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

**STANDARD OPERATING PROCEDURE / JOB HAZARD ANALYSIS**

**TITLE**  
**TERMINATE HIGH VOLTAGE CABLES**  
**ELBOW CONNECTORS**

**PROCEDURE NUMBER**  
**WC 624 HVE 050**

**SIGNED:** \_\_\_\_\_

**(DATE)**

**APPROVED:** \_\_\_\_\_

**(DATE)**

**SAFETY PROFESSIONAL:** \_\_\_\_\_

**(DATE)**

**MANAGEMENT OFFICIAL:** \_\_\_\_\_

**(DATE)**

REVISION

**A**





## TERMINATE HIGH VOLTAGE CABLES ELBOW CONNECTORS

### **Purpose:**

Procedure to terminate high voltage cables onto a dead front switch or a dead front transformer.

### **Potential Energy Sources:**

1. The cables being terminated can be a potential energy source if they have already been spliced into the underground circuit.
2. All cables already terminated on the oil switch if terminating onto an oil switch.
3. Secondary cables to the transformer if generators have been placed to supply temporary power to facilities which have had their normal power switched off due to this work if terminating onto a transformer.

### **Tools and PPE:**

Tools: Shotgun stick, cable cutters, hydraulic press, torch, and assorted hand tools. PPE: Nomex coveralls, Nomex hood, insulating rubber gloves, insulating rubber sleeves, hard hat, safety shoes, work gloves, safety glasses, 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. 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
3. NFPA 70 E approach distances to exposed, energized, electrical conductors and circuit parts.
4. ANSI C2-1987 National Electrical Safety Code
5. Electrical Transmission and Distribution Safety Manual, P-1060
6. SOP WC 622 HVE 013, Deenergization, Lockout, Tagout
7. SOP WC 622 HVE 007, Switchout and Switchback Energized Circuit

### **Procedures:**

1. Terminating onto a distribution switch - Operations personnel will deenergize
  - a) the high voltage cables to be terminated if they are connected to an energized circuit.
  - b) All circuits terminated on the switch.

Terminating onto a transformer or transformer switch - Operations personnel will perform deenergization switching if

- a) the high voltage cables to be terminated are connected to an energized circuit
- b) a generator has been placed at the facility to supply temporary power during the work period, and there is a possibility the generator can back feed the transformer.

Operations personnel will follow the following SOPs

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WC 622 HVE 007, Switchout and Switchback Energized Circuit  
WC 622 HVE 013, Deenergization, Lockout, Tagout

2. Terminating onto a distribution oil switch -

After the switch has been cleared for work by operations personnel, test all cables to be terminated using a high voltage tester to verify that all the cables are deenergized. Before the cables are checked, test the high voltage tester on a known energized circuit to verify the tester is working. Test each cable separately, taking care not to cross phase during test. If voltage is detected, stop the test and (a) notify operations personnel that the circuit(s) is still energized, (b) wait for operations personnel to correct the problem, (c) perform the deenergization verification test once again after operations personnel finish switching operations and declare the cables deenergized. If no voltage is indicated, retest the high voltage tester to re-verify it is working properly. Wear Nomex coveralls, Nomex hood, safety glasses, safety shoes, insulating rubber gloves and sleeves, and hard hat while testing.

Terminating onto a transformer or transformer switch -

Using a high voltage tester test the high voltage cables to be terminated and/or the transformer's primary bushings, or transformer primary switch's bushings, to verify they are deenergized. Before the conductors are checked, test the high voltage tester on a known energized circuit to verify the tester is working. Test each deenergized conductor separately, taking care not to cross phase during test. If voltage is detected, stop the test and (a) notify operations personnel that the circuit is still energized, (b) wait for operations personnel to correct the problem, (c) perform the deenergization verification test once again after WC 622 personnel finish switching operations and declare the cables deenergized. If no voltage is indicated, retest the high voltage tester to re-verify it is working properly. Wear Nomex coveralls, Nomex hood, safety glasses, safety shoes, insulating rubber gloves and sleeves, and hard hat while testing.

3. Cut the cables to proper length and prepare the cable ends per the elbow manufacture's instructions.

4. Install elbow connectors on to prepared cable ends as per the elbow manufacture's instructions.

5. Plug the elbow connector in the transformer or switch bushing wells.

6. Operations personnel energize all circuits and/or equipment as per the following SOPs:

WC 622 HVE 007, Switchout and Switchback Energized Circuit  
WC 622 HVE 013, Deenergization, Lockout, Tagout

END

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