

ENCLOSURE C  
STATION PROCEDURE COVER SHEET

A. IDENTIFICATION

Number: SP 668.1

Rev. 18

Title: DIESEL GENERATOR OPERATIONAL READINESS DEMONSTRATION

Prepared By: MICHAEL J. ROSS

B. REVIEW

I have reviewed the above procedure and have found it to be satisfactory.

<u>TITLE</u>	<u>SIGNATURE/DATE</u>	<u>TITLE</u>	<u>SIGNATURE/DATE</u>
<u>DEPARTMENT HEAD</u>	<u>R. J. Palmer 7/17/91</u>		<u>/</u>
<u>OPS ASSISTANT</u>	<u>Whitfield 7/17/91</u>		<u>/</u>

C. SPECIFIC UNREVIEWED SAFETY QUESTION EVALUATION REQUIRED:

Modifies intent of procedure and changes operation of systems as described in design documents.

YES [ ] NO [☒]

(If yes, perform written USQ determination and Safety Evaluation, and contact Manager, Safety Analysis Branch to determine need for Integrated Safety Evaluation.)

ENVIRONMENTAL REVIEW REQUIRED

(Adverse environmental impact)

YES [ ] NO [☒]

D. SPECIFIC SAFETY EVALUATION REQUIRED

Affects response of safety systems, performance of systems which may have been credited in the safety analysis or non-credited systems which may indirectly affect safety system response.

YES [ ] NO [☒]

(If yes, perform written Safety Evaluation and contact Manager, Safety Analysis Branch to determine need for Integrated Safety Evaluation.)

E. INTEGRATED SAFETY EVALUATION REQUIRED

YES [ ] NO [☒]

F. BIENNIAL REVIEW

This revision satisfies biennial review requirements.

YES [ ] NO [☒]

G. PROCEDURE REQUIRES PORC/SORC REVIEW

(In addition to review, items with a YES response must be documented in the PORC/SORC meeting minutes.)

YES [☒] NO [ ]

H. PORC/SORC APPROVAL (PORC/SORC Meeting Number 1-91-198)

I. APPROVAL AND IMPLEMENTATION

The attached procedure is hereby approved, and effective on the date below:

H. J. Ross  
STATION/SERVICES UNIT DIRECTOR

7/17/91  
EFFECTIVE DATE



SP 668.1  
Rev. 18

Page 1

Unit 1

DIESEL GENERATOR OPERATIONAL READINESS DEMONSTRATION

Page No.

1 - 7

Eff. Rev.

18

1. OBJECTIVE

- 1.1 To demonstrate the operational readiness of the following:
  - 1.1.1 Diesel generator
  - 1.1.2 Diesel starting air compressor
  - 1.1.3 Diesel fuel oil transfer pumps
  - 1.1.4 Diesel air start receiver outlet check valves 1-DGSA-18A and 1-DGSA-18B

2. ACCEPTANCE CRITERIA

- 2.1 This test shall be considered satisfactory provided the following occur:
  - 2.1.1 Diesel generator shall operate normally for at least 60 minutes at full load output of 2665 - 2700 kW.
  - 2.1.2 Diesel starting air compressor shall operate normally and recharge the air receiver.
  - 2.1.3 Diesel fuel oil transfer pumps shall operate normally.
  - 2.1.4 Diesel generator shall be ready for loading in  $\leq 13$  seconds.
  - 2.1.5 Diesel air start receiver outlet check valves 1-DGSA-18A and 1-DGSA-18B open upon engine start.

3. REFERENCES

- 3.1 Technical Specifications
  - 3.1.1 Section 3.9.C, "Auxiliary Electrical System - Diesel and Gas Turbine Fuel."
  - 3.1.2 Section 4.9.A.1, a - c, "Auxiliary Electrical System - Emergency Power Sources."
  - 3.1.3 Section 4.9.C, "Auxiliary Electrical System."
  - 3.1.4 Section 3.5.F.2, "Core and Containment Cooling Systems: Minimum Core and Containment Cooling System Availability."
  - 3.1.5 Section 4.5.F.1, "Core and Containment Cooling Systems: Surveillance of Core and Containment Cooling System."
  - 3.1.6 Section 4.13, "Inservice Inspection."
- 3.2 SP 668.11, "Unit I Diesel Fuel Sampling Analysis."
- 3.3 OP 338, "Standby Diesel Generator."
- 3.4 SP 608.17, "Diesel Generator Service Water Outlet Valve Readiness Test (ISI)."
- 3.5 SP 1060, "ISI Program Pump Vibration and Hydraulic Test."

- 3.6 SP 1061C, "Diesel Fuel Oil Transfer Pump Discharge Check Valve Operability Test."

4. PREREQUISITES

4.1 Operating Considerations

- 4.1.1 ENSURE the Shift Supervisor (SS) or Senior Control Operator (SCO) has signed data sheet OPS Form 668.1-1 authorizing the test.
- 4.1.2 If present diesel run is first or second run in the quarter, then NOTIFY IST Coordinator of test schedule to prepare for vibration and check valve testing of fuel oil transfer pumps. ✓
- 4.1.3 ENSURE bus 14F available to accept 2665 kW from diesel generator.
- 4.1.4 STATION an operator at Engine Control Panel 2305 to communicate with Control Room.
- 4.1.5 On Engine Control Panel 2305, VERIFY Diesel Mode Switch in "REMOTE" position.
- 4.1.6 COMPLETE OPS Form 668.1-2, "Standby Diesel Generator Prestart Check Sheet."

4.2 Tools and Equipment

- 4.2.1 OBTAIN the following test equipment:
  - 4.2.1.1 Stopwatch

5. PRECAUTIONS

- 5.1 COORDINATE performance of procedure with Control Room Operator.

NOTE

The following requirement may be waived on repetitive starts while grooming or troubleshooting.

- 5.2 COMPLETE OPS Form 668.1-2 prior to any planned start of diesel generator.
- 5.3 ENSURE diesel generator "Paralleling" switch on CRP 908 is in "PARALLEL" position prior to start and is returned to "INDIVIDUAL" after unit shutdown.
- 5.4 CHECK SHUT air receiver cross-connect 1-DGSA-94A and 1-DGSA-94B.

6. PROCEDURE

- 6.1 INITIAL data sheet, indicating prerequisites are completed and precautions noted.
- 6.2 ESTABLISH communications with operator at Engine Control Panel 2305.

NOTE

Diesel air start solenoids should be tested in the following order:

- a. 1st. run of month "AS-1" test position.
- b. 2nd. run of month "AS-2" test position.

NOTE

If IST testing of diesel fuel oil transfer pumps and check valves is required, then pumps should be aligned to the following on Generator Control Panel 2304:

- a. 1st. run of quarter: pump 1A in auto, pump 1B in off.
- b. 2nd. run of quarter: pump 1B in auto, pump 1A in off.

- 6.3 Prior to starting diesel, TURN air start solenoid test switch, located on Engine Control Panel 2305, to desired test position (AS-1, NORMAL, or AS-2) and HOLD it until after diesel has been started.
- 6.4 START diesel generator in accordance with OP 338, "Standby Diesel Generator," and gradually INCREASE load to 100% over a 10-minute period.
  - 6.4.1 RECORD the following on data sheet OPS Form 668.1-1:
    - 6.4.1.1 Time diesel started.
    - 6.4.1.2 Amount of time required to start diesel (time to "READY FOR LOADING" alarm on CRP 908).
    - 6.4.1.3 Time when diesel loaded to 2665 kW.
    - 6.4.1.4 Air start solenoid test switch position used.
  - 6.4.2 OBSERVE air pressure in both air start receivers is lower than that recorded on data sheet OPS Form 668.1-2, Prestart Checklist. (This verifies flow through receiver outlet check valves 1-DGSA-18A and 1-DGSA-18B.)
    - 6.4.2.1 INITIAL data sheet OPS Form 668.1-1.



- 6.5 With diesel in operation, INFORM diesel operator when "DIESEL DAY TANK LEVEL DECREASING" alarm annunciates on CRP 908.
- 6.6 At Generator Control Panel 2304, PLACE fuel oil transfer pump 1A(1B) control switch in "MAN" position.
  - 6.6.1 If required, then PERFORM applicable section of IST test, SP 1061C, "Diesel Fuel Oil Transfer Pump Discharge Check Valve Operability Test."
- 6.7 When fuel oil transfer pump 1A(1B) shuts off, then PLACE its control switch in "AUTO" position.
  - 6.7.1 ENSURE pump 1B(1A) is in "OFF."
- 6.8 CONTACT Control Room to verify that "DIESEL DAY TANK LEVEL DECREASING" alarm extinguished.
  - 6.8.1 INITIAL data sheet OPS Form 668.1-1.
- 6.9 When engine and generator have operated at full load for at least 60 minutes, then RECORD time and required parameters as indicated on data sheet OPS Form 668.1-4.
- 6.10 CHECK engine crankcase oil level, and, if necessary, then SUBMIT an AWO for oil addition (1" equals approximately 25 gallons).
- 6.11 SHUT DOWN diesel as follows:
  - 6.11.1 REDUCE load on diesel generator down to 50 - 60% (1332 - 1600 kW) for approximately 5 minutes.
  - 6.11.2 UNLOAD diesel generator down to 50 kW.
  - 6.11.3 OPEN diesel generator breaker to bus 14F.
  - 6.11.4 ENSURE voltage regulator switch is in "AUTO" position.
  - 6.11.5 With diesel generator breaker open, VERIFY output voltage is greater than 4 kV and frequency is approximately 60 Hz.
  - 6.11.6 ALLOW diesel a cooldown period of approximately 5 minutes, and then TURN diesel generator switch on CRP 908 to "STOP" position.
  - 6.11.7 RETURN diesel generator "Paralleling" switch on CRP 908 to "INDIVIDUAL" position.
- 6.12 At Generator Control Panel 2304, PLACE fuel oil transfer pump 1B(1A) control switch in "MAN" position.
  - 6.12.1 If required, then PERFORM IST vibration test in accordance with SP 1060, "ISI Program Pump Vibration and Hydraulic Test."
  - 6.12.2 If required, then COMPLETE applicable section of IST test, SP 1061C.





- 6.13 While fuel oil transfer pump 1B(1A) is running, PROCEED to Diesel Day Tank Room and BLOW DOWN day tank fill line strainer into a suitable container.
- 6.14 When fuel oil transfer pump 1B(1A) shuts off, then PLACE its control switch in "OFF".
- 6.15 CONTACT Control Room to verify that "DIESEL DAY TANK LEVEL DECREASING" alarm extinguished.
  - 6.15.1 INITIAL data sheet OPS Form 668.1-1.
- 6.16 RECORD the following on data sheet OPS Form 668.1-1:
  - 6.16.1 Total engine operating hours
  - 6.16.2 Watt meter reading (Watts)
  - 6.16.3 Fuel oil day tank level (Gal.)
  - 6.16.4 Fuel oil storage tank level (Gal.)
  - 6.16.5 Verification that emergency diesel generator outlet valve 1-SW-99 is closed.
- 6.17 RECORD pressure of air receivers on data sheet OPS Form 668.1-1 and PERFORM the following:
  - 6.17.1 PLACE AC air compressor control switch in "OFF" position.
  - 6.17.2 OPEN receiver drain stop valves 1-DGSA-15A or 1-DGSA-15B to decrease pressure in air receivers until DC air compressor starts.
  - 6.17.3 RECORD starting pressure of DC air compressor on data sheet OPS Form 668.1-1.
  - 6.17.4 VERIFY on data sheet OPS Form 668.1-1 that "DIESEL GENERATOR DC COMPRESSOR RUNNING" alarm annunciates on CRP 908.
  - 6.17.5 Once DC air compressor is verified to be recharging air receiver, PLACE AC air compressor control switch in "AUTO" position.
  - 6.17.6 VERIFY on data sheet OPS Form 668.1-1 that standby lube oil pump has started.
  - 6.17.7 VERIFY on data sheet OPS Form 668.1-1 that coolant water circulation pump has started.

## 7. RESTORATION

- 7.1 After stopping engine, ALLOW time for oil to drain back to sump before checking level.
  - 7.1.1 INITIAL data sheet OPS Form 668.1-1.

- 7.2 RETURN diesel generator "Paralleling" switch to "INDIVIDUAL" position.
  - 7.2.1 INITIAL data sheet OPS Form 668.1-1.
- 7.3 ENSURE "DIESEL GENERATOR NOT READY FOR AUTO START" annunciator on CRP 908 is extinguished.
  - 7.3.1 INITIAL data sheet OPS Form 668.1-1.
- 7.4 ENSURE fuel injector pump rack not in "NO FUEL" position.
  - 7.4.1 If in "NO FUEL" position, then NUDGE governor's red link lever clockwise until injector pump's rack position is between notches 1 and 5, ensuring that rack is free for any subsequent starts.
  - 7.4.2 INITIAL data sheet OPS Form 668.1-1.
- 7.5 SHIFT and CLEAN service water strainers in accordance with OP 338.
  - 7.5.1 INITIAL data sheet OPS Form 668.1-1.
- 7.6 At Engine Control Panel 2305, ENSURE air start solenoid test switch is in "NORMAL" position.
  - 7.6.1 INITIAL data sheet OPS Form 668.1-1.
- 7.7 PERFORM air roll of engine in accordance with OP 338.
  - 7.7.1 INITIAL data sheet OPS Form 668.1-1.
- 7.8 At Generator Control Panel 2304, ENSURE diesel fuel oil transfer pump 1A(1B) is in "AUTO" and diesel fuel oil transfer pump 1B(1A) in "OFF."
  - 7.8.1 INITIAL data sheet OPS Form 668.1-1.
- 7.9 Independently VERIFY 1-DGSA-27 and 1-DGSA-28 are locked in the open position.
  - 7.9.1 INITIAL data sheet OPS Form 668.1-1.
- 7.10 VERIFY Diesel Generator fuel oil tank level meets the minimum Technical Specification quantity of 22,000 gallons and 1400 gallons in the diesel day tank, for a total of 23,400 gallons.
  - 7.10.1 INITIAL data sheet OPS Form 668.1-1.

## 8. SURVEILLANCE DATA SHEETS

- 8.1 OPS Form 668.1-1, "Diesel Generator Operational Readiness Demonstration."
- 8.2 OPS Form 668.1-2, "Standby Diesel Generator Prestart Check Sheet."
- 8.3 OPS Form 668.1-4, "Diesel Generator Equilibrium Temperature Running Data."

## 9. FIGURES

- 9.1 None.

MJR:clc

## ENCLOSURE D

### MNPS-1 UFSAR

TABLE 8.3-6

#### STANDBY DIESEL GENERATOR SYSTEM PRINCIPAL EMERGENCY LOADS

<u>Description of Load</u>	<u>Nameplate hp</u>	<u>Actual hp</u>	<u>Nameplate kW</u>	<u>Actual kW</u>	<u>(Connected kW)</u>	
					<u>1st Min.</u>	<u>30 Min.</u>
LPCI & Containment Cooling Pump A	500	500	--	401	401	401
LPCI & Containment Cooling Pump C	500	500	--	401	401	401
Core Spray Pump A	700	650	--	521	521	521
Service Water Pump D	600	500	--	401	401	401
Turbine Building Secondary Closed Cooling Water Pump B	150	135	--	108	108	108
Emergency Service Water Pump A	400	400	--	321	0	321
Emergency Service Water Pump C	400	400	--	321	0	321
Miscellaneous						
o Safety Injection MOVs	120	60	--	59	59	0
o Isolation MOVs	72	36	--	37	37	0
o Diesel Auxiliaries	12	6	--	6	6	6
o Transformer Losses	--	--	17	8	8	8
o Emergency Lights	--	--	70	35	35	35
o Instrument AC	--	--	23	11	11	11
o Standby Gas Treatment	10	5	--	5	5	5
o Emergency Air Handling	40	20	--	16	16	16



MNPS-1 UFSAR

STANDBY DIESEL GENERATOR SYSTEM  
PRINCIPAL EMERGENCY LOADS

<u>Description of Load</u>	<u>Nameplate hp</u>	<u>Actual hp</u>	<u>Nameplate kW</u>	<u>Actual kW</u>	<u>(Connected kW)</u>	
					<u>1st Min.</u>	<u>30 Min.</u>
o Water Cooled Cond.	70	34	--	30	30	30
o Reactor Building Elevation	25	12	--	11	11	11
o Reactor Feed Pump Seal Water Return Pump	5	3	--	2	2	2
o SBLC Heater	--	--	25	25	0	25
o Battery Charger	--	--	40	9	0	9
Subtotal Miscellaneous					<u>220</u>	<u>158</u>
Total kW Load					2052	2632

- Notes: 1. A 50 percent diversity factor was applied to miscellaneous loads.
2. A motor efficiency of 93 percent for large motors and 80 percent for small motors was utilized.

## ENCLOSURE E

### Inspection Request No. 011

#### Millstone Unit No. 1 - Diesel Generator Loading

Calculation No. PA 79-126-742-GE

Initial Issue - Rev. 0 dated July 24, 1990 (Included in Calc Pkg)

This initial revision of the EDG loading calculation examined both the steady-state and transient loading. The calculation assumed that both the S2 LPCI pumps would remain running during containment cooling operation as the two Emergency Service Water pumps are started. The "Start Check" multiplier of 2.2 HP/KW was used. The starting KW requirements were evaluated against the short-time overload rating of 2932 KW (2/24 Hr). Only the starting of the 2nd ESW pump exceeded the 2932 KW rating. A future dynamic EDG analysis would address this starting issue. The final steady-state load was calculated to be 2632 KW which was less than the 2665 KW continuous rating.

Rev. 0, Change No. 1 dated December 19, 1990

This calculation change addressed the replacement of the "A" LPCI pump motor from 500 hp to 600 hp. The steady-state loading was unchanged. The "A" LPCI motor is the first large motor automatically sequenced on the EDG. The load starting KW increased from 45.9% to 52.5% of the 2932KW overload rating.

Rev. 0, Change No. 2 dated May 9, 1991

The calculation change addressed the addition of 56KW of drywell cooler load added to the EDG load under PA 83-017-526. The final steady-state load of 2632KW did not change since the calculation addressed the large break LOCA within the drywell. For other LOCAs outside of primary containment (Drywell) the loading is expected to be less than 2632KW.

Rev. 0, Change 3 dated June 24, 1991

This calculation change addressed the replacement of the Core Spray pump motor from 700 hp to 800 hp. The steady-state Core Spray motor load was unchanged. The load starting KW increase from 87.4% to 94.9% of the 2932KW overload rating. The total EDG steady-state load was reduced to 2614KW because a computation error was found.

Rev. 0, Change 4 dated July 29, 1991

This calculation change addressed the following items:

- The two LPCI pump motor BHP increased from 500 to 532 hp
  - The Core Spray pump motor BHP increased from 650 to 736 hp
  - The calculation recognized operator training directives to secure one LPCI pump motor prior to the initiation of the two Emer. Serv. Wtr. pumps for LPCI/Cont. Cooling operation
  - A EDG 3000KW load starting figure was utilized to check motor starting conditions
  - A 1.8 HP/KW ratio was utilized for motor starting figures
- All the load starting step KW figures are within both the 2932KW and 3000KW figures. The steady-state loading decreased from 2614KW to 2308KW.

Rev. 0, Change 5 dated August 9, 1991

This calculation change addressed Emer. Oper. Proc. steps that have the operators manually start the Control Rod Drive (CRD) and Reactor Building Closed Cooling Water (RBCCW) pumps after the automatic sequencing is completed. These loads are secured along with one LPCI pump prior to the initiation of the LPCI/Cont. Cooling and ESW pumps. Once in the LPCI/Cont. Cooling mode, only one of these two pumps is restarted. All the load starting step KW figures are within both the 2932KW and 3000KW figures. The steady-state loading increased from 2308KW to 2508KW.



