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

STANDARD OPERATING PROCEDURE / JOB HAZARD ANALYSIS

TITLE
TERMINATE HIGH VOLTAGE CABLES
UNDERGROUND TO OVERHEAD TRANSITION

PROCEDURE NUMBER
WC 624 HVE 042

SIGNED: _____

(DATE)

APPROVED: _____

(DATE)

PROFESSIONAL: _____

SAFETY

(DATE)

OFFICIAL: _____

MANAGEMENT

(DATE)

REVISION

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TERMINATE HIGH VOLTAGE CABLES
UNDERGROUND TO OVERHEAD TRANSITION

Purpose:

Procedure for terminating underground, high voltage, cables at an overhead to underground transition point. The procedure is also valid for replacing existing terminators at an overhead to underground transition.

Potential Energy Sources:

1. Energized overhead circuits in close proximity of work.
2. Deenergized overhead circuits which are not included in the work and have not been grounded.
3. The cables being terminated can be a potential energy source if they have already been spliced into the underground circuit.

Tools and PPE:

Tools: Bucket truck, rubber hoses, rubber blankets, rubber insulator hoods, grounding spike, shotgun stick, hydraulic press, cable cutters, and assorted hand tools. PPE: Nomex coveralls, Nomex hood, insulating rubber gloves, insulating rubber sleeves, hard hat, safety shoes, work gloves, safety glasses, 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. SOP WC 622 HVE 013, Deenergization, Lockout, Tagout
8. SOP WC 622 HVE 007, Switchout and Switchback Energized Circuit
9. 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) When working near or around energized conductors or equipment in wet weather insure that personnel performing work are properly trained, and use the proper PPE.

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. Operations personnel may have to deenergize the overhead and underground circuits involved as per the following SOPs:

WC 622 HVE 007, Switchout and Switchback Energized Circuit

WC 622 HVE 013, Deenergization, Lockout, Tagout

The particular job will dictate the necessity of this step.

4. Insulate energized overhead conductors within 3 feet of the work area. Insulate deenergized overhead circuits within 3 feet of the work area which are not included in the work and have not been grounded as 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.

5. Using a high voltage tester test the underground cables, and, if applicable, the overhead conductors, 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 conductor separately, taking care not to cross phase during test. If voltage is detected, stop the test and (a) notify operations personnel that the conductors are 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 conductors deenergized. If no voltage is indicated, retest the high voltage tester to re-verify it is working properly. Wear listed Nomex coveralls, Nomex hood, safety glasses, safety shoes, insulating rubber gloves and sleeves, and hard hat.

6. The following rules will apply to job.

a) Bucket personnel working on poles which have energized overhead circuits or overhead circuits which are not included in the work and have not been grounded as per Lockout and Tagout procedures will wear Nomex coveralls, safety glasses, safety shoes, hard hat, safety harness, insulating rubber gloves insulating rubber sleeves, and a back brace if required to wear. The overhead circuits in question have been insulated per Step 4.

b) Bucket personnel working on poles which have all other high voltage overhead circuits deenergized and properly grounded, or which have no other overhead circuits on the poles, will wear hard hats, work gloves, safety shoes, safety harness, safety glasses when required, and a back brace if required to wear.

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c) Ground personnel will wear hard hats, safety shoes, work gloves, and safety glasses.

d) Ground personnel will wear orange vests if working adjacent to a road or in a parking lot.

e) Ground personnel not involved with the work will watch the personnel working aloft.

f) Ground personnel will stay clear of area underneath the bucket unless the work dictates.

h) If ground personnel are present, then at least one of them will have been trained to operate the bucket in an emergency situation where the bucket personnel are no longer able to operate the bucket controls.

7. Cut the cables to required length and prepare the cable ends to meet the specific termination kit's manufacture's specifications.

8. Form the cables to proper position and secure to termination brackets.

9. Install terminators on the cables as per the manufacture's instructions.

10. Connect jumpers from the terminators to the load side of the switches. Ensure the switches are in the open position prior to connecting the jumpers. Insure that proper clearances are met. Refer to attached LANTDIVENCOM Pole Line Plates for further information.

11. After termination work is completed prepare to re-energize the circuit by:

Removing insulation placed on energized conductors. Remove insulation placed on conductors which are not included in the work and have not been grounded as 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. Remove insulation in reverse order that it was placed.

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

13. WC 622 personnel will energize the circuit(s) as per the following SOPs:

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

END