NAVY PUBLIC WORKS CENTER
NORFOLK, VIRGINIA
UTILITIES DEPARTMENT

STANDARD OPERATING PROCEDURE / JOB HAZARD ANALYSIS

TITLE

REPLACE CROSS ARM ON EXISTING POLE STRAIGHT LINE WITH ENERGIZED CIRCUITS

PROCEDURE NUMBER

WC 624 HVE 004

DISTR:
601A
610
620
WC 624

SIGNED:_____
(DATE)

APPROVED:_____
(DATE)

SAFETY PROFESSIONAL:_____
(DATE)

MANAGEMENT OFFICIAL:_____
(DATE)

DATE:_____ **REVISION DATE:**_____

REPLACE CROSS ARM ON EXISTING POLE
STRAIGHT LINE WITH ENERGIZED CIRCUITS

Purpose:
Replace a cross arm on a straight line pole with energized circuits on the pole.

Potential Energy Sources:
1. Energized conductors within work area.
2. Deenergized conductors within work area which have not been properly grounded.

Tools and PPE:
Tools: Bucket truck, hydraulic or pneumatic operated drill, brace and bit, hand line, rubber hoses, rubber blankets, and insulator hoods. PPE: Nomex coveralls, Nomex hood, hard hat, safety glasses, safety shoes, insulating rubber gloves, insulating rubber sleeves, work gloves, orange vest, safety harness, and back brace if required by back injury prevention and control program. The class of rubber gloves and sleeves will depend on the exposure voltage as per the following: Class 0 - up to 1,000 volts, Class 1 - up to 7,500 volts, Class 2 - up to 17,000 volts, Class 3 - up to 26,500 volts, Class 4 - up to 36,000 volts.

References:
1. PWC Occupational Safety and Health Program Manual, PWCNORVAINST 5100.33E
2. SOP WC 624 HVE 001, Set Up and Secure Bucket/Auger Truck
3. Occupational Safety and Health Standards for General Industry (29 CFR PART 1910): Subpart I, Personnel Protective Equipment; Subpart R, Electrical Power Generation / Transmission / Distribution; Subpart S, Electrical
4. NFPA 70 E, Approach Distances To Exposed Energized Electrical Conductors and Circuit Parts
5. ANSI C2-1987, National Electrical Safety Code
6. Electrical Transmission and Distribution Safety Manual, P-1060
7. The Lineman's and Cableman's Handbook, 5th ED

Procedures:
1. Set up bucket truck. Refer to SOP WC 624 HVE 001, Set Up and Secure Bucket/Auger truck for details.

2. When operating a bucket truck the following safety rules will be followed.
   a) Only an authorized person, one with a current government license to operate an aerial lift, will operate the bucket.
   b) Do not use the bucket truck if winds exceed the truck manufacture's specified limit.
   c) Do not perform energized work in wet weather, unless an emergency.

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   d) Personnel in bucket will wear a safety harness with a lanyard attached to the boom or bucket.
   e) Do not exceed the bucket's weight limitations.
   f) Stand firmly on the floor of the bucket with both feet. Do not sit on

the bucket's edge or use planks, ladders, or other such devices.

3. Insulate all energized overhead circuits which are within 3 feet of work area. Insulate any deenergized overhead circuits that have not been properly grounded per Lockout and Tagout procedures. Personnel in the bucket shall wear Nomex coveralls, Nomex hood, safety glasses, safety shoes, insulating rubber gloves and sleeves, and hard hat.

4. In order to replace the old cross arm, personnel in the bucket will wear Nomex coveralls, safety glasses, safety shoes, insulating rubber gloves and sleeves, and hard hat. Ground personnel will wear hard hats, safety shoes, gloves, and orange vests if work is adjacent to a road or in a parking lot. Personnel in the bucket will carry a hand line aloft with them.

5. Remove conductors from existing arm. Remove tie wires from insulator and conductor and lower or raise conductor from arm using bucket or hand line as necessary. The method to support the conductors during the change out will be left to the mechanic's judgement. Wear PPE per Step 4 plus Nomex hood.

6. Remove old cross arm. Unbolt and remove cross arm from pole and lower to ground with bucket or hand line. Ground men not required to be near the area below the bucket will stay clear of this zone. Ground men required to be near the bucket will be alert for falling objects.

7. Install new cross arm and insulators. Even though the new cross arm installation should be the same as the removed one, refer to attached LANTDIVENGCOM Pole Plates for further information if required. Attach arm to pole and have ground personnel level the arm. Once leveled the arm can be secured in position with a hard head or bolt. Attach insulators and arm pins to the arm. Secure bolt on arm pin with the insulator in the proper position. The insulators have to be properly rated based on conductor voltage. Top grooved or saddleback insulators should be used. Use angle insulators if the line is turning at pole work is occurring at. If placing a new cross arm involves drilling new holes, personnel in the bucket will add ear protection to PPE.

8. Place the conductors on the new insulators and secure them. The exact method will depend on work conditions and mechanic's judgement. A conductor should be placed so the securing tie wire will have minimum strain on it. An insulator and pin is to take the strain

of a conductor. The tie wire just holds the conductor in place. Some general
rule for tie wires are as follows:

a) the tie wire will be the same kind of wire as the conductor, copper tie for copper wire, aluminum tie for aluminum wire, covered tie for covered conductor
b) use soft annealed wire
c) use solid wire
d) never reuse a tie wire
e) in general use #6 tie wire for conductors #4 and smaller, and use #4 tie wire for conductors greater than #4

Secure the conductor tightly via standard tying methods as any looseness between the tie wire, conductor, and insulator will lead to chafing and injury to the conductor. Wear Step 4 PPE plus Nomex hood.

9. Remove insulating material from overhead conductors. Usually remove insulators in reverse order from which they were placed.

10. Secure bucket truck. Refer to SOP WC 624 HVE 001, Set Up and Secure Bucket/Auger Truck, for details.