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

STANDARD OPERATING PROCEDURE / JOB HAZARD ANALYSIS

TITLE
SHORE POWER LOW VOLTAGE
CIRCUIT BREAKER MAINTENANCE
ANNUAL MAINTENANCE

PROCEDURE NUMBER
622.4 ELE 12

SIGNED: _____

(DATE)

APPROVED: _____

(DATE)

SAFETY PROFESSIONAL: _____

(DATE)

MANAGEMENT OFFICIAL: _____

(DATE)

REVISION

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SHORE POWER LOW VOLTAGE CIRCUIT BREAKER MAINTENANCE
ANNUAL MAINTENANCE

DISTRIBUTION

CODE	REV/DATE						
620							
622							
610							
610.E1							
601A							
30A							
09A							
216							
226							
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SHORE POWER LOW VOLTAGE CIRCUIT BREAKER MAINTENANCE
ANNUAL MAINTENANCE

Purpose:

Procedure to perform annual maintenance on pier low voltage shore power breakers.

Potential Energy Sources:

1. Circuit breaker 120 or 240 volt control power.
2. When testing, applied low voltage of test unit to power current path of circuit breaker.
3. Breaker operating mechanism.

Tools and PPE:

Tools: Combination wrenches, open end, box; screwdrivers, flat tip and phillips(#1, 2, 3, and 4); pliers, channel lock, side cutter, long nose, standard, snap ring(inside and out); socket sets: 3/8" and 1/2" drive sockets with ratchet, universal and extensions; allen wrench set; machinist rule; thin line feeler gauges; torque wrenches: one each ft/lbs and in/lbs, 3/8" or 1/2" drive; fine file; burnishing tool; cleaning brush; manufacture special tools as per instruction book; high current-low voltage circuit breaker test set, 2500 volt insulation resistance test set; 1000 volt insulation resistance test set; Micro-Ohmmeter. PPE: Work gloves, back brace if required to wear one by back injury and control program, safety shoes, safety glasses.

References:

1. Pertinent circuit breaker maintenance manual.
2. PWC Occupational Safety and Health Program Manual, PWCNORVAINST 5100.33E
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.

Procedures:

Note: Note all steps completed and record all data on Annual Maintenance Form

1. Place circuit breaker on work bench.
2. Record circuit breaker's nameplate data, PWC number, and trip device data.

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3. Remove, inspect and clean the circuit breaker's arc chutes.
4. Clean the entire circuit breaker.
5. Clean the main and arcing contacts.
6. Clean main stabs and auxiliary contacts.
7. Inspect circuit breaker's condition. Repair all discrepancies found.
8. Lubricate the circuit breaker per manufacturer's instruction book.
9. Check manual fast close operation.
10. Check electrical close operation.
11. Check slow close operation.
12. Check electrical trip operation.
13. Check trip free safety feature.
14. Perform contact print check using bond and carbon paper.
15. Refer to circuit breaker's instruction manual for any mandatory adjustments, mandatory adjustment checks, and required adjustments based on deficiencies noted in Steps 8-13.
16. Reassemble the circuit breaker.
17. Electrically operate the breaker 5 times.
18. Perform the following electrical tests:
 - a) Contact resistance
 - b) 2500 volt DC insulation resistance tests:
 - . Breaker Open - line stab to ground
 - . Breaker Open - load stab to ground
 - . Breaker Open - line stab to same phase load stab

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- . Breaker Closed - each phase to ground
- . Breaker Closed - phase to phase; A-B, B-C, A-C
- c) Determine the following trip unit pick ups and delays;
 - . Long Time Pick Up
 - . Long Time Delay
 - . Short Time Pick Up
 - . Short Time Delay
 - . Instantaneous Pick Up
- 19. Record as left trip unit settings.
- 20. Place breaker in proper storage location.

END