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**NAVY PUBLIC WORKS CENTER
NORFOLK, VIRGINIA
UTILITIES DEPARTMENT**

STANDARD OPERATING PROCEDURE / JOB HAZARD ANALYSIS

TITLE

**REPLACE AN INSULATOR ON A CROSS ARM
ENERGIZED CONDUCTORS**

**PROCEDURE NUMBER
WC 624 HVE 016**

**DISTR:
601A
610
620
WC 624**

SIGNED: _____
(DATE)

APPROVED: _____
(DATE)

SAFETY PROFESSIONAL: _____
(DATE)

MANAGEMENT OFFICIAL: _____
(DATE)

DATE: _____

REVISION DATE: _____

REPLACE AN INSULATOR ON A CROSS ARM ENERGIZED CONDUCTORS

Purpose:

Procedure to replace a pole line insulator supporting energized conductors.

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, 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.

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 - c) Do not perform energized work in wet weather, unless an emergency.
 - 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 insulator, 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 conductor from existing insulator by removing tie wire securing conductor to insulator. Lower or raise conductor from cross arm using a hand line. Personnel in bucket will add Nomex hood to PPE while doing this task.

6. Remove and replace the insulator. Unbolt and remove old insulator and arm pin. Install the new arm insulator and arm pin. The new insulator should have the same voltage rating and be the same type; pin or post, straight or angle, as the replaced one. Secure bolt on arm pin with the insulator in the proper position.

7. Place the conductor on the new insulator and secure it. Use the hand line to place the conductor on the insulator. The conductor should be placed so the securing tie wire will have minimum strain on it. The insulator and pin are to take the strain of the 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

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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. Personnel in bucket will add Nomex hood to PPE while doing this task.

8. Remove insulating material from overhead conductors. Usually remove insulators in reverse order from which they were placed. Personnel in the bucket shall wear Nomex coveralls, Nomex hood, safety glasses, safety shoes, insulating rubber gloves and sleeves, and hard hat.

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