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

STANDARD OPERATING PROCEDURE / JOB HAZARD ANALYSIS

TITLE

**TERMINATE HIGH VOLTAGE CABLES
SUBSTATION SWITCHGEAR**

PROCEDURE NUMBER

WC 624 HVE 049

SIGNED: _____
(DATE)

APPROVED: _____
(DATE)

SAFETY PROFESSIONAL: _____
(DATE)

MANAGEMENT
OFFICIAL: _____
(DATE)

REVISION

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TERMINATE HIGH VOLTAGE CABLES SUBSTATION SWITCHGEAR

Purpose:

Procedure to terminate high voltage cables onto substation switchgear.

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. Substation breaker's line side stabs' bus sections.

Tools and PPE:

Tools: Shotgun stick, cable cutters, hydraulic press, 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. Operations personnel will deenergize
 - a) the high voltage cables to be terminated if they are connected to an energized circuit.
 - b) the breaker's load side stabs' bus sections.

Operations personnel will follow the following SOPs

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

2. Using a high voltage tester test the high voltage cables to be terminated and the breaker's line side stabs' bus sections 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 WC 622 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

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properly. Wear Nomex coveralls, Nomex hood, safety glasses, safety shoes, insulating rubber gloves and sleeves, and hard hat while testing.

3. Verify that the circuit breaker has been opened and placed in the disconnect position.
4. Cut the cables to proper length and ground conductors to block of residual voltage. Prepare the cable ends per the specific terminating kit's manufacture's instructions.
5. Install the terminators per the specific terminating kit's manufacture's instructions.
6. Mount and connect the terminated cables to the breaker's load side stabs' bus sections. If the cables have to be phased, refer to the hot phasing SOP.
7. Operations personnel close the breaker and energize the circuit as per the following SOPs:
WC 622 HVE 007, Switchout and Switchback Energized Circuit
WC 622 HVE 013, Deenergization, Lockout, Tagout

END