DISCLAIMER: These Standard Operating Procedures (SOP's) are for the exclusive use of Navy Public Works Center (PWC) Norfolk. They are promulgated as guidance for their NAVFAC Commands. If intended to be used by other activities, they must be tailored to each activity's particular requirements and must be reviewed/approved by the activity's safety professionals prior to use.

NAVY PUBLIC WORKS CENTER
NORFOLK, VIRGINIA
UTILITIES

STANDARD OPERATING PROCEDURE / JOB HAZARD ANALYSIS

TITLE
PORTABLE GENERATOR
CONNECT AND DISCONNECT

PROCEDURE NUMBER

CODE 622.1 HVE 009

SIGNED:_____

(DATE)

APPROVED:_____
(DATE)

SAFETY PROFESSIONAL:_____
(DATE)

MANAGEMENT OFFICIAL:_____
(DATE)

REVISION **B**

DISTRIBUTION

CODE	REV/DAT	REV/DAT	REV/DAT	REV/DAT	REV/DAT	REV/DAT	REV/DAT
620							
622							
610							
610.E1							
601A							
30A							
09A							
216							
226							
236							

REVISIONS

REV	DESCRIPTION		DATE
A	Initial Issue.		
B	Added note to avoid connecting/disconnecting diesel on energized circuit.	D. Lougen	7/2/96

Purpose:
Procedure to connect and to disconnect a portable generator at a facility.

Potential Energy Sources:
1. 34,500, 11,500, 4,160 volt switch.
2. Generator 208Y120, 480Y277 volt output.
3. Generator engine.

Tools and PPE:
Tools: portable generator, truck, electrical power conductors, voltmeter, and phase rotation meter. PPE: Hard hat, safety shoes, safety glasses, work gloves, Nomex coveralls, Nomex hood, insulating rubber gloves and sleeves, ear protection, 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. PWC, Code 600, Lockout and Tagout Procedure
5. PWC SOP# 600 HVE 6, PWC Switching or Breaker Operation

Procedures:

Deliver Generator To Site

1. Inspect the generator. Check for obvious damage, oil level, fuel level, fuel leaks. Check the generator's battery voltage. Add fuel, or have fuel added to the fuel tank if the petro level is not at full level.

2. Test run the generator. Check louvers, oil level, temperature, frequency, RPM, and any other gauges on the generator. Wear work gloves, safety glasses, safety shoes, and ear protection. Avoid contact with electrically energized parts on the generator. Avoid rotating and/or reciprocating parts on the engine.

PORTABLE GENERATOR CONNECT AND DISCONNECT

3. Using two men, attach generator to truck using proper bending and lifting techniques. The trailer hitch should be locked with safety pin, and the safety chains are to be connected. Plug in trailer lights. Check trailer for proper operation of lights and connections.

4. Deliver generator to the facility and using two men and proper bending and lifting techniques place the generator in proper position.

Connect Generator

B> NOTE: The diesel generator is not to be connected or disconnected until the subject circuit's transformer primary line has been de-energized and grounded. This will cause an outage on the circuit. This does not apply to transformers with both primary and secondary disconnecting devices.

5. Prior to securing power to the facility, check and record the existing service's phase rotation and the existing service voltage. While performing the electrical checks, avoid contact with energized parts. Prior to performing the electrical tests, check the transformer nameplate or the service panel rating for rated the secondary voltage. If these checks indicate the voltage is greater than 300 volts, wear Nomex coveralls, Nomex hood , safety glasses, and insulating rubber gloves to check voltage and phase rotation.

6. Open the building transformer's primary switch. Refer to SOP# 600 HVE 6, PWC Switching or Breaker Operation, for procedure to open/close the switches or breakers. Lockout and Tagout the primary switch as per PWC, Code 600, Lockout and Tagout Procedure. Wear Nomex coveralls, Nomex hood, insulating gloves, safety glasses, safety shoes, hard hat, and work gloves.

7. Test the facility's secondary power for zero potential to verify normal power has been secured. Maintain Step 6 PPE till this step has been completed.

8. Remove generator cables from truck and connect to secondary load. Use proper bending and lifting techniques while handling the cables. Wear safety shoes and work gloves.

9. Open louvers and start generator. Monitor generator operation, observing all gauges, for 5 to 10 minutes. Avoid contact with electrically energized parts on the generator. Avoid rotating and/or reciprocating parts on the engine. Wear ear protection while generator is running.

10. Check generator output voltage and generator phase rotation. Compare these results to the facility checks made as per Step 5. While performing the electrical checks, avoid contact with energized parts. If the generator voltage is to be greater than 300 volts, wear Nomex coveralls, Nomex hood, safety glasses, and insulating rubber gloves to check voltage and phase rotation. If the generator and
facility electrical checks do not match, then shut the generator down, correct the problem, and perform Steps 9-10 again.

PORTABLE GENERATOR CONNECT AND DISCONNECT

11. Close the generator disconnect to supply the secondary load. If the generator voltage is greater than 300 volts, wear Nomex coveralls, Nomex hood, safety glasses, and insulating rubber gloves.

Disconnect Generator

B> NOTE: Ensure the subject circuit's transformer primary line has been de- energized and grounded prior to disconecting the generator. This does not apply to transformers with both primary and secondary disconnecting devices.

12. Open generator disconnect switch. If the generator voltage is greater than 300 volts, wear Nomex coveralls, Nomex hood, safety glasses, and insulating rubber gloves. Always wear ear protection around an operating generator.

13. Allow generator to run another 5-10 minutes to cool down, and then shut down the unit and inspect the generator for any abnormal conditions. If a problem is observed, be sure to inform generator operations personnel.

14. Test the facility's secondary power for zero potential, and if no voltage is detected, disconnect the generator cables. Avoid contact with conductive parts while testing voltage. If the facilities voltage is greater than 300 volts wear Nomex coveralls, Nomex hood, safety glasses, and insulating rubber gloves to test voltage.

15. Place generator cables on truck. Use proper bending and lifting techniques while handling the cables. Wear safety shoes and work gloves.

16. Clear all lockout tags with operations control personnel, Lockout and Tagout Procedure and close the facility's transformer primary switch. Refer to SOP# 600 HVE 6, PWC Switching or Breaker Operation for procedure to open/close the switches or breakers. Wear Nomex coveralls, Nomex hood, insulating gloves, safety glasses, safety shoes, hard hat, and work gloves.

17. Test the facility's secondary power for proper voltage and phase rotation. Avoid contact with conductive parts while testing voltage. If the facilities voltage is greater than 300 volts wear Nomex coveralls, Nomex hood, safety glasses, and insulating rubber gloves to test voltage and phase rotation.

18. Using two men, attach generator to truck using proper bending and lifting techniques. The trailer hitch should be locked with safety pin, and the safety chains are to be connected. Plug in trailer lights. Check trailer for proper operation of lights and connections.

19. Transport generator to proper storage site.