

WP 04-ED1301

Revision 11

Diesel Generator Operation

Technical Procedure

EFFECTIVE DATE: 06/28/10

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APPROVED FOR USE

CONTINUOUS USE PROCEDURE

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CHANGE HISTORY SUMMARY

REVISION NUMBER	DATE ISSUED	DESCRIPTION OF CHANGES
11	06/28/2010	Changed statement in Introduction about records retention Added bullets to Precautions and Limitations on breaker interlock system and operation time of diesel generators

INTRODUCTION

This procedure provides instructions for normal operation of Diesel Generators 1 and 2, and for performance of backup Diesel Generator Operability testing, at the Waste Isolation Pilot Plant (WIPP). Sections of this procedure may be performed in a sequence appropriate to the situation requirements. As required per WP 04-CO, this procedure shall be followed step-by-step for the activities and operations addressed therein. This procedure shall be performed under the direct supervision of the Facility Shift Manager (FSM)/Facility Shift Engineer.

This procedure provides instructions for monthly inspections for mechanical operability, and leaks or spills, as identified in Hazardous Waste Facility Permit, WIPP, Permit # NM4890139088 TSDf, issued by the New Mexico Environment Department (NMED). If the generators develop leaks or spills, or fail the operability test, an Action Request (AR) should be written to correct the deficiency. The corrective action is documented on the work order and the operability re-performed. The inspector, signature, date, and time are recorded on the logsheet.

Performance of this procedure generates the following record(s), as applicable. Any records generated are handled in accordance with departmental Records Inventory and Disposition Schedules.

- The Diesel Generator (DG) Log Sheets

REFERENCES

BASELINE DOCUMENTS

- *Hazardous Waste Facility Permit, Waste Isolation Pilot Plant, Permit # NM4890139088 TSDf, Issued by the New Mexico Environment Department*
- NMED Air Permit 310-M-2
- *Simplex Load Bank Operations Manual*
- 25-J-071-W1, Backup Diesel Generator #1, 25P-E-503, Reference Sheet
- 25-J-071-W2, Backup Diesel Generator #1, 25P-E-503, Single Line Diagram Schematic & Plan View
- 25-J-071-W6, Backup Diesel Generator #1, 25P-E-503, Engine Control Schematic
- 25-J-071-W7, Backup Diesel Generator #1, 25P-E-503, Engine Control Schematic
- 25-J-071-W8, Backup Diesel Generator #1, 25P-E-503, Generator Control Schematic

- 25-J-072-W1, Backup Diesel Generator #2, 25P-E-504, Reference Sheet
- 25-J-072-W2, Backup Diesel Generator #2, 25P-E-504, Single Line Diagram Schematic & Plan View
- 25-J-072-W6, Backup Diesel Generator #2, 25P-E-504, Engine Control Schematic
- 25-J-072-W7, Backup Diesel Generator #2, 25P-E-504, Engine Control Schematic
- 25-J-072-W8, Backup Diesel Generator #2, 25P-E-504, Generator Control Schematic
- 25P-E-503/504, Operation and Maintenance Manual for 3516 Industrial Engine

REFERENCED DOCUMENTS

- WP 04-CO, Conduct of Operations
- WP 04-VU1001, Surface Underground Ventilation and Filtration System Operation

PRECAUTIONS AND LIMITATIONS

- If the breaker interlock system (BIS) is inoperable, it must be DISABLED in Sub #3 before operating the diesel generators. This will enable CBG-1 and CBG-2 to open and close remotely.
- Each diesel generator must not be operated for more than 20 hours per month or 240 hours per year.

- The following diesel engine operating limits shall **NOT** be exceeded:

MONITORING DEVICE	LIMIT
WATER JACKET TEMPERATURE	200°F MAXIMUM
OIL PRESSURE AT 1800 RPM	50 PSI MINIMUM
OIL TEMPERATURE	230°F MAXIMUM
OIL FILTER DIFFERENTIAL PRESSURE	15 PSI MAXIMUM
FUEL FILTER DIFFERENTIAL PRESSURE	5 PSI MAXIMUM
AIR FILTER DIFFERENTIAL PRESSURE	30 IN. WG (RED ZONE) MAXIMUM
ENGINE SPEED	1850 RPM MAXIMUM

- The following warning devices alarm to warn operator of an impending serious condition:

WARNING DEVICE	SET POINT
ENGINE CRANK	DISENGAGES AT 600 (550 TO 650) RPM
PRE OIL PRESSURE	30 PSI
PRE WATER TEMPERATURE	200°F
LOW FUEL LEVEL	1/4 TANK
OVER CURRENT	≥2000 AMPS

- The following protective devices will cause a fault shutdown and a corresponding alarm:

PROTECTIVE DEVICE	SET POINT
START FAIL	MAXIMUM OF 4 AUTOMATIC START ATTEMPTS OF 15 SECONDS EACH
LOW OIL PRESSURE	20 PSI
HIGH WATER TEMPERATURE	210°F
ENGINE OVERSPEED	1980 RPM

- Emergency Stop
 - Diesel Generators 1 and 2 LOCAL/REMOTE EMERGENCY STOP pushbuttons shut off fuel to engine, and trip output circuit breaker CB-G1 and CB-G2.

- FUEL RACK lever can also be used to EMERGENCY STOP diesel generator by manually placing lever in CLOSED position.
- If Central Monitoring Room Operator (CMRO) has initiated a START Signal, a STOP Signal from the Central Monitoring System must be initiated for the system to reset properly.

INITIAL CONDITIONS

1. Prior to starting Diesel Generator 1, 25P-E-503, verify Diesel Generator 2, 25P-E-504, is **NOT** running.
2. Prior to starting Diesel Generator 2, 25P-E-504, verify Diesel Generator 1, 25P-E-503, is **NOT** running.
3. Verify Synchronizing System DGs ISOLATION/DISABLE switches (SS-1 and SS-2) in Substation Three are in DISABLE position.
4. Verify fire extinguisher is available prior to, and during, diesel generator operation.
5. Verify the DG Enclosure Louvers are in the OPEN position.

PERFORMANCE

- 1.0 DIESEL GENERATOR 1 OPERABILITY CHECK USING LOAD BANK 25P-LB04/1
 - 1.1 Remote Start and Operability Check Using Load Bank 25P-LB04/1

NOTE

REMOTE START must be followed by REMOTE CLOSING of output breaker and remote shutdown.

NOTE

The preferred method is using REMOTE START on the diesel generators. These steps have been incorporated in this section.

- 1.1.1 Verify Synchronizing System DGs ISOLATION/DISABLE switches (SS-1 and SS-2) located in (Sub 3) are in DISABLE position.
- 1.1.2 Position CB-7 at (Sub 3), to the OPEN/DISCONNECT position.
- 1.1.3 Verify the Remote Emergency Stop pushbutton is pulled out at DG #1 Auxiliary Control Panel (25P-CP03/001) (Sub 9).
- 1.1.4 Verify 25P-SWG04/9 SW-2 (Sub 9) is in OFF position.
- 1.1.5 Close 25P-SWG04/9 SW-1 (Sub 9).

- 1.1.6 Verify fuel level is greater than 3/4 tank (outside).
- 1.1.7 Secure generator enclosure door in open position, prior to operation, to prevent door from closing on personnel.
- 1.1.8 Verify water level in radiator expansion tank is greater than halfway in sight glass.

NOTE

FUEL RACK lever can also be used to EMERGENCY STOP diesel generator by manually placing lever in CLOSED position.

- 1.1.9 Verify FUEL RACK lever is in OPEN position.
- 1.1.10 Verify Air Box valve handle is in OPEN position.
- 1.1.11 Verify lubricating oil sump level is within normal operating range as indicated on dip stick.
- 1.1.12 Verify Engine Control Panel is aligned as follows:
 - [A] EMERGENCY STOP pushbutton pulled OUT.
 - [B] ENGINE MODE switch in AUTO REMOTE/CMR START.
 - [C] SYSTEM TEST switch in AUTO.
- 1.1.13 Verify Generator Control Panel is aligned as follows:
 - [A] AUTO START switch in ON (cabinet door).
 - [B] 0/VOLT BREAKER switch is OFF (inside cabinet).
 - [C] GOV MODE switch is in IDLE (inside cabinet).
 - [D] Output circuit breaker CB-G1 is in OPEN/CONNECT position (inside cabinet).

NOTE

REMOTE START must be followed by REMOTE CLOSING of output breaker and remote shutdown.

NOTE

Out-of-calibration gauges based on due date without considering grace period are **NOT** grounds for failing operability check in the Precautions and Limitations section.

- 1.1.14 **RECORD** Diesel Generator indicating meters (KW, AC Volts, AC Amperes, Frequency) (On door of DG cabinet) calibration due dates on Diesel Generator Log Sheet.

- 1.1.15 **RECORD** hour meter reading before running Diesel Generator and document on Diesel Generator Log Sheet.
- 1.1.16 Verify all personnel in immediate area of operating Diesel Generator use hearing protection.

NOTE

When CMRO initiates remote start in Step 1.1.17, engine will start, ENGINE CRANK alarm light will extinguish at 600 (550 to 650) rpm, and engine will accelerate to idle speed of 800 (750 to 850) rpm.

- 1.1.17 Request CMRO to initiate remote start.
- 1.1.18 Verify engine starts and accelerates to idle speed of 800 (750 to 850) rpm.
- 1.1.19 Verify the following engine operating parameters:
- Water jacket temperature < 200°F maximum
 - Oil pressure > 50 psi minimum
 - Inlet oil temperature < 230°F maximum
 - Oil filter differential pressure < 15 psi maximum
 - Fuel filter differential pressure < 5 psi maximum
 - Air filters differential pressure < 30 in. wg maximum (below RED ZONE on indicators).
- 1.1.20 Allow engine to run at idle for at least 5 minutes prior to proceeding.

NOTE

During the 5-minute engine idle time, the Sub 9 and the Load Bank may be aligned per Step 1.1.21.

- 1.1.21 Verify the following:
- [A] CB-7 (Sub 3) Rack is in OPEN/DISCONNECT position.
 - [B] 25P-SWG04/9 SW-2 (Sub 9) is in OFF position.
 - [C] 25P-SWG04/9 SW-1 is (Sub 9) CLOSED.

NOTE

REMOTE MANUAL from 25P-CP03/004 is the preferred method of Load Bank operation. Remote Control Panel (RCP) 25P-CP03/004 is located inside switchgear 25P-SWG04/9 (Sub 9).

NOTE

Power for Load Bank Local Control Panel (outside) and Control Panel (RCP) 25P-CP03/004 located inside switchgear 25P-SWG04/9 (Sub 9), comes from a closed output circuit breaker CB-G1 or CB-G2.

- 1.1.22 Operate Load Bank remotely (inside Sub 9), from RCP 25P-CP03/004.
- 1.1.23 Perform the following at Load Bank local Control Panel (outside):
 - [A] Position MASTER CONTROL SWITCH to ON at Load Bank (main power on door).
 - [B] Position all LOAD CONTROL switches to OFF.
 - [C] Position AUTO LOAD DUMP switch to BYPASS.
 - [D] Position LOAD BANK MODE switch to REMOTE.
- 1.1.24 Perform the following at RCP 25P-CP03/004 (inside Sub 9):
 - [A] Position all LOAD CONTROL switches to OFF.
 - [B] Position AUTO LOAD DUMP switch to BYPASS.
 - [C] Position LOAD BANK MODE switch to REMOTE MANUAL.

NOTE

Diesel Generators should run under load when possible. Running diesel generators in idle should be minimized to prevent injector fouling and dilution of lube oil.

NOTE

When Step 1.1.25 is performed, engine will accelerate to 1800 (1750 to 1850) rpm.

- 1.1.25 Position GOV MODE switch to RUN (inside generator cabinet).
- 1.1.26 Verify engine accelerates to 1800 (1750 to 1850) rpm.
- 1.1.27 Position O/VOLT BREAKER switch to ON (inside generator cabinet).
- 1.1.28 Verify generator output voltage is 480 (470 to 490) vac.

- 1.1.29 Verify generator output frequency is 60 (58 to 62) Hz.
 - 1.1.30 Request CMRO to initiate remote closure of output circuit breaker CB-G1.
 - 1.1.31 Verify output circuit breaker CB-G1 CLOSED (inside generator cabinet).
 - 1.1.32 Notify CMRO that Diesel Generator 1 is ready for loading.
 - 1.1.33 **RECORD** no load running data on Diesel Generator Log Sheet.
- 1.2 Diesel Generator Loading Using Load Bank 25P-LB04/1

NOTE

Power for Load Bank Local Control Panel (Outside) and Control Panel (RCP) 25P-CP03/004 located inside switchgear 25P-SWG04/9 (Sub 9), comes from a closed output circuit breaker CB-G1 or CB-G2.

- 1.2.1 Check the following LEDs are illuminated at RCP-25P-CP03/004 (inside Sub 9):
 - POWER AVAILABLE – LED is illuminated.
 - LOAD DUMP BYPASS - LED is illuminated.
- 1.2.2 Press the LAMP TEST PRESS TO TEST pushbutton and verify all LEDs illuminate.
- 1.2.3 Press the PUSH TO RUN pushbutton to energize the cooling fan.
- 1.2.4 Verify REMOTE MANUAL RUN (remote operation), or LOCAL MANUAL RUN (local operation) is illuminated.
- 1.2.5 Check NORMAL OPERATION - LED is illuminated.

NOTE

Diesel Generator can be loaded in **ANY** step sequence to achieve desired load. Recommended load is 500-700KW.

- 1.2.6 Position MASTER LOAD switch to ON.

1.2.7 Proceed to load Diesel Generator as directed by FSM using the following LOAD STEP switch schedule:

- Step 1 = 50 KW
- Step 2 = 50 KW
- Step 3 = 100 KW
- Step 4 = 100 KW
- Step 5 = 200 KW
- Step 6 = 200 KW
- Step 7 = 500 KW

Total = 1200 KW

1.2.8 Operate Diesel Generator under available load for a minimum of 30 minutes **OR** until Oil Temperature Inlet reading has stabilized (less than 10 degree change in 15 minutes), whichever is longer.

1.2.9 **RECORD** required data at 15-minute intervals on Diesel Generator Log Sheet.

1.3 Restoration from Diesel Generator Loading

NOTE

Diesel Generator may be unloaded by positioning step switches to OFF in any sequence.

1.3.1 Perform the following at RCP 25P-CP 03/004 (inside Sub 9).

- [A] Position step switches to OFF.
- [B] Position MASTER LOAD switch to OFF.

1.3.2 Allow cooling fan to operate a minimum of 5 minutes to completely cool load element (WAIT).

1.3.3 After 5 minutes, press the PUSH TO STOP button.

1.3.4 Position LOAD BANK MODE switch to OFF at Load Bank local Control Panel (outside).

1.3.5 Position MASTER CONTROL SWITCH to OFF position at Load Bank (main power on door).

1.3.6 Perform the following at 25P-SWG04/9 (Sub 9).

- [A] Position LOAD BANK MODE switch to OFF at RCP 25P-CP03/004.
- [B] OPEN 25P-SWG04/9 SW-1.
- [C] Verify 25P-SWG04/9 SW-2 OPEN.

- 1.4 Diesel Generator Remote Shutdown
 - 1.4.1 Request CMRO to Open output circuit breaker CB-G1.
 - 1.4.2 Verify CB-G1 Open (inside generator cabinet).
 - 1.4.3 Position 0/VOLT BREAKER switch to OFF (inside cabinet).
 - 1.4.4 Position GOV MODE switch to IDLE (inside cabinet).
 - 1.4.5 Verify engine speed reduces to IDLE speed of 800 (750 to 850) rpm.
 - 1.4.6 Request CMRO to initiate remote shutdown.
 - 1.4.7 Verify Diesel Generator engine shuts down after 5-minute cool-down.
 - 1.4.8 At Sub 3, position CB-7 to OPEN/CONNECT.
 - 1.4.9 **RECORD** hour meter reading after running Diesel Generator and document on Diesel Generator Log Sheet.
- 1.5 Diesel Generator Alignment for Remote Start
 - 1.5.1 Verify Engine Control Panel is aligned as follows:
 - [A] EMERGENCY STOP pushbutton pulled OUT.
 - [B] ENGINE MODE switch to AUTO REMOTE/CMR START.
 - [C] SYSTEM TEST switch to AUTO.
 - 1.5.2 Verify that Generator Control Panel AUTO START switch is ON (cabinet door).
 - 1.5.3 Verify GOV MODE switch is in IDLE (inside cabinet).
 - 1.5.4 Verify 0/VOLT BREAKER switch to OFF (inside cabinet).
 - 1.5.5 Verify fuel level is greater than 3/4 tank (outside).

NOTE

Step 1.6 is to be performed only if the fuel level is less than 3/4 full. If fuel level is 3/4 or greater, operator will proceed to Step 1.7.

- 1.6 Refueling of Diesel Generator
 - 1.6.1 Verify fire extinguisher availability.

NOTE

Diesel fuel may be transferred from surface fuel storage tank to Diesel Generator using portable fuel tank.

- 1.6.2 Ensure Operator remains in immediate area during refueling of diesel generator.
- 1.6.3 Verify 500-gallon portable fuel tank 3/4 to 7/8 full.
- 1.6.4 Transfer portable fuel tank to Diesel Generator.

CAUTION

Fuel transfer shall be continuously monitored to prevent overflow.

NOTE

Diesel Generator may be refueled while in operation carrying site electrical loads. A 400-gallon tank allows approximately 4.5 hours of operation.

- 1.6.5 Fill Diesel Generator fuel tank to greater than 3/4 full.
 - 1.6.6 Move portable fuel tank at least 25 feet from Diesel Generators after refueling is complete.
 - 1.6.7 Fill 500-gallon portable fuel tank 3/4 to 7/8 full.
- 1.7 Review of Diesel Generator Log Sheets
- 1.7.1 FSM, review and sign Diesel Generator Log Sheet when complete.
 - 1.7.2 FSM, validate Diesel Generator Log Sheets.
 - 1.7.3 FSM, forward a copy of the validated Diesel Generator Log Sheet to Facility Operations Records Coordinator (File Cabinet), and the original to Work Control with the completed Work Order Cover Page.
- 2.0 DIESEL GENERATOR 2 OPERABILITY CHECK USING LOAD BANK
25P-LB04/1
- 2.1 Remote Start and Operability Check Using Load Bank 25P-LB04/1.

NOTE

REMOTE START must be followed by REMOTE CLOSING of output breaker and remote shutdown.

NOTE

The preferred method is using REMOTE START on the diesel generators. These steps have been incorporated in this section.

- 2.1.1 Verify Synchronizing System DGs ISOLATION/DISABLE switches (SS-1 and SS-2) located in (Sub 3) are in DISABLE position.
 - 2.1.2 Position CB-11 at (Sub 3), to the OPEN/DISCONNECT position.
 - 2.1.3 Verify the Remote Emergency Stop pushbutton is pulled out at DG #2 Auxiliary Control Panel (25P-CP03/002) (Sub 9).
 - 2.1.4 Verify 25P-SWG04/9 SW-1 (Sub 9) is in OFF position.
 - 2.1.5 Close 25P-SWG04/9 SW-2 (Sub 9).
 - 2.1.6 Verify fuel level is greater than 3/4 tank (outside).
 - 2.1.7 Secure generator enclosure door in open position, prior to operation, to prevent door from closing on personnel.
 - 2.1.8 Verify water level in radiator expansion tank is greater than half way in sight glass.
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NOTE

FUEL RACK lever can also be used to EMERGENCY STOP diesel generator by manually placing lever in CLOSED position.

- 2.1.9 Verify FUEL RACK lever is in OPEN position.
- 2.1.10 Verify Air Box valve handle is in OPEN position.
- 2.1.11 Verify lubricating oil sump level is within normal operating range as indicated on dip stick.
- 2.1.12 Verify Engine Control Panel is aligned as follows:
 - [A] EMERGENCY STOP pushbutton pulled OUT.
 - [B] ENGINE MODE switch in AUTO REMOTE/CMR START.
 - [C] SYSTEM TEST switch in AUTO.
- 2.1.13 Verify Generator Control Panel is aligned as follows:
 - [A] AUTO START switch is ON (cabinet door).

- [B] AUTO SYNC switch is OFF (cabinet door).
- [C] VOLT REG switch is OFF (inside cabinet).
- [D] GOV MODE switch is in IDLE (inside cabinet).
- [E] Output circuit breaker CB-G2 is in OPEN/CONNECT position (inside cabinet).

NOTE

REMOTE START must be followed by REMOTE CLOSING of output breaker and remote shutdown.

NOTE

Out-of-calibration gauges based on due date without considering grace period are **NOT** grounds for failing operability check in Precautions and Limitations section.

- 2.1.14 **RECORD** Diesel Generator indicating meters (KW, AC Volts, AC Amperes, Frequency) (on door of DG cabinet) calibration due dates on Diesel Generator Log Sheet.
- 2.1.15 **RECORD** hour meter reading before running Diesel Generator and document on Diesel Generator Log Sheet.
- 2.1.16 Verify all personnel in immediate area of operating Diesel Generator use hearing protection.

NOTE

When CMRO initiates remote start in Step 2.1.17, engine will start, ENGINE CRANK alarm light will extinguish at 600 (550 to 650) rpm, and engine will accelerate to idle speed of 800 (750 to 850) rpm.

- 2.1.17 Request CMRO to initiate remote start.
- 2.1.18 Verify engine starts and accelerates to idle speed of 800 (750 to 850) rpm.
- 2.1.19 Verify the following engine operating parameters:
 - Water jacket temperature < 200°F maximum.
 - Oil pressure > 50 psi minimum.
 - Inlet oil temperature < 230°F maximum.
 - Oil filter differential pressure < 15 psi maximum.

- Fuel filter differential pressure < 5 psi maximum.
- Air filters differential pressure < 30 in. wg maximum (below RED ZONE on indicators).

2.1.20 Allow engine to run at idle for at least 5 minutes prior to proceeding.

NOTE

During the 5-minute engine idle time, the Sub 9 and the Load Bank may be aligned per Step 2.1.21.

2.1.21 Verify the following:

- [A] CB-11 (Sub 3) Rack to OPEN/DISCONNECT position.
 - [B] 25P-SWG04/9 SW-1 (Sub 9) is in OFF position.
 - [C] 25P-SWG04/9 SW-2 (Sub 9) CLOSED.
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NOTE

REMOTE MANUAL from 25P-CP03/004 is the preferred method of Load Bank operation. Remote Control Panel (RCP) 25P-CP03/004 is located inside switchgear 25P-SWG04/9 (Sub 9).

NOTE

Power for Load Bank Local Control Panel (Outside) and Control Panel (RCP) 25P-CP03/004 located inside switchgear 25P-SWG04/9 (Sub 9), comes from a closed output circuit breaker CB-G1 or CB-G2.

2.1.22 Operate Load Bank remotely (inside Sub 9), from RCP 25P-CP03/004.

2.1.23 Perform the following at Load Bank local Control Panel (outside):

- [A] Position MASTER CONTROL SWITCH to ON at Load Bank (main power on door).
- [B] Position all LOAD CONTROL switches to OFF.
- [C] Position AUTO LOAD DUMP switch to BYPASS.
- [D] Position LOAD BANK MODE switch to REMOTE.

2.1.24 Perform the following at RCP 25P-CP03/004 (inside Sub 9):

- [A] Position all LOAD CONTROL switches to OFF.
- [B] Position AUTO LOAD DUMP switch to BYPASS.

[C] Position LOAD BANK MODE switch to REMOTE MANUAL.

NOTE

Diesel Generators should run under load when possible. Running diesel generators unloaded for long periods will eventually foul injectors and dilute lube oil.

NOTE

When Step 2.1.25 is performed, engine will accelerate to 1800 (1750 to 1850) rpm.

- 2.1.25 Position GOV MODE switch to RUN (inside generator cabinet).
- 2.1.26 Verify engine accelerates to 1800 (1750 to 1850) rpm.
- 2.1.27 Position VOLT REG switch to ON (inside generator cabinet).
- 2.1.28 Verify generator output voltage is 480 (470 to 490) vac.
- 2.1.29 Verify generator output frequency is 60 (58 to 62) Hz.
- 2.1.30 Request CMRO to initiate remote closure of output circuit breaker CB-G2.
- 2.1.31 Verify output circuit breaker CB-G2 CLOSED (inside generator cabinet).
- 2.1.32 Notify CMRO that Diesel Generator 2 is ready for loading.
- 2.1.33 **RECORD** no load running data on Diesel Generator Log Sheet.

2.2 Diesel Generator Loading Using Load Bank 25P-LB04/1

NOTE

Power for Load Bank Local Control Panel (Outside) and Control Panel (RCP) 25P-CP03/004 located inside switchgear 25P-SWG04/9 (Sub 9), comes from a closed output circuit breaker CB-G1 or CB-G2.

- 2.2.1 Check the following LEDs are illuminated at RCP-25P-CP03/004 (inside Sub 9):
 - POWER AVAILABLE - LED is illuminated.
 - LOAD DUMP BYPASS - LED is illuminated.
- 2.2.2 Press the LAMP TEST PRESS TO TEST pushbutton and verify all LEDs illuminate.
- 2.2.3 Press the PUSH TO RUN pushbutton to energize the cooling fan.

- 2.2.4 Verify REMOTE MANUAL RUN (remote operation), or LOCAL MANUAL RUN (local operation) is illuminated.
- 2.2.5 Check NORMAL OPERATION - LED is illuminated.

NOTE

Diesel Generator can be loaded in **ANY** step sequence to achieve desired load. Recommended load is 500-700KW.

- 2.2.6 Position MASTER LOAD switch to ON.
- 2.2.7 Proceed to load Diesel Generator as directed by FSM using the following LOAD STEP switch schedule:
- Step 1 = 50 KW
 - Step 2 = 50 KW
 - Step 3 = 100 KW
 - Step 4 = 100 KW
 - Step 5 = 200 KW
 - Step 6 = 200 KW
 - Step 7 = 500 KW
- Total = 1200 KW
- 2.2.8 Operate Diesel Generator under available load for a minimum of 30 minutes **OR** until Oil Temperature Inlet reading has stabilized (less than 10 degree change in 15 minutes), whichever is longer.
- 2.2.9 **RECORD** required data at 15-minute intervals on Diesel Generator Log Sheet.
- 2.3 Restoration from Diesel Generator Loading

NOTE

Diesel Generator may be unloaded by positioning step switches to OFF in any sequence.

- 2.3.1 Perform the following at RCP 25P-CP 03/004 (inside Sub 9).
- [A] Position step switches to OFF.
 - [B] Position MASTER LOAD switch to OFF.
- 2.3.2 Allow cooling fan to operate a minimum of 5 minutes to completely cool load element (WAIT).
- 2.3.3 After 5 minutes, press the PUSH TO STOP button.
- 2.3.4 Position LOAD BANK MODE switch to OFF at Load Bank local Control Panel (outside).

- 2.3.5 Position MASTER CONTROL SWITCH to OFF position at Load Bank (main power on door).
- 2.3.6 Perform the following at 25P-SWG04/9 (Sub 9).
 - [A] Position LOAD BANK MODE switch to OFF at RCP 25P-CP03/004.
 - [B] OPEN 25P-SWG04/9 SW-2.
 - [C] Verify 25P-SWG04/9 SW-1 OPEN.
- 2.4 Diesel Generator Remote Shutdown
 - 2.4.1 Request CMRO to Open output circuit breaker CB-G2.
 - 2.4.2 Verify CB-G2 Open (inside generator cabinet).
 - 2.4.3 Position VOLT REG switch to OFF (inside cabinet).
 - 2.4.4 Position GOV MODE switch to IDLE (inside cabinet).
 - 2.4.5 Verify engine speed reduces to IDLE speed of 800 (750 to 850) rpm.
 - 2.4.6 Request CMRO to initiate remote shutdown.
 - 2.4.7 Verify Diesel Generator engine shuts down after 5-minute cool-down.
 - 2.4.8 At Sub 3, position CB-11 to OPEN/CONNECT.
 - 2.4.9 **RECORD** hour meter reading after running Diesel Generator and document on Diesel Generator Log Sheet.
- 2.5 Diesel Generator Alignment for Remote Start
 - 2.5.1 Verify Engine Control Panel is aligned as follows:
 - [A] EMERGENCY STOP pushbutton pulled OUT.
 - [B] ENGINE MODE switch to AUTO REMOTE/CMR START.
 - [C] SYSTEM TEST switch to AUTO.
 - 2.5.2 Verify at Generator Control Panel is aligned as follows:
 - [A] AUTO START switch is ON (cabinet door).
 - [B] AUTO SYNC switch is OFF (cabinet door).
 - 2.5.3 Verify GOV MODE switch is in IDLE (inside cabinet).

2.5.4 Verify VOLT REG switch to OFF (inside cabinet).

2.5.5 Verify fuel level is greater than 3/4 tank (outside).

NOTE

Step 2.6 is to be performed only if the fuel level is less than 3/4 full. If fuel level is 3/4 or greater, operator will proceed to Step 2.7.

2.6 Refueling of Diesel Generator

2.6.1 Verify fire extinguisher availability.

NOTE

Diesel fuel may be transferred from surface fuel storage tank to diesel generator using portable fuel tank.

2.6.2 Operator remains in immediate area during refueling of Diesel Generator.

2.6.3 Verify 500-gallon portable fuel tank 3/4 to 7/8 full.

2.6.4 Transfer portable fuel tank to Diesel Generator.

CAUTION

Fuel transfer shall be continuously monitored to prevent overflow.

NOTE

Diesel generator may be refueled while in operation carrying site electrical loads. A 400-gallon tank allows approximately 4.5 hours of operation.

2.6.5 Fill Diesel Generator fuel tank to greater than 3/4 full.

2.6.6 Move portable fuel tank at least 25 feet from Diesel Generators after refueling is complete.

2.6.7 Fill 500-gallon portable fuel tank 3/4 to 7/8 full.

2.7 Review of Diesel Generator Log Sheets

2.7.1 FSM, review and sign Diesel Generator Log Sheet when complete.

2.7.2 FSM, validate Diesel Generator Log Sheets.

- 2.7.3 FSM, forward a copy of the validated Diesel Generator Log Sheet to Facility Operations Records Coordinator (file cabinet), and the original to Work Control with the completed Work Order Cover Page.

3.0 REMOTE START

NOTE

REMOTE START must be followed by REMOTE CLOSING of output breaker and remote shutdown.

- 3.1 At the Load Bank Switchgear (25-SWG04/9), perform the following:
- 3.1.1 Verify the Remote Emergency Stop pushbutton is pulled out at DG #1 Auxiliary Control Panel (25P-CP03/001).
 - 3.1.2 Verify the Remote Emergency Stop pushbutton is pulled out at DG #2 Auxiliary Control Panel (25P-CP03/002).
- 3.2 Verify all personnel in immediate area of operating diesel generator use hearing protection.
- 3.3 If aligning for use of Substation Three for loading, then verify ISOLATION/DISABLE 120 VAC INTERLOCK DGs 1 and 2 selector switch (located in Underground Ventilation and Filtration System [UVFS] Control Panel, 413-CP-056-01) is in the DISABLE position.
- 3.4 Secure generator enclosure door in open position, prior to operation, to prevent door from closing on personnel.
- 3.5 Verify fuel level is greater than 3/4 tank.
- 3.6 Verify lubricating oil sump level is within normal operating range as indicated on dip stick.
- 3.7 Verify water level in radiator expansion tank is greater than half way in sight glass.
- 3.8 Verify FUEL RACK lever is in OPEN position.

NOTE

FUEL RACK lever can also be used to EMERGENCY STOP diesel generator by manually placing lever in CLOSED position.

- 3.9 Verify Air Box valve handle is in OPEN position.
- 3.10 Verify Engine Control Panel is aligned as follows:
- 3.10.1 EMERGENCY STOP pushbutton pulled OUT.

- 3.10.2 ENGINE MODE switch in AUTO REMOTE/CMR START.
- 3.10.3 SYSTEM TEST switch in AUTO.
- 3.11 **IF** starting Diesel Generator 1,
THEN verify Generator Control Panel is aligned as follows:
 - 3.11.1 AUTO START switch in ON.
 - 3.11.2 Output circuit breaker CB-G1 in OPEN.
- 3.12 **IF** starting Diesel Generator 2,
THEN verify Generator Control Panel is aligned as follows:
 - 3.12.1 AUTO START switch in ON.
 - 3.12.2 AUTO SYNC switch in OFF.
 - 3.12.3 Output circuit breaker CB-G2 in OPEN.
- 3.13 **IF** starting Diesel Generator 1,
THEN verify 0/VOLT BREAKER switch is OFF.
- 3.14 **IF** starting Diesel Generator 2,
THEN verify VOLT REG switch is OFF.
- 3.15 Verify GOV MODE switch is in IDLE.
- 3.16 **IF** starting Diesel Generator 1,
THEN verify Sub Three CB-7 is OPEN.
- 3.17 **IF** starting Diesel Generator 2,
THEN verify Sub Three CB-11 is OPEN.

NOTE

When CMRO initiates remote start in Step 3.18, engine will start, ENGINE CRANK alarm light will extinguish at 600 (550 to 650) rpm, and engine will accelerate to idle speed of 800 (750 to 850) rpm.

- 3.18 Request CMRO to initiate remote start.
- 3.19 Verify engine starts and accelerates to idle speed of 800 (750 to 850) rpm.
- 3.20 Verify the following engine operating parameters:
 - 3.20.1 Water jacket temperature < 200°F maximum.
 - 3.20.2 Oil pressure > 50 psi minimum.
 - 3.20.3 Inlet oil temperature < 230°F maximum.

- 3.20.4 Oil filter differential pressure < 15 psi maximum.
 - 3.20.5 Fuel filter differential pressure < 5 psi maximum.
 - 3.20.6 Air filters differential pressure < 30 in. wg maximum (below RED ZONE on indicators).
- 3.21 Allow engine to run at idle for at least five minutes prior to proceeding.

NOTE

When Step 3.22 is performed, engine will accelerate to 1800 (1750 to 1850) rpm.

- 3.22 Position GOV MODE switch to RUN.
 - 3.23 Verify engine accelerates to 1800 (1750 to 1850) rpm.
 - 3.24 **IF** operating Diesel Generator 1,
THEN position 0/VOLT BREAKER switch to ON.
 - 3.25 **IF** operating Diesel Generator 2,
THEN position VOLT REG switch to ON.
 - 3.26 Verify generator output voltage is 480 (470 to 490) vac.
 - 3.27 Verify generator output frequency is 60 (58 to 62) Hz.
- 4.0 LOCAL START

NOTE

LOCAL START must be followed by LOCAL CLOSING of output breaker and local shutdown.

- 4.1 At the Load Bank Switchgear (25-SWG04/9):
 - 4.1.1 Verify the Remote Emergency Stop pushbutton is pulled out at DG #1 Auxiliary Control Panel (25P-CP03/001).
 - 4.1.2 Verify the Remote Emergency Stop pushbutton is pulled out at DG #2 Auxiliary Control Panel (25P-CP03/002).
- 4.2 Establish communications with CMRO prior to performing local start-up of diesel generator.
- 4.3 If aligning for use of Substation Three for loading, then verify ISOLATION/DISABLE 120 VAC INTERLOCK DGs 1 and 2 selector switch (located in UVFS control Panel, 413-CP-056-01) is in the DISABLE position.

- 4.4 Secure generator enclosure door in open position prior to operation to prevent door from closing on personnel.
- 4.5 Verify that all personnel in immediate area of operating diesel generator use hearing protection.
- 4.6 Verify fuel level is greater than 3/4 tank.
- 4.7 Verify lubricating oil sump level is within normal operating range, as indicated on dip stick.
- 4.8 Verify water level in radiator expansion tank is greater than half way in sight glass.

NOTE

In Step 4.9, FUEL RACK lever can also be used to EMERGENCY STOP diesel generator by manually placing lever in CLOSED position.

- 4.9 Verify FUEL RACK lever is in OPEN position.
- 4.10 Verify Air Box valve handle is in OPEN position.
- 4.11 Verify Engine Control Panel is aligned as follows:
 - 4.11.1 EMERGENCY STOP pushbutton pulled OUT.
 - 4.11.2 SYSTEM TEST switch in AUTO.
- 4.12 Position ENGINE MODE switch to OFF/RESET.
- 4.13 **IF** starting Diesel Generator 1,
THEN verify Generator Control Panel is aligned as follows:
 - 4.13.1 AUTO START switch to OFF.
 - 4.13.2 Output circuit breaker CB-G1 to OPEN.
- 4.14 **IF** starting Diesel Generator 2,
THEN verify Generator Control Panel is aligned as follows:
 - 4.14.1 AUTO START switch to OFF.
 - 4.14.2 AUTO SYNC switch to OFF.
 - 4.14.3 Output circuit breaker CB-G2 to OPEN.
- 4.15 **IF** starting Diesel Generator 1,
THEN verify 0/VOLT BREAKER switch is OFF.

- 4.16 **IF** starting Diesel Generator 2,
THEN verify VOLT REG switch is OFF.
- 4.17 Verify GOV MODE switch is in IDLE.
- 4.18 **IF** starting Diesel Generator 1,
THEN verify Sub Three CB-7 is OPEN.
- 4.19 **IF** starting Diesel Generator 2,
THEN verify Sub Three CB-11 is OPEN.

NOTE

When Step 4.20 is performed, engine will start, ENGINE CRANK alarm light will extinguish at 600 (550 to 650) rpm, and engine will accelerate to idle speed of 800 (750 to 850) rpm.

- 4.20 Position ENGINE MODE switch to MANUAL.
- 4.21 Verify engine starts and accelerates to IDLE speed of 800 (750 to 850) rpm.
- 4.22 Verify the following engine operating parameters:
 - 4.22.1 Water jacket temperature < 200°F maximum.
 - 4.22.2 Oil pressure > 50 psi minimum.
 - 4.22.3 Inlet oil temperature < 230°F maximum.
 - 4.22.4 Oil filter differential pressure < 15 psi maximum.
 - 4.22.5 Fuel filter differential pressure < 5 psi maximum.
 - 4.22.6 Air filters differential pressure < 30 in. wg maximum (below RED zone on indicators).
- 4.23 Allow engine to idle for at least five minutes prior to proceeding.

NOTE

When Step 4.24 is performed, engine will accelerate to 1800 (1750 to 1850) rpm.

- 4.24 Position GOV MODE switch to RUN.
- 4.25 Verify engine accelerates to 1800 (1750 to 1850) rpm.
- 4.26 **IF** operating Diesel Generator 1,
THEN position 0/VOLT BREAKER switch to ON.

- 4.27 **IF** operating Diesel Generator 2,
THEN position VOLT REG switch to ON.
- 4.28 Verify generator output voltage is 480 (470 to 490) vac.
- 4.29 Verify generator output frequency is 60 (58 to 62) Hz.

5.0 DIESEL GENERATOR LOADING

NOTE

Diesel generators should run under load when possible. Running diesel generators unloaded for long periods will eventually foul injectors and dilute lube oil.

- 5.1 **IF** operating Diesel Generator 1,
THEN perform the following:
 - 5.1.1 Close generator output circuit breaker CB-G1.
 - 5.1.2 Notify CMRO that Diesel Generator 1 is ready for loading.
- 5.2 **IF** operating Diesel Generator 2,
THEN perform the following:
 - 5.2.1 Close generator output circuit breaker CB-G2.
 - 5.2.2 Notify CMRO that Diesel Generator 2 is ready for loading.

NOTE

In Step 5.2.3, digital readout is not activated until generator is excited.

- 5.2.3 Record diesel engine water jacket temperature as indicated on digital readout located on engine control panel.
- 5.2.4 Monitor temperature indication at this location whenever possible.
- 5.3 Verify diesel generator operating parameters are within limits by completing Diesel Generator Log Sheet at 30-minute intervals during diesel generator operation.
- 5.4 When operating the diesel generators, do not exceed the parameters listed in Table 1.

Table 1

	kW	kVA
Operating two hours or less	1300	1625
Operating for greater than two hours	1100	1375

6.0 DIESEL GENERATOR OPERABILITY CHECK USING SUBSTATION THREE

NOTE

Due to nature of site operation, actual electrical distribution lineup may differ from that outlined in Section 6.0. FSM shall provide additional guidance required to complete procedure and support site operations.

Out-of-calibration gauges based on due date without considering grace period are **NOT** grounds for failing operability check in Section 6.0.

- 6.1 Record Diesel Generator indicating meters (KW, AC Volts, AC Amperes, Frequency) calibration due dates on Diesel Generator Log Sheet.
- 6.2 **GO TO** Section 3.0 and remote start Diesel Generator, **OR** **GO TO** Section 4.0 and local start Diesel Generator, **THEN GO TO** Section 5.0, prepare Diesel Generator for loading, and **RETURN TO** Step 6.3.
- 6.3 Record no load running data on Diesel Generator Log Sheet.
- 6.4 **GO TO** WP 04-VU1001, secure all running Underground Ventilation Fans, and **RETURN TO** Step 6.5.
- 6.5 Secure the following:
 - 6.5.1 Exhaust Filter Building HVAC.
 - 6.5.2 Safety and Emergency Building Chillers.
- 6.6 Open the following Circuit Breakers (CBs) at Substation Three:
 - CB-5
 - CB-6
 - CB-8
 - CB-10
- 6.7 **IF** operating Diesel Generator 1, **THEN** close CB-7 in Substation Three.
- 6.8 **IF** operating Diesel Generator 2, **THEN** close CB-11 in Substation Three.
- 6.9 Close CB-9 in Substation Three.
- 6.10 Close the following CBs in Substation Three:
 - CB-5
 - CB-6

- 6.11 **GO TO** WP 04-VU1001, start Underground Ventilation System in MINIMUM VENTILATION mode, and **RETURN TO** Step 6.12.
- 6.12 Start up the following:
- 6.12.1 Exhaust Filter Building HVAC.
- 6.12.2 Safety and Emergency Building Chillers and ventilation fans.
- 6.13 If additional loading is required, **GO TO** WP 04-VU1001, shift Underground Ventilation System to REDUCED VENTILATION mode, and **RETURN TO** Step 6.14.
- 6.14 Operate Diesel Generator under available load for a minimum of 30 minutes **OR** until Oil Temperature Inlet reading has stabilized (less than 10 degree change in 15 minutes), whichever is longer.
- 6.15 Record required data at 15-minute intervals on Diesel Generator Log Sheet.
- 7.0 RESTORATION FOLLOWING OPERABILITY CHECK USING SUBSTATION THREE
- 7.1 Secure the following:
- 7.1.1 Exhaust Filter Building HVAC.
- 7.1.2 Safety and Emergency Building Chillers.
- 7.2 **GO TO** WP 04-VU1001, secure all running Underground Ventilation Fans, and **RETURN TO** Step 7.3.
- 7.3 Position ISOLATION/DISABLE 120 VAC INTERLOCK DG 1 and DG 2 switch to ENABLE.
- 7.4 Open the following CBs in Substation Three:
- CB-5
 - CB-6
 - CB-9
- 7.5 **IF** preparing to shut down Diesel Generator 1, **THEN** also open CB-7 in Substation Three.
- 7.6 **IF** preparing to shut down Diesel Generator 2, **THEN** also open CB-11 in Substation Three.

- 7.7 **GO TO** Section 10.0, perform Remote Shutdown of Diesel Generator,
OR
GO TO Section 11.0, perform Local Shutdown of Diesel Generator, and
RETURN TO Step 7.8.
- 7.8 Close the following CBs in Substation Three, as directed by FSM:
- CB-8
 - CB-10
 - CB-5
 - CB-6
- 7.9 **GO TO** WP 04-VU1001, start Underground Ventilation System as directed by FSM, and
RETURN TO Step 7.10.
- 7.10 Start up the following:
- 7.10.1 Exhaust Filter Building HVAC.
- 7.10.2 Safety and Emergency Building Chillers and ventilation fans.
- 7.11 Restore remaining site loads as directed by FSM.
- 8.0 LOCAL START, DIESEL GENERATOR OPERABILITY CHECK USING LOAD BANK 25P-LB04/1

NOTE

Out-of-calibration gauges based on due date without considering grace period are **NOT** grounds for failing operability check in Section 8.0.

- 8.1 Record Diesel Generator indicating meters (KW, AC Volts, AC Amperes, Frequency) calibration due dates on Diesel Generator Log Sheet.
- 8.2 **IF** preparing to operate Diesel Generator 1,
THEN perform the following:
- 8.2.1 Rack Substation Three CB-7 to DISCONNECT.
- 8.2.2 Verify 25P-SWG04/9 SW-2 is in OFF position.
- 8.2.3 Close 25P-SWG04/9 SW-1.
- 8.3 **IF** preparing to operate Diesel Generator 2,
THEN perform the following:
- 8.3.1 Rack Substation Three CB-11 to DISCONNECT.
- 8.3.2 Verify 25P-SWG04/9 SW-1 is in OFF position.

8.3.3 Close 25P-SWG04/9 SW-2.

NOTE

REMOTE MANUAL from 25P-CP03/004 is the preferred method of Load Bank operation. Remote Control Panel (RCP) 25P-CP03/004 is located inside switchgear 25P-SWG04/9.

8.4 **IF** preparing to operate Load Bank locally,
THEN perform the following:

8.4.1 At RCP 25P-CP03/004, perform the following:

- [A] Verify LOAD BANK MODE switch is in OFF position.
- [B] Verify all LOAD CONTROL switches are in OFF position.
- [C] Verify AUTO LOAD DUMP switch is in BYPASS position.

8.4.2 Verify MASTER CONTROL switch is in ON position at Load Bank.

8.4.3 Perform the following at Load Bank local Control Panel:

- [A] Verify all LOAD CONTROL switches are in OFF position.
- [B] Verify AUTO LOAD DUMP switch is in BYPASS position.
- [C] Position LOAD BANK MODE switch to LOCAL MANUAL.

8.4.4 **GO TO** Step 8.6.

8.5 **IF** preparing to operate Load Bank remotely from RCP 25P-CP03/004,
THEN perform the following:

8.5.1 Verify MASTER CONTROL switch is in ON position at Load Bank.

8.5.2 Perform the following at Load Bank local Control Panel:

- [A] Verify all LOAD CONTROL switches are in OFF position.
- [B] Verify AUTO LOAD DUMP switch is in BYPASS position.
- [C] Position LOAD BANK MODE switch to REMOTE.

8.5.3 Perform the following at RCP 25P-CP03/004:

- [A] Verify all LOAD CONTROL switches are in OFF position.
- [B] Verify AUTO LOAD DUMP switch is in BYPASS position.
- [C] Position LOAD BANK MODE switch to REMOTE MANUAL.

8.6 **GO TO** Section 4.0 and local start Diesel Generator,
THEN GO TO Section 5.0, prepare Diesel Generator for loading, and
RETURN TO Step 8.7.

8.7 Record no load running data on Diesel Generator Log Sheet.

NOTE

Steps 8.8 through 8.14 are performed at the control panel determined in Steps 8.4 and 8.5.

8.8 Check the following LEDs are illuminated:

- POWER AVAILABLE
- LOAD DUMP BYPASS

8.9 Press the LAMP TEST PRESS TO TEST pushbutton and verify all LEDs illuminate.

8.10 Press the PUSH TO RUN pushbutton to energize the cooling fan.

8.11 Verify REMOTE MANUAL RUN (remote operation), or LOCAL MANUAL RUN (local operation) is illuminated.

8.12 Check NORMAL OPERATION LED is illuminated.

NOTE

Diesel Generator can be loaded in **ANY** step sequence to achieve desired load. Recommended load is 500-700 KW.

8.13 Position MASTER LOAD switch to ON.

8.14 Proceed to load Diesel Generator as directed by FSM using the following LOAD STEP switch schedule:

- Step 1 = 50 KW
- Step 2 = 50 KW
- Step 3 = 100 KW
- Step 4 = 100 KW
- Step 5 = 200 KW
- Step 6 = 200 KW
- Step 7 = 500 KW

Total = 1200 KW

8.15 Operate Diesel Generator under available load for a minimum of 30 minutes **OR** until Oil Temperature Inlet reading has stabilized (less than 10 degree change in 15 minutes), whichever is longer.

8.16 Record required data at 15-minute intervals on Diesel Generator Log Sheet.

9.0 LOCAL SHUTDOWN, RESTORATION FOLLOWING OPERABILITY CHECK USING LOAD BANK 25P-LB04/1

NOTE

Diesel Generator may be unloaded by positioning step switches to OFF in any sequence.

- 9.1 Position step switches to OFF.
 - 9.2 Position MASTER LOAD switch to OFF
 - 9.3 Allow cooling fan to operate a minimum of 5 minutes to completely cool load element.
 - 9.4 At applicable control panel, press the PUSH TO STOP button.
 - 9.5 Perform the following:
 - Position LOAD BANK MODE switch to OFF at Load Bank local Control Panel.
 - Position LOAD BANK MODE switch to OFF at RCP 25P-CP03/004.
 - 9.6 **GO TO** Section 11.0, perform Local Shutdown of Diesel Generator, and **RETURN TO** Step 9.7.
 - 9.7 At 25P-SWG04/9, perform the following:
 - Verify SW-1 OPEN
 - Verify SW-2 OPEN
 - 9.8 Return Substation Three to its normal line-up.
- ## 10.0 REMOTE SHUTDOWN
- 10.1 **IF** preparing to shut down Diesel Generator 1, **THEN** perform the following:
 - 10.1.1 Verify Sub Three CB-7 is open.
 - 10.1.2 Open output circuit breaker CB-G1.
 - 10.1.3 Position 0/VOLT BREAKER switch to OFF.
 - 10.2 **IF** preparing to shut down Diesel Generator 2, **THEN** perform the following:
 - 10.2.1 Verify Sub Three CB-11 is open.

- 10.2.2 Open output circuit breaker CB-G2.
- 10.2.3 Position VOLT REG switch to OFF.
- 10.3 Position GOV MODE switch to IDLE.
- 10.4 Verify engine speed reduces to IDLE speed of 800 (750 to 850) rpm.
- 10.5 Request CMRO to initiate remote shutdown.
- 10.6 Verify engine shuts down after 5-minute cooldown.
- 10.7 **GO TO** Section 12.0 to realign diesel generator for remote start.
- 11.0 LOCAL SHUTDOWN
 - 11.1 **IF** preparing to shut down Diesel Generator 1,
THEN perform the following:
 - 11.1.1 Verify Sub Three CB-7 is open.
 - 11.1.2 Open output circuit breaker CB-G1.
 - 11.1.3 Position 0/VOLT BREAKER switch to OFF.
 - 11.2 **IF** preparing to shut down Diesel Generator 2,
THEN perform the following:
 - 11.2.1 Verify Sub Three CB-11 is open.
 - 11.2.2 Open output circuit breaker CB-G2.
 - 11.2.3 Position VOLT REG switch to OFF.
 - 11.3 Position GOV MODE switch to IDLE.
 - 11.4 Verify engine speed reduces to IDLE speed of 800 (750 to 850) rpm.
 - 11.5 Allow diesel engine to idle for 5-minute cooldown period.
 - 11.6 Position ENGINE MODE switch to OFF/RESET.
 - 11.7 **GO TO** Section 12.0 to realign diesel generator for remote start.
- 12.0 DIESEL GENERATOR ALIGNMENT FOR REMOTE START
 - 12.1 Verify Engine Control Panel is aligned as follows:
 - 12.1.1 EMERGENCY STOP pushbutton pulled OUT.

- 12.1.2 ENGINE MODE switch to AUTO REMOTE/CMR START.
 - 12.1.3 SYSTEM TEST switch to AUTO.
 - 12.2 Verify Generator Control Panel AUTO START switch is ON.
 - 12.3 Verify GOV MODE switch is in IDLE.
 - 12.4 **IF** aligning Diesel Generator 1 for remote start,
THEN verify 0/VOLT BREAKER switch is OFF.
 - 12.5 **IF** aligning Diesel Generator 2 for remote start,
THEN verify position VOLT REG switch is OFF.
 - 12.6 **IF** aligning Diesel Generator 2 for remote start,
THEN verify AUTO SYNC switch in OFF.
 - 12.7 Verify fuel level is greater than 3/4 tank.
- 13.0 REFUELING
- 13.1 Verify fire extinguisher availability.
 - 13.2 Operator remains in immediate area during refueling of diesel generator.

CAUTION

Fuel transfer in Step 13.3 shall be continuously monitored to prevent overflow.

NOTE

In Step 13.3, diesel fuel may be transferred from surface fuel storage tank to diesel generator using portable fuel tank.

- 13.3 Fill 500-gallon portable fuel tank 3/4 to 7/8 full.
- 13.4 Transfer portable fuel tank to diesel generator.

CAUTION

Fuel transfer in Step 13.5 shall be continuously monitored to prevent overflow.

NOTE

In Step 13.5, diesel generator may be refueled while in operation carrying site electrical loads. A 400-gallon tank allows approximately 4.5 hours of operation.

13.5 Fill diesel generator fuel tank to greater than 3/4 full.

13.6 Move portable fuel tank at least 25 feet from diesel generators after refueling is complete.

14.0 REVIEW

14.1 FSM, perform the following:

14.1.1 Review and sign Diesel Generator Log Sheet when complete.

14.1.2 Forward data sheet to Facility Operations Manager (FOM) for review.

14.1.3 FOM, forward data sheet to FSM for validation.

14.1.4 FSM, forward a copy of the validated data sheet to Facility Operations Records Coordinator, and the original to Work Control with the completed Work Order Cover Page.