



NUCLEAR OPERATIONS DEPARTMENT

PILGRIM NUCLEAR POWER STATION

Procedure No. 8.9.1

Manually Start and Load Each D/G Once Per Month

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Approved Charles J. Math
ORC Chairman
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I. PURPOSE

To provide instructions for testing the Diesel Generators, including air compressors and fuel oil transfer pumps.

II. DISCUSSION

15 | In accordance with PNPS Tech. Specs. 4.9.A.1.a, each diesel generator will be manually started and loaded (2600 KW/1250 KVAR) once per month. In addition, the Turbo Assist and Starting Air Compressors and Fuel Oil Transfer Pump will be operated if not automatically started during the load test.

III. REFERENCES

- A. Tech. Specs., 4.9.A.1.a
- B. ASME Code Section XI 1980 Edition, Winter 80 Addenda
- C. PNPS Inservice Test Program (IST)

IV. PREREQUISITES

- A. Obtain Watch Engineers permission to start test.
- B. The Diesel Generator will be in its Standby Mode of operation.
- C. Insure that surveillance tests are not being performed on the Core Spray or RHR System as test initiation of this logic, with the Diesel Generator 4.16 kV breaker closed, will cause load shedding initiation.

V. APPARATUS

- A. Diesel Generator Log Sheets 1, 2, 3.
- B. Stop Watch

VI. PRECAUTIONS

Performance of the load test will not impair, in any manner, the availability of the Diesel Generator as a source of power for the accident condition.

VII. PROCEDURE

- A. Diesel Generator Operation
 - 1. Utilizing Log #1 (see Attachment A-1), take preliminary data.
 - 2. Prepare to time DG start utilizing the stop watch and log #1 (see Attachment A-1). The DG start time will be determined as the time between start initiation and energization of relay 159-509/159-609 on Panel C101/C102.
 - 3. Insure that the DG Voltage Regulator is in Auto as indicated by the Voltage Regulator mode selection lights on C101/C102 Panel.

4. Switch the Droop/Isochronous switch at C-3 Panel to Droop.
5. Switch the Test/Normal switch to Test.
6. Start the DG from C103B/C104B Panel and time and record the start time.
7. Insure that crankcase exhausters motors have started.
8. Close the DG synchronizing switch and note the incoming and running synchronizing voltmeters and synchroscope rotation.
9. Raise and lower the incoming voltage via Voltage Regulator Set Point Adjuster to insure control.
10. Set the incoming voltage to match the running voltage.
11. Raise and lower DG speed via the Governor Speed Control Switch noting the change on the synchroscope and DG frequency meter thus insuring control.
12. Adjust the DG speed to produce a slow rotation in the fast direction on the synchroscope.
13. At 5 degrees before "in phase" on the synchroscope, close the DG 416 kV breaker (152-509/152-609).
14. Load the DG to 1000 KW via the Governor Speed Control Switch.
15. Load the DG to 500 KVAR via the Voltage Regulator Set Point Control.
16. Load the DG to 2600 KV via the Governor Speed Control Switch.
17. Load the DG to 1250 KVAR via the Volatge Regulator Set Point Control.
18. Allow the DG to run at this load and take data and record at 15 minute intervals on Log 2 and 3 (Attachment B-1 and C-1).

NOTE: Do not exceed 2600 KV, or 1250 KVAR.

19. After the DG has been run loaded for one hour, unload the DG in the following manner:
 - a. Lower the voltage to 500 KVAR.
 - b. Lower the load to 1000 KW.
 - c. Lower the voltage to 0 KVAR.
 - d. Lower the load to 100 KW.

20. Open DG 4.16 kV breaker 152-509/152-609.
21. Adjust the generator terminal voltage to 4200V via the Voltage Regulator Set Point Adjuster.
22. Raise the generator frequency to 61 hertz via the governor control switch.
23. Return the Droop/Isochronous switch to Isochronous.
24. Return the Test/Normal switch to Normal.
25. Note the DG frequency returns to 60 hertz.
26. Permit to DG to run for approximately 3 minutes unloaded in order to equalize temperatures.
27. Shut the DG down via the pushbutton on C103B/C104B Panel.
28. Insure that the DG prelube pump is running.

B. Air Compressor Operation.

1. Reduce the Starting Air Receiver tank pressure on both tanks via opening the drain valves to permit automatic compressor start. Starting pressure is approximately 225#. Verify the pressure in both tanks increases above 225#.
2. Repeat the above for the Turbo Assist System (3 Tanks)

C. Fuel Oil Transfer Pump Operation..

1. Open the Fuel Oil Transfer System discharge air operated valve to the DG day tank (switch located in Day Tank Room) (A04521/A04522).
2. Operate the Fuel Oil Transfer Pump via manual/auto switch located at the Panel by the transfer pump (P141A/P141B). Verify day tank level rises.
3. Return both controls to automatic.
4. Verify valve positions (A04521/A04522) closed after testing.

D. Physical Evidence of Off-Normal Operation.

1. Observe any physical evidence of off-normal operation such as:
 - a. Odor (excess diesel oil smell, burning smell, etc.)
 - b. Visual (smoke, particular attention to around the exhaust manifold).
 - c. Heat (unusual hot spots in controls or equipment)

- d. Hearing (vibration or knocks not usually present)
- 2. If any of the above observations are noted, you should originate a Maintenance Request and notify the Watch Engineer to ensure immediate corrective action.
- 3. Note observations on bottom of Form 8.9.1.C

VIII. ACCEPTANCE CRITERIA

- A. The diesel generator start within 10 seconds.
- B. Generator voltage varies upon demand.
- C. Generator synchronizes satisfactorily.
- D. Diesel generator operated for at least one hour with a minimum load of 1250 KVAR.
- E. Air compressors operate upon demand.
- F. Fuel oil transfer pumps operate upon demand. (IST requirements)
- G. The successful performance of this procedure verifies the operability of the following valves for IST requirements.

A0-4321 - Stroke Test.
A0-4522 - Stroke Test.
1" - 225 - Self Actuating.
1" - 225 - Self Actuating.
Foot-Val-A - Self Actuating.
Foot-Val-B - Self Actuating.

- H. Procedure performed as written without any unexplained discrepancies, as indicated by Check-Off Form 8.9.1A being completed with required signatures.

IX. Normal Position for Components Operated In This Procedure

Verify all switches and valves displaced during performance of Section VII parts A, B, & C are returned to their normal positions. (See procedure 2.2.8).

X. ATTACHMENTS

- A. PNPS Form 8.9.1A, Log Sheet #1.
- B. PNPS Form 8.9.1B, Log Sheet #2.
- C. PNPS Form 8.9.1C, Log Sheet #3.

PRELIMINARY DATA

- A. Before Start Watch Engineer's Permission obtained: Initials
- B. Diesel Generator is in Standby Mode of Operation. Initials
- C. No other Surveillance Tests are being performed on Core Spray and RHR System. Initials

Diesel Generator

Date

Operator

Time

Lube Oil in °F

Lube Out °F

Jacket Water In °F

Jacket Water Out °F

Eng. Air Hdr. °F

Fuel Oil Temp. °F

Lube Oil Level

Coolant Level

Bleed Moisture From

Air Storage Tanks

Start Motors Sw. Pos.

During and After Start

Diesel Generator
Date/Time
Operator
Acceleration Time
Starting Air Compressor
Operable
Turbo Air Compressor
Operable
Diesel Oil Transfer Pump
Operable

Remarks:

Oil level in engine crankcase verified: Initial _____ Date _____

Acceptance Criteria as

specified in Section VIII

was met. _____
(Watch Engineer)

Plant Status _____ Date _____

Operator _____ Date _____

Operating Super _____ Date _____

System returned to normal (refer to Section IX).

Verified by _____ Verified by _____

DIESEL ROOM LOG

Diesel Gen # _____ Operator _____ Date _____

Running Time: _____ Start _____ Stop _____

Time	
Ambient Temp. °F (Room)	
Field Voltage	
Fuel Rack Position - MM	
Diesel Engine RPM	
Turbine Gas	Upper Right
Inlet Pipe	Lower Right
Temp. °F	Upper Left
	Lower Left
Jacket Water PSI	
Jacket Water Inlet Temp. °F	
Jacket Water Outlet Temp. °F	
Lube Oil PSI	
Lube oil Inlet Temp. °F	
Lube Oil Outlet Temp. °F	
Lube Filter Inlet PSI	
Lube Filter Outlet PSI	
Lube Strainer Inlet PSI	
Lube Strainer Outlet PSI	
Fuel Oil Header PSI	
Fuel Strainer Inlet Vac. "HG"	
Fuel Strainer Outlet Vac. "HG"	
Fuel Oil Filter Inlet PSI	
Fuel Oil Filter Outlet PSI	
Air Manifold PSI	
Air Manifold Temp. °F	
Cylinder	1 R
	2 R
	3 R
	4 R
	5 R
	6 R
	7 R
	8 R
	9 R
Temperature	1 L
	2 L
	3 L
	4 L
	5 L
	6 L
	7 L
	8 L
	9 L

Reviewed By _____
Operating Supervisor

Date _____

