A92.2-2015, including appendix.

Aerial lifts include the following types of vehicle mounted aerial devices used to elevate personnel to job-sites above ground:

- a. extensible boom platforms.
- b. aerial ladders.
- c. articulating boom platforms.
- d. vertical towers.
- e. combination of any of the above.

2. Aerial booms shall be secured in the lower traveling position by the locking device on top of the truck cab, and the manually operated device at the base of the ladder before the truck is moved for highway travel.
3. Lift controls shall be tested each day prior to use to determine that such controls are in safe working condition.
4. Only qualified and authorized persons shall operate an aerial lift.
5. Belting off to an adjacent pole, structure, or equipment while working from an aerial lift shall not be permitted.
6. Employees shall always stand firmly on the floor of the bucket and shall not sit or climb on the edge of the bucket or use planks, ladders, or other devices for a work position. Fall Protection in compliance with OSHA 1926.502 shall be worn and a lanyard attached to the boom or bucket when working from an aerial lift.
7. Boom and bucket load limits specified by the manufacturer shall not be exceeded.
8. An aerial lift truck shall not be moved with employees in the bucket, except for equipment which is specifically designed for this type of operation.
9. Articulating boom and extendible boom platforms, primarily designed as personnel carriers, shall have both platform (upper) and lower controls. Upper controls shall be in or beside the platform within easy reach of the operator. Lower controls shall provide for overriding the upper controls. Controls shall be plainly marked as to their function. Lower level controls shall not be operated unless permission has been obtained from the employee in the lift, except in case of emergency.
10. The insulated portion of an aerial lift shall not be altered in any manner that might reduce its insulating value.
11. Before moving an aerial lift for travel, the boom(s) shall be inspected to see that it is properly cradled and outriggers are in stowed position.
12. Employees shall not transfer from the bucket to a pole or fixture, nor from a pole or fixture to the bucket. On dual bucket trucks, employees shall not transfer between the baskets.
13. Only approved attachments shall be allowed on the buckets.
14. When two (2) employees are working from a bucket or buckets, the employee operating the unit shall not move the bucket or buckets until the second employee has been told of the move.

Note: In this section, the word bucket(s) shall also mean basket(s).

Insulated Booms

1. Electrical test. All electrical tests shall conform to the requirements of ANSI A92.2-1990 section 5. However equivalent d.c. voltage tests may be used in lieu of the a.c. voltage tests which are approved by the equipment manufacturer or equivalent entity. Such test shall be performed every calendar year. The insulating fiberglass boom and basket must be thoroughly cleaned as needed and determined by the crew using the unit, and must be properly cleaned each time any service work has been performed.

2. After such test a sticker shall be attached to the vehicle in a visible location showing test results.

Structural Tests

1. A stress test and structured boom test shall be conducted as per ANSI standards A92.2-2015, or if the boom has been modified or a structural member has been replaced. An annual boom inspection shall be conducted. Such inspection shall be in compliance with ANSI standard A92.2- 2015.
2. A sticker showing the results of such tests shall be attached to the vehicle in a visible location.
3. A visual inspection of all mounting and securement pins must be conducted prior to use.

General Use of Aerial Lifts

Outriggers

1. Available footing for the truck wheels and outriggers shall be examined carefully and extra caution, including the use of pads, shall be exercised if there is snow, ice, mud, soft ground or other unusual conditions.
2. Blind ditches, manholes, culverts, underground cesspools, tanks, wells, etc., shall be considered as additional possible hazards.
3. The operator shall assure all personnel and obstacles are clear prior to moving outriggers either down or up.

Maneuvering Booms and Buckets

1. Only employees who have been certified shall be permitted to operate the booms carrying an aerial bucket.
2. The operator shall note all obstructions so that the bucket or booms will not contact obstructions when raised, lowered or rotated.
3. When the booms are to be maneuvered over a street or highway, necessary precautions, including flagmen, shall be taken to provide adequate safe clearance for traffic and pedestrians.

Inclines and Hills

The truck shall sit approximately level as viewed from the rear. On hills, the truck must either be headed uphill and all work done with the boom pointed uphill beyond the center of the truck, or the truck headed downhill, but all work must be done with the boom pointed uphill. Wheel chocks shall be installed prior to use of the aerial lift.

Ground Controls

1. When the bucket is in operation, a qualified employee shall be present to operate the ground controls if the need arises.
2. Except in emergency situations, the lower controls shall not be operated when employees are working aloft, unless so requested by the employees in the bucket.
3. All crew members shall be familiar with emergency lowering procedures.

Use of Insulated Aerial Buckets

1. BEFORE entry into the minimum approach distance, the appropriate rubber gloves and rubber sleeves shall be put on. The appropriate rubber gloves and rubber sleeves shall not be removed until outside the minimum approach distance.
2. Energized conductors and equipment shall be covered with protective devices.
3. Adequate clearance shall be maintained so that protruding tools will not come into contact with conductors, limbs or other obstructions.
4. All hydraulic fluids used for the insulated sections of derrick trucks, aerial lifts, and hydraulic tools which are used on or around energized lines and equipment shall be of the insulating type.
5. The insulated portion of an aerial lift shall not be altered in any manner that might reduce its insulating value.
6. Equipment or material shall not be passed between a pole or structure and an aerial lift while an employee, working from the bucket, is within reaching distance of energized conductors or equipment that are not covered with insulating protective equipment.

Working from Non-Insulated Aerial Platform Trucks and Cranes

1. Work shall not be performed on or over any energized circuits or equipment.
2. When working from a non-insulated aerial platform the basket must be bonded to any conductive object the employee may come in contact with to create an EPZ.
3. Rubber goods or protective equipment shall not be installed or removed from any energized line or piece of equipment by employees working from aerial platform trucks.
4. The floor of the aerial platform shall be kept clear of all tripping hazards and loose material such as wire, tools, etc.
5. When working near energized conductors, no part of the aerial platform boom (or crane) shall violate the minimum clearance rules.

Aerial Lifts

When working near energized lines or equipment, aerial lift trucks shall be grounded, and or barricaded.

Grounding Vehicle Frames

The frames of all motor vehicles equipped with booms or aerial buckets shall be barricaded or grounded with approved clamp capable of conducting the anticipated fault current.

Grounding Lead

A ground lead, to be attached to either a tower ground or driven ground, shall be capable of conducting the anticipated fault current and shall have a minimum conductance of No.2AWG copper.

First Aid and Emergency Procedures

First Aid and Emergency Procedures

All employees shall be trained in Emergency Procedures and shall carry current First Aid and CPR cards issued by qualified training agencies.

Emergency Planning

Every crew shall have a plan ready for execution in case of an emergency. This plan may vary with the location of the work being done and other circumstances that surround the work procedures. When an AED is available, procedures must be in place to ensure it is in working order and ready for use.

Artificial Resuscitation - Pole Top

1. When a victim receives an electrical shock, his breathing often stops. The goal of a successful rescue should be rescue first. If for any reason the victim cannot be rescued immediately, resuscitation should begin while still on the pole.
2. It must be noted that brain damage can occur four (4) minutes after breathing stops. Therefore, pole top rescue should include the ability to perform pole top resuscitation when necessary.
3. The rescuer should be very careful that they do not endanger their own life as they get the patient in position to work on him. If the victim is still in contact with the source of current, the rescuer should not make contact with the victim without using rubber gloves or taking other precautions to insure, their own safety.

Lowering a Person from a Pole or Structure

An injured person should be lowered by the use of Pole Top rescue methods as quickly as possible. If the injured workman has stopped breathing for four (4) minutes, pole resuscitation, as noted above, shall be performed when possible.

Program Audits

This program addendum shall be audited as part of the Electrical Safety Program audit every 3 years.

Auditing of field work shall be performed to help assure that the requirements contained in the procedures of the electrical safety program are being followed. Where the auditing determines that the principles and procedures of the electrical safety program are not being followed, the appropriate revisions to the training program or revisions to the procedures shall be made.

When auditing, determine procedures are not being followed, appropriate revisions to the procedures and training program will be made.

Annual audits shall be performed by reviewing the SOPs, JHA's and Electrical Permits completed in the field. These documents will be saved for a minimum of one (1) year. Documentation of the audits will be maintained by the E Light Safety Department.

Enforcement

Any employee found to be in violation of this policy will be subjected to disciplinary action up to and including termination.