ELECTRICAL DISTRIBUTION SAFETY RULES, POLICIES AND PROCEDURES

The following sections provide general guidelines and requirements for work zone and traffic control safety and have been prepared to assist you based on your job descriptions and nature of work.

Overhead and Underground Line Maintenance Safety Procedures

1. Work in the Street

    a. All employees who work in or along streets are required to wear reflective vests and use warning signs and flagmen as necessary to direct traffic. (See "Work in the Street," Section V, page 5).

2. Line and Equipment Clearance

    a. A switching tool and rubber gloves with leather protectors shall be used when opening and closing switches from an elevated position.

    b. A tag shall be attached to each switch that is providing clearance on the line. A lock shall be installed on accessible (ground level) switch.

    c. Capacitors shall be de-energized for 5 minutes, removed from the line, short circuited, and grounded as needed for the job. Rubber gloves and a hot stick shall be used.

    d. The identification of all underground equipment and lines shall be verified by tags and chart comparison.

    e. If radios are used, all instructions about clearances shall be repeated back to the person giving them.

    f. Only the crew working the line is authorized to release the line for service after all personnel are accounted for.

3. Testing for Dead

    a. After switching clearance, all line equipment, transformers, etc., shall be tested for dead. Rubber gloves and live line tools, when necessary, shall be used.

4. Testing Poles for Climbing

    a. Poles shall be inspected and tested for soundness before they are climbed.

    b. Poles with rot or other structural defects making it not safe, shall be made safe with guying, bracing a new pole next to it, or otherwise before climbing.

5. Entering Manholes/Opening Underground Service Compartments

   a. The manhole opening must be guarded with signs, barricades, etc., as necessary or directly attended by a worker.

   b. Confined space procedures (testing for gases, ventilation, etc.), shall be followed.

   c. Rubber gloves shall be put on before entering pad mount or below ground compartments.

   d. Where a cable in a manhole has one or more abnormalities that could lead to or be an indication of an impending fault, the defective cable shall be de-energized before any employee may work in the manhole.

Note: ***Abnormalities such as oil or compound leaking cable or joints, broken cable sheaths or joint sleeves, hot localized surface temperatures of cables or joints, or joints that are swollen beyond normal tolerance are presumed to leak or be an indication of an impending fault.***

6. Grounding

   a. Grounding must achieve an equipotential zone for the worker. Live line tools shall be used when grounding.

   b. After clearance and testing, de-energized lines shall be grounded as close to the work area as possible.

   c. The ground end shall be attached to the neutral first; the other end shall then be attached to the line or equipment. To remove, reverse the process. Grounding must be able to carry the maximum fault current and have impedance low enough to ensure quick operation of protective devices.

   d. At least 2 feet 6 inches shall be maintained between ungrounded energized lines at the work location.

   e. Line and aerial trucks shall be grounded anytime work is being performed near energized lines.

7. Work on or Near Energized Lines or Ungrounded De-Energized Lines

Note: ***When working on de-energized and grounded construction, the work may be performed without rubber gloves and protectors; all other protective gear requirements still apply.***

   a. When two or more employees are working within reach of each other, they shall not work on different phases at the same time.

Approach Distance

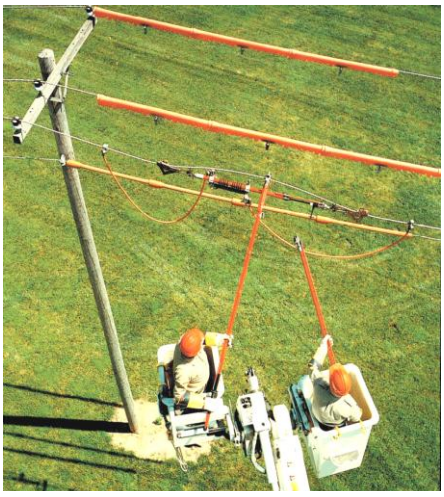
b. Employees shall not approach or take any conductive object closer to any exposed energized conductor or equipment than that distance shown below unless that employee is wearing approved rubber gloves with protectors, approved hard hat, approved eye protection and wearing clothing made from flame resistant natural fibers, Nomex or PBI and be void of any exposed metallic jewelry: 7.2kV through 34.5 kV 2'6".

Note: ***The maximum voltage which may be worked or handled with approved rubber gloves from a pole is 600 volts.***

Rubber sleeves are required when the work requires reaching through energized conductors, or working close to more than one conductor.

c. If any part of the employee's body can, at any time during the work, come closer than 2'6" to any exposed energized conductor or equipment as listed in the note above, the energized part or equipment shall be covered with insulated hose blankets or covers.

d. The maximum voltage which may be worked or handled from an approved insulated platform or an approved insulated bucket is:



-Wearing 20 kV gloves - 7.2 kV phase or ground or
12.5 kV phase to phase

-Wearing 40 kV gloves -19.9 kV phase to ground or
34.5 kV phase to phase

All work on conductors or equipment energized at voltages higher than those listed above shall be performed with approved live line tools.

Work from the Pole

e. Approved hardhat, eye protection and rubber gloves with protectors shall be put on by the employee before leaving the ground. Rubber gloves may only be removed to retrieve small objects from equipment containers.

f. All telephone circuits, cable television circuits, secondary conductors, service cables, guys and neutrals shall be covered with approved high voltage cover gear if any part of the employee's body can come into contact with these facilities while working on energized conductors and equipment, or while working on de-energized or grounded conductors and equipment if any part of the employee's body may contact energized conductors or equipment. Ungrounded conductors or conductors up to 600 volts shall be covered while wearing approved rubber gloves and protectors.

g. All energized conductors in the work area shall be covered with approved protective equipment except the part of the conductor on which work is being done.

h. Protective equipment shall be installed from a safe position and from a position below the conductor or equipment being covered.

i. Approved hard hat, eye protection, approved rubber gloves and protectors and rubber sleeves shall be worn by employees while covering conductors and equipment energized at 601 volts through 34.5 kV. The employee's gloved hand shall not come in contact with conductors or equipment energized at primary voltage while installing or removing protective cover gear. Approved plastic shields with insulated handles or shields with the provision for the installation with hotsticks shall be used to cover energized primary conductors.

j. Approved hard hat, eye protection, approved rubber gloves with protectors and rubber sleeves shall be worn by employees and all energized primary conductors and equipment shall be covered with approved protective covers, when during the course of the work, any part of the employee's body may come closer to the energized conductor or equipment then the distance specified below:

- 7.2 kV through 34.5 kV 2'6".

k. When work from the pole requires the use of an insulated platform attached to the pole, items "e" through "j" above apply as well as the following:

- Approved hard hat, eye protection, approved rubber gloves with protectors and rubber sleeves shall be worn by all employees while working on the platform
- The platform barricade system shall be in place and the employee shall be secure with a safety strap or lanyard at all times while on the platform.
- All energized conductors in the work area shall be covered with protective equipment except the part of the conductor on which work is being done.

l. When work from the pole requires the use of live line tools to cut, splice, move, relocate or hold energized conductors, items "e" through "j" above apply as well as the following:

- Approved hard hat, eye protection, approved rubber gloves with protectors and rubber sleeves shall be worn by all employees on the pole regardless of position on the pole.
- All energized conductors in the work area shall be covered with protective equipment except the part of the conductor on which work is being done.

Work from an Aerial Bucket

m. Energized work from an aerial bucket with an insulated liner is limited to 19.9 kV phase to ground or 34.5 kV phase to phase or lower voltages.

n. Approved hard hat, eye protection, approved rubber gloves with protectors, rubber sleeves and body harness with lanyard firmly attached shall be put on by the employee before the bucket leaves the cradled position and worn at all times. These items shall not be removed until the bucket has returned to the cradle position.

o. All neutrals, secondary circuits, telephone circuits, cable television circuits, guys, grounds and grounded equipment shall be covered with protective equipment if in close proximity to the work area.

p. All energized conductors in the work area shall be covered with protective equipment except the part of the conductor on which work is being performed.

q. Protective covering equipment shall be installed as the circuit or equipment to be covered is approached and whenever possible from a position below the circuit. Covering shall be removed in the reverse order.

Work from the Ground

r. The use of a TEL-O-POLE or EXTENDO STICK is restricted as follows:

- The employee shall be standing firmly on the ground.
- There shall be no vehicles or other persons in the immediate area.

s. Approved, low voltage rubber gloves shall be used on overhead line work, company telephone or telemetry circuits, or while doing work in ungrounded transformer secondary compartments or pedestals.

t. Approved, low voltage or high voltage rubber gloves with protectors, approved hard hat, approved eye protection shall be worn when installing, changing, testing or removing CT's or when work on or within energized meter enclosures. In addition, the employee shall be void of any exposed metallic jewelry.

u. Approved hard hat, eye protection, leather gloves and clothing shall be worn when removing, installing or changing energized electric meters.

8. Installing and Removing Overhead Lines

a. Tension stringing method barriers, or other EQUIVALENT measures shall be used if contact can be made with energized power lines or equipment.

b. Cover exposed energized lines and/or protect employees from differences in potential by grounding/bonding of use insulated equipment whenever the cable being installed could become energized with this activity.

Event considerations shall include ANY of the following:

- Failure of stringing equipment – pulling or tensioning; or
- Failure of wire or cable being pulled; OR,
- Failure of any previously installed lines or equipment.

c. CONSIDERATION REQUIRED: Pulling over energized facilities above 600 volts:

- If auto-reclosure can be disabled, it shall so be done.

d. Study is required concerning induction from energized parallel lines or treat work activities as under hot work.

e. Use conductor grounding requirements (see #4) at least every 2 miles. Grounds shall remain in place until installation is complete between dead ends, removed as LAST phase of work.

f. Work on bare conductors requires grounds at EACH work LOCATION, PLUS grounds at EACH OPEN dead-end OR catch-off points OR next adjacent structure.

g. When splicing two bare conductors, they SHALL be bonded AND grounded BEFORE doing work.

h. All items of stringing equipment shall be in good condition. Pulling rig shall be operated only when safe to do so. Do not stand under lines or conductors!

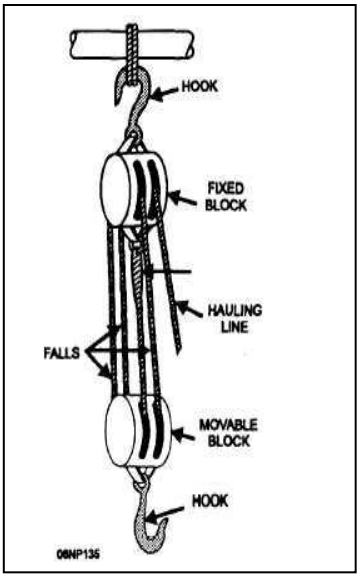
i. Conductor grips shall NOT be used on wire rope unless specifically designed for this.

j. Reliable communications are needed between ends of the work (changing shifts).

9. Transformers

a. Block and tackle of adequate strength shall be use when installing or removing transformers. If mechanical power is used, the fall line of the tackle must be run through a snatch block at the base of the pole. (Excluding material handling buckets).

b. When installing and connecting transformers, the ground and neutral connections shall be made first, then the secondary connections and last, the primary. The reverse order shall be followed in removing a transformer.



c. When transformers are being raised or lowered, all workers shall stand in the clear and guard traffic if necessary.

d. When climbing an energized transformer pole, linemen shall immediately observe that proper transformer ground connections exist.

e. Linemen shall avoid touching the case of any energized transformer with any portion of their bodies.

f. When fusing transformers, linemen shall avoid energized conductors.

g. All transformers shall be carefully inspected before being installed.

h. The secondary circuit of a current transformer shall not be opened while the primary is energized.

10. Working on Capacitors

a. Line capacitors shall be considered at full voltage until they have been removed from the line, and terminals short-circuited and discharged to ground by an approved method. The terminals shall not be short-circuited until the capacitors have been de-energized for at least five minutes. Once terminals have been short-circuited (terminals bonded together), they should remain bonded until later use.

b. Employees shall wear rubber gloves and use a hot stick while shorting terminals to discharge capacitor.

c. New capacitors should be short-circuited by a qualified electrician as soon as they have been received in the warehouse

11. Fuses

a. Insulated tools or rubber gloves with protectors must be used when installing or removing fuses.

b. Eye protection and insulating tools must be used when installing or removing explosion-type fuses.

12. Setting Poles or Removing Poles Near Energized Conductors

a. Insulated equipment shall be used; no contact between the pole and the un-insulated portion of the body.

13. Circuit Breakers

a. Draw-out type circuit breakers shall be inserted and removed while the breakers are in the open positions.

Bucket Trucks

1. Only qualified electric shop persons shall operate this equipment.

   Note: Other GSA employees may borrow and operate bucket truck only if they have completed the training in the operation of the truck.

2. The operating and maintenance instruction manuals issued by the manufacturer shall be followed.

3. Load limits of the boom and bucket shall not be exceeded. Shock loading (sudden stops or starts) of the equipment shall be avoided. Maximum load limits should be painted on the outside of the bucket.

4. Aerial lifts shall not be "field modified."

5. Prior to use, the equipment shall be given a warm up period. The hydraulic system and the lift controls shall be checked and tested daily before use to determine such features are in safe working condition. Malfunctions or unsafe operational conditions shall be reported to the foreman. Equipment, which is not in proper operational condition, shall not be used.

6. Articulating boom and extensible boom platforms, primarily designed as personnel carriers, have both platform (upper) and lower controls. Lower level controls shall not be operated unless permission has been obtained from the employee in the bucket, except in case of emergency.

7. The truck shall not be moved unless the boom is lowered, the bucket cradled and secured, and the outriggers retracted.

8. When employees are in the bucket of an aerial lift, the emergency brake of the vehicle shall be set. Wheel chocks or outriggers shall be used to provide added protection. When the vehicle is on an incline, wheel chocks shall be used regardless of whether or not outriggers are used. The truck should sit approximately level when viewed from the rear.

9. When outriggers are used, they shall be set on pads or a solid surface. Care should be taken when outriggers are lowered and raised. The outriggers must be in clear of the operator during this process.

10. Employees shall not belt to an adjacent pole or structure. When working from an aerial lift, a body harness shall be worn and a lanyard attached to the boom.

11. Safety rules governing the use of hot-line tools, rubber gloves, personal protective equipment and general safe practices shall also apply to work done from aerial baskets.

12. When a boom must be maneuvered over a street or highway, necessary precautions shall be taken to avoid accidents with traffic and pedestrians.

13. The operator shall always face in the direction in which the basket is moving and he shall see that the path of the boom or basket is clear when it is being moved.

14. Employees shall not stand or sit on top or on the edge of the basket or on ladders placed in the basket. The employee's feet shall be on the floor of the basket the entire time he/she is in it.

15. Climbers shall not be worn by employees while in the basket.

16. When two men are in the basket or baskets, one of them shall be designated to operate the controls. One employee shall give all signals, which shall be thoroughly understood by all persons concerned.

17. When two linemen are working from the basket, extreme care shall be taken to avoid one man contacting poles, cross arms or other grounded or live equipment while the second lineman is working on equipment at a different potential.

18. In no case shall more than one energized conductor or phase be worked at one time.

19. The aerial lift, together with the workers, the basket, and all tools and equipment, shall maintain proper clearances from unprotected energized conductors.

20. When using pneumatic or hydraulic tools in a bucket, the operator shall be sure that hoses or lines do not become entangled in the operational controls.

21. While live-line work is in progress, no other work of any nature shall be performed on the same pole or structure.

22. Equipment or material shall not be passed between a pole or structure and an aerial lift while the employee working from the basket is within reaching distance of energized conductors or equipment that is not covered with insulating protective equipment.

23. Bucket shall not be operated without a hand line.

24. Bucket trucks shall be electrically tested annually or every twelve (12) months as per ANSI and records of test kept on the truck.

25. If it becomes necessary to operate the truck in high grasses or weeds, this growth shall be cleared from under the truck.

26. Bucket trucks shall be equipped with a back-up alarm, or someone shall assist the driver in safely backing.

27. All controls shall be labeled as to the direction of boom and outriggers.

<u>Care and Use of Hotsticks</u>

1. Hotsticks shall be stored in a clean, dry area designed to prevent rolling and striking other hotsticks, materials or tools.

2. Hotsticks shall be wiped clean and dried before use and before being placed in storage.

3. Fiberglass hotsticks shall be thoroughly examined for cracks, checks, and signs of tracking or other contamination before each use. The hotstick shall not be used and must be tagged out of service if there is evidence of any of the above conditions. Hotsticks removed from service for structural repair shall be electrically tested before being placed back into service.
4. Fiberglass hotsticks shall be thoroughly examined, cleaned, and waxed annually using products approved for the use.
5. Fiberglass hotsticks shall be electrically tested annually at 75,000 volts per foot.
6. Employees using hotsticks during rain, wet snow, and/or during electrical storm conditions shall wear approved rubber gloves with protectors.

Care and Use of Rubber Gloves and Rubber Protective Equipment

1. Rubber gloves, sleeves, blankets, line hose covers, etc. shall be inspected prior to use.
2. Rubber protective equipment shall be stored in a clean and dry location and secured from drainage.
3. Rubber gloves shall be tested once every three months; rubber protective equipment once every six months.

Line Trucks

1. Only qualified, electric shop employees shall use or operate this equipment.
2. Line trucks shall be inspected prior to use.
3. All controls shall be labeled as to the direction of boom and outriggers.
4. Outriggers shall always be used and shall be set on pads or a solid surface.

PCB Leaks

1. Wear disposable coveralls, vitron, or neoprene gloves.
2. If possible, contain the spill by placing the transformer in DOT 55 or 85-gallon drum. Use sand or similar absorbent to dike and control the flow of the oil.
3. Excavate ALL contaminated sand and soil and place in 55-gallon drums. Clean all solid surfaces with Hexane or kerosene.
4. Dispose of coveralls, gloves, and all contaminated clothing in a 55-gallon drum.

5. Label all containers with PCB decals.

Line Clearance Tree Trimming

1. Hard hats, safety glasses, or goggles and ear protection are to be worn when operating the chipper.

2. If the bucket truck could become energized, then the wood chipper must be removed from the truck, or the chipper must be grounded, bonded, ground mats used, etc., to extend area of equipotential and to ensure that employees are not exposed to hazardous difference in potential.

3. The wheels of the chipper must be chocked when it is removed from the truck.