The information contained in this Appendix is a summary of the technical requirements of Safety Code 11. This summary is provided for convenience only and cannot be relied on in lieu of the actual safety standards.

APPENDIX E TO CODE 11 - SUMMARY OF 29 C.F.R. §1926.950 CONSTRUCTION OF POWER TRANSMISSION, DISTRIBUTION LINES AND EQUIPMENT

1926.950 GENERAL REQUIREMENTS

(a) Application.

The term “construction” includes the erection of new electric transmission and distribution lines, equipment, the alteration, and conversion of such lines.

(b) Initial inspections, tests, or determinations.

An evaluation of existing conditions shall be made before starting work on any new construction.

(c) Clearances.

Employees must not work close to exposed energized parts unless proper PPE (Personal Protection Equipment) or insulated slicks are used or barriers are provided.

(d) Deenergizing lines and equipment.

When deenergizing lines or equipment in excess of 600 volts, and the means of disconnection is not visibly open or visibly locked out, the provisions of paragraphs (d)(1)(i) through (vii) of this section must be complied with.

Upon completion of work, the designated employee in charge shall report to the designated authority that all employees are in the clear, protective grounds have been removed, and that all tags may be removed.

(e) Emergency procedures and first aid.

The employer must provide training in first aid and procedures involving emergency situations.

(f) Night work.

Adequate lighting such as spotlights or portable lights must be provided so that work can be performed safely.

(g) Work near or over water.

Suitable protection equipment such as life preservers, safety nets, safety harness and lanyards, and standby rescue boats need to be provided.

(h) Sanitation facilities.

Portable sanitation facilities may be provided or employees need to be allowed to visit the nearest permanent facility.

(i) Hydraulic fluids.

All hydraulic fluids used for tools or other equipment that is used around energized equipment shall be the insulating type.

1926.951 TOOLS & PROTECTIVE EQUIPMENT

(a) Protective equipment.

Rubber protective equipment must be visibly inspected and air tested prior to each use.

Protective hats must be Class "B" for employees that are exposed to the hazards of falling objects, electric shock, or burns.

(b) Personal Climbing equipment.

Body belts and safety lanyards shall be worn by employees working at elevated locations, or other safeguards must be used to protect employees from falls.

(c) Ladders.

Conductive ladders can not be used near energized lines, except under special conditions.

Ladders used in structures must be secured in place to prevent accidental displacement.

(d) Live-line Tools.

Only live-line tools having a manufacturers certification shall be used on live-line work.

All live-line tools must be visually inspected before use. Tools showing defects of any kind must not be used.

(e) Measuring tapes or ropes.

Conductive tapes or ropes must not be used when working on or near energized parts.

(f) Handtools.

All portable electric handtools need to be either:

(1) Properly grounded if they have metal frames

(2) Of the double insulated type and identified as such

(3) Connected to the power supply by means of an isolating power supply.

All Pneumatic tools used on or around energized lines or equipment shall:

(1) Have nonconducting hoses

(2) Have an accumulator on the compressor to collect moisture

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MECHANICAL EQUIPMENT

(a) General.

Visual inspections must be made on equipment each day.

Brakes on equipment shall be tested at the beginning of each shift.

All vehicles with the view to the rear obstructed must be equipped with reverse signal alarm, or be directed by an observer while backing up.

(b) Aerial lifts.

Aerial lifts near energized lines or equipment not insulated from the exposed lines or equipment, need to be grounded or barricaded, and are to be considered as energized.

Equipment or material must be passed to an employee in an aerial basket that is within reach of energized lines.

(c) Derrick trucks, cranes, and other lifting equipment.

All lifting equipment needs to be certified for the voltage it will be exposed to, or the equipment needs to be insulated or considered energized or grounded.

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MATERIAL HANDLING

(a) Unloading.

Prior to unloading material, the load needs to be examined thoroughly to assure that the unloading process will not be a danger to employees.

(b) Pole hauling.

During pole hauling, the poles will be secured to prevent movement, and a red flag attached to the trailing end of the longest pole. During darkness an illuminated warning device shall be attached to the longest pole.

(c) Storage.

Materials should not be stored under or near energized lines or equipment.

(d) Tag lines.

An established safety practice is to use a tag line to control loads handled by hoisting equipment.

(e) Oil filled equipment.

During construction or repair of oil filled equipment, the oil may be stored in temporary containers such as pillow tanks.

(f) Framing.

During framing operations, employees cannot work under loads suspended by hoisting equipment, unless additional adequate support is provided for the load.

(g) Attaching the load.

The hoist rope must not be wrapped around the load. Suitable underhook devices must be used to hold and control the load. This provision does not apply to electric construction crews when setting or removing poles.

1926.954 GROUNDING FOR PROTECTION OF EMPLOYEES

(a) General.

All conductors and equipment shall be treated as energized until tested or otherwise determined to be deenergized or until grounded.

(b) New construction.

New lines or equipment may be considered deenergized and worked as such where ground sets are installed or where the hazard of induced voltage is not present, and where new lines cannot contact energized lines or equipment.

(c) Communication.

Bare wire communication conductors on power poles or structures must be treated as energized unless protected by insulating materials.

(d) Voltage testing.

Deenergized conductors and equipment which are to be grounded, shall be tested for voltage and be locked and tagged out or be worked as if they are energized. For additional information see 1910.950(d).

(e) Attaching grounds.

When attaching grounds, the ground end shall be attached first, and the other end must be worked with insulated tools or suitable devices.

When removing grounds, the grounding device must first be removed from the line, or equipment with insulated tools or other suitable devices.

(f) Grounds.

Grounds shall be placed between the work location and all sources of energy. Grounds shall be placed as close to the work location as possible.

If grounds are not used, lines or equipment shall be worked as energized.

(g) Testing without grounds.

Grounds can be temporarily removed only for test purposes, and extreme caution must be exercised.

(h) Grounding electrodes.

Ground electrodes shall have a resistance to ground low enough to protect employees and operate protective devices.

(i) Grounding to tower.

Grounding to tower shall be made with a tower clamp capable of conducting the anticipated fault current.

(j) Ground lead.

All ground leads must be capable of conducting the anticipated fault current and have a minimum conductance of No. 2AWG copper.

1926.955 OVERHEAD LINES

(a) Overhead lines.

Prior to climbing poles, ladders, structures, or scaffolds, an evaluation shall be made to determine if it is safe to climb.

Employees standing on the ground must not contact equipment or machinery working adjacent to energized lines or equipment.

Lifting equipment must be bonded to an effective ground or it shall be considered energized and barricaded when working near energized lines or equipment.

Pole holes must be attended or guarded to protect employees.

Tag lines shall be of the nonconductive type when used near energized lines.

(b) Metal tower construction.

When working in unstable soil or other material, provisions shall be made for cleaning out auger-type footings without requiring an employee to enter the footings or excavation unless shoring or suitable protective systems are installed to protect employees.

A designated employee shall direct the movement of equipment adjacent to footing excavations.

Members and sections of towers being assembled must be adequately supported to protect employees.

Erection cranes shall be positioned on firm, level foundations with outriggers used.

A designated employee must assure that proper clearance is maintained while moving or placing equipment or materials under or near energized lines.

(c) Stringing or removing deenergized conductors.

Before stringing operations start:

(1) A job briefing shall be conducted

(2) The procedures to be followed must be established

Where a conductor can accidentally contact or receive an induced voltage, the conductor must be grounded and the employee must be insulated or isolated for protection.

When crossing over energized conductors of 600 volts or more, guards or nets must be used to protect employees from shock hazard or the employee must be insulated or isolated for protection. Also, the line being strung must be grounded or worked as energized.

While conductor or pulling line is being pulled (in motion) employees can not be under overhead operations or on crossarms.

Stringing and clipping shall not be performed during an electrical storm.

Reliable communications must be established between the reel tender and pulling rig operator.

(d) Stringing adjacent to energized lines.

An evaluation must be made so that a competent determination can be made to ascertain that induced voltage buildups will not occur, or the lines must be worked as energized.

AII pulling and tensioning equipment must be isolated, insulated or grounded.

(e) Live-line bare-hand work.

Employees shall be instructed and trained in live-line bare-hand technique, and the safety requirements prior to starting work.

Only equipment designed, tested, and intended for live-line bare-hand work shall be used.

All live-line bare-hand work shall be personally supervised by a person trained and qualified to perform live-line bare-hand work.

1926.956 UNDERGROUND LINES

(a) Guarding and ventilating manholes and vaults.

Appropriate warning signs must be displayed when covers of manholes or vaults are removed.

(b) No entry can be made into manholes or vaults unless forced ventilation is provided, or the atmosphere is tested and found to be safe. Where unsafe conditions are detected, the space must be made safe before entry and a adequate continuous air supply provided.

(c) Trenching and excavating.

Trenching and excavating operations must comply with construction safety standard 1926.651 and 1926.652.

Underground utilities must be located prior to starting excavating, and must be protected as necessary to avoid damage.

Where multiple cables exist in an excavation, the cable not being worked must be protected.

Before cutting into a cable or opening a splice, the cable must be identified and verified to be the proper cable.

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CONSTRUCTION IN ENERGIZED SUBSTATIONS

(a) Work near energized equipment facilities.

Before work is started on energized substations, authorization must be obtained from the designated authorized person.

When work is to be done in an energized substation, the following shall be determined:

(1) What facilities are energized

(2) What protective equipment and precautions are necessary for the safety of personnel

(b) Deenergized equipment and lines.

When it is necessary to deenergize equipment or lines for protection of employees, the requirements contained in construction safety standard 1926.950(d) must be followed.

(c) Barricades and barriers.

Barricades or barriers must be installed to prevent accidental contact with energized lines and equipment.

(d) Control panels.

Work on or adjacent to energized control panels must be performed by designated employees.

Precaution should be taken to prevent accidental operation of relays or other protective devices due to jarring, vibration, or improper wiring.

(e) Mechanized equipment.

All mobile cranes and devices must be effectively grounded when moved or operated close to energized lines or equipment.

(f) Substation fences.

Temporary fencing will be provided around substations where the permanent fence has been removed. The temporary fence must be grounded.

All gates to all unattended substations shall be kept locked.