

TENNESSEE VALLEY AUTHORITY

SEQUOYAH NUCLEAR PLANT

SURVEILLANCE INSTRUCTION

**1-SI-OPS-082-007.B**

**ELECTRICAL POWER SYSTEM DIESEL GENERATOR 1B-B**

Revision 39

**QUALITY RELATED**

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RESPONSIBLE ORGANIZATION: OPERATIONS

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EFFECTIVE DATE: 11/15/06

LEVEL OF USE: **CONTINUOUS USE**

REVISION

DESCRIPTION: Removed references to Tech Spec 3.3.2.1 due to relocation to TS 3.3.3.11 per TSC 04-01. This is a minor editorial change. Also provided guidance for operability of Diesels when the Turbocharger Inlet Temperature thermocouple is not operable. Reference PER 111005. Also added guidance to Appendix I to ensure over voltage relay reset and D/G Exciter Relay Panel Overvoltage red light out as part of standby readiness checks. Reference RT 060879. These are intent changes.

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## 1.0 INTRODUCTION

### 1.1 Purpose

This Instruction provides the steps necessary to demonstrate OPERABILITY of 1B-B Diesel Generator in accordance with frequency and requirements of Technical Specification Surveillance Requirements. [C.2]

This instruction also performs monthly inspections in accordance with manufacturers recommendations.

### 1.2 Scope

#### 1.2.1 Operability Test to be Performed

The surveillance test to be performed in a 31 day interval staggered test basis involves the following verifications: [C.2]

- A. The fuel level adequate in the engine-mounted day tanks.
- B. The fuel level adequate in the 7-day tank.
- C. The fuel transfer pump starts and transfers fuel from the storage system to the engine mounted fuel tanks.
- D. The Diesel Generator (D/G) is started by one of the following signals with startup on each signal verified at least once per 124 days.
  - 1. Manual
  - 2. Simulated Loss of Offsite Power
  - 3. SI (ESF) Actuation Test Signal
- E. D/G starts from ambient conditions and achieves in less than or equal to 10 seconds voltage and frequency of  $\geq 6800$  volts and  $\geq 58.8$  Hz and achieves a steady state voltage of  $\geq 6800$  and  $\leq 7260$  volts and frequency of  $\geq 58.8$  and  $\leq 61.2$  Hz. All other D/G starts for the purpose of this surveillance testing, may be preceded by an engine idle start and gradual acceleration to synchronous speed.

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### 1.2.1 Operability Test to be Performed (Continued)

**NOTE** In accordance with Reg. Guide 1.9, the load requirement of between 3.96 MW and 4.4 MW may be reduced to  $\geq 2.2$  MW when both units are in MODE 5 or 6. All four D/Gs must be within test frequency between 3.96 and 4.4 MW prior to either unit entering MODE 4.

F. The generator is synchronized, loaded between 3.96 and 4.4 MW  $\leq 60$  seconds and operates for  $\geq 60$  minutes once per 184 days. All other loading for the purpose of this surveillance testing may be gradual to  $\geq 3.96$  MW and maintained at  $\leq 4.4$  MW for  $\geq 60$  minutes.

G. The D/G is realigned to provide standby power to associated Shutdown Board upon completion of the testing.

### 1.2.2 Requirements Fulfilled

This Instruction fulfills the following Technical Specification (TS) Surveillance Requirements (SR):

A. SR 4.8.1.1.2.a.1 through 4.8.1.1.2.a.6 (for D/G tested).

B. SR 4.8.1.2 (Partial for D/G tested).

### 1.2.3 Mode

A. Applicable Modes - All

B. Performance Modes - All

### 1.3 Frequency/Conditions

A. This test must be performed on a periodic basis at least once per 31 days.

B. This test may be performed as a Post-Maintenance-Test (PMT) to prove operability of the D/G upon work completion.

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## 2.0 REFERENCES

### 2.1 Performance References

- A. System Instructions
  - 1. 0-SO-82 (Series) *Diesel Generators*
- B. Other Surveillance Instructions
  - 1. 0-SI-OPS-082-007.M, Diesel Generator Surveillance Frequency
  - 2. SI-102 (Series); Diesel Generator Inspections
- C. Maintenance Instructions
  - 1. 0-MI-EDG-082-001.0, *Installation and Removal of the D/G Data Acquisition (DAQ) System*

### 2.2 Developmental References

- A. TVA-Drawings
  - 1. 45N765-1 through 5
  - 2. 45N767-1 through 5
- B. Technical Specifications
  - 1. Surveillance Requirement 4.8.1.1.2.a
  - 2. Surveillance Requirement 4.8.1.2
- C. Regulatory Guide 1.108
- D. Regulatory Guide 1.9
- E. FSAR Section 8.0, *Electrical Power*
- F. SI-7, *Electrical Power System: Diesel Generators*
- G. Technical Standard 04.06.07.14.03
- H. RIMS L44 870227 811 (provided background data needed to generate Attachments A, B, and C capability curves).
- I. SSP-13.3, Appendix B, Air Pollution Control
- J. P318-0020, tab 61 Vendor manual
- K. Recommended Shutdown Limits for SQN DG's signed by Engine Systems Inc. (ESI) dated 10-21-97 (VM change 5584)

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### 3.0 PRECAUTIONS AND LIMITATIONS

- A. Operating the Diesel engines without air box drains (crankcase vents) open could damage the engines.
- B. Operating the Diesel engine with high jacket water temperature (> 205°F) could damage the engine.
- C. Operating the Diesel engine with < 20 psi lube oil pressure could damage the engine.
- D. Operating the generator system at speeds  $\leq$  850 rpm for extended periods of time with exciter regulator in operation could cause damage to the exciter-regulator field.
- E. Fire protection system shall be available for 1B-B D/G room.
- F. In the event of a crankcase high pressure trip, the diesel generator should not be restarted until a thorough checkout has been performed by Maintenance. Diesel engine should be allowed to cool for two hours prior to opening the top deck cover or handhole, to prevent the possibility of an explosion from hot oil vapors.
- G. The prestart rolling requirements of 0-SO-82 series must be observed (unless waived by SM) to check for water in the cylinders. If prestart rolling requirements are waived, no personnel are required in the DG room upon DG start as an ambient start must be performed and the required DG start readings can be obtained in the MCR (panel 0-M-26B).
- H. In accordance with FSAR 8.3-11 more than one D/G will not be operated in parallel with its 6.9 kV unit board at the same time.
- I. Care should be used when changing lamps on the diesel generator local control panel. A short circuit in a lamp socket has the potential for rendering the diesel generator inoperable.
- J. Diesel engine exhaust stack should be monitored within five minutes after startup. If the equipment is still emitting black smoke, a malfunction or misadjustment is indicated and the equipment should be readjusted or shutdown for repairs as applicable. If black smoke persists and equipment cannot be shutdown, Site Environmental shall be notified. Black smoke is defined for this precaution as smoke significantly darker than is normal from previous experience.
- K. Placing 43T(L) switch in test position will make the associated D/G inoperable (LCO 3.8.1.1 or 3.8.1.2).

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### 3.0 PRECAUTIONS AND LIMITATIONS (Cont.)

- L. Breaker position disagreement /overcurrent white light for the Normal, Alternate, and Emergency supply breakers on the 6900V Shutdown Boards, may illuminate momentarily as the breaker closes.
- M. When the diesel generator is in operation in parallel mode, power switching activities (large motor starts, capacitor switching, CSST tap changer operation, generator synchronizing activities, etc.) may result in actuation of the phase imbalance or overcurrent relay.
- N. Chemistry should be notified to adjust ERCW flow calculations prior to initiating ERCW flow to a DG Heat Exchanger.
- O. The following annunciators may be expected as a result of starting a D/G, and should clear momentarily if not valid (unless otherwise stated):

#### 1B-B LOCAL PANEL (Lights)

- A-1 Green light not illuminated (numerous reasons as stated in AR)
- A-8 Engine Running (engine above 40 rpm)
- C-2 Low Jacket Water Temp (pump pulls some water for makeup from expansion tank which is not heated)
- C-3 Field Ground Relay (64X) Operation (leakage current when field flash/excitation occurs)
- C-5 Low Jacket Water Temp (see C-2)
- E-2 Low Jacket Water (only if level in expansion tank is substantially below run full mark)
- E-5 Low Jacket Water (see E-2)
- G-1 Low Start Air Pressure Tank (depends on initial tank pressure)
- G-4 Low Start Air Pressure Tank (see G-1)
- BB-1 Overvoltage (59 relay operates when field flash occurs - generator output voltage does not drop below relay reset until D/G excitation is removed below 550 rpm - to extinguish light requires manual reset per the AR after excitation is removed)

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### 3.0 PRECAUTIONS AND LIMITATIONS (Cont.)

**NOTE** The associated local alarm must be reset prior to resetting UCR alarm.

**0-M-26B** (0-XA-55-26B Windows)

- A-5 D/G 1B-B Running > 40 rpm
- C-1 D/G 1B-B Start Air Pressure Low Eng 1 or 2
- C-4 D/G 1B-B Jacket Water Temp High-Low Eng 1 or 2
- C-5 D/G 1B-B Water Level or Pressure Abn Eng 1 or 2
- D-3 D/G 1B-B Protective Relay Operation

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#### 4.0 PREREQUISITE ACTIONS

**NOTE** Throughout this Instruction where an **IF/THEN** statement exists, the step should be **N/A** if condition does not exist.

#### 4.1 Preliminary Actions

- [1] **ENSURE** Instruction to be used is a copy of the effective version. RHE
- [2] **ENSURE** Precautions and Limitations, Section 3.0, has been reviewed. RHE
- [3] **IF** diesel generator has been inop (tagged) for maintenance, **THEN**  
**ENSURE** diesel generator is in standby mode in accordance with 0-SO-82-2. **[C.3]** RHE
- [4] **COORDINATE** performance of this test with D/G Outage Coordinator, assigned per D/G outage schedule supplied by Daily Scheduling. (N/A if not assigned.) N/A
- [5] **VERIFY** necessary portions of all outage work/test items are complete before running operability test. Coordinate with D/G Outage Coordinator or Daily Scheduling. RHE
- [6] **VERIFY** necessary personnel are stationed at D/G building to complete any remaining (running) requirements of other Surveillance Instructions in progress via D/G Outage Coordinator, as applicable. RHE
- [7] **IF** performing Ambient Start, **AND** use of the D/G-DAQ is desired for start timing, **THEN**  
**ASSIGN** Electrical Maintenance/Engineering responsibility for operating the D/G-DAQ, **AND**  
**NOTIFY** responsible group to  
**COMPLETE** applicable portions of 0-MI-EDG-082-001.0, Installation and Removal of the D/G Data Acquisition (DAQ) System. RHE

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**4.2 Measuring and Test Equipment, Parts, and Supplies**

**NOTE** If performing an ambient start, AND if using the D/G DAQ for start timing, a stopwatch must be used as a backup. If the DAQ is NOT being used, two stopwatches must be used.

[1] **IF** performing an ambient start, **OR** timing of DG loading required, **THEN**

**OBTAIN** stopwatch(es).

[2] **IF** performing Ambient Start **AND** use of the D/G-DAQ is desired for start timing, **THEN**

**REFERENCE** 0-MI-EDG-082-001.0, Installation and Removal of the D/G Data Acquisition (DAQ) System, for listing of required M&TE.

[3] **IF** an Engine Cylinder Thermocouple is known or suspected to be inoperable, **THEN**

**OBTAIN** a pyrometer for surface temperature measurement from M&TE. N/A

**4.3 Field Preparations**

[1] **ENSURE** prestart rolling requirements of 0-SO-82-2 have been met, **OR**

**OBTAIN** waiver from SM.  
Prestart rolling waived for this performance (N/A if not waived.)

NA  
SM Signature

[2] **IF** SM waived prestart rolling requirements, **THEN**

**NOTIFY** the Control Room Operator that the D/G room 1B-B is to be cleared of **ALL** personnel prior to startup of the diesel

**AND** the DG start readings will be obtained from the MCR (panel 0-M-26B). NA

[3] **ENSURE** Fire protection system is available for D/G Room 1B-B. RHC

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**4.3 Field Preparations (Continued)**

- [4] IF diesel exhaust fumes accumulate in D/G Bldg corridor during Diesel Generator operation, **THEN**  
**CLOSE [0-FCO-30-467]** DG Bldg Corridor Air Intake Damper **USING [0-HS-30-467]** (1B-B DG Exhaust Fan Room, north wall).

N/A

**4.4 Approvals and Notifications**

- [1] **OBTAIN** Senior Reactor Operators (SRO) approval from both units prior to beginning this surveillance.

 Unit 1 SRO	1	<u>today</u>	Date	Time
 Unit 2 SRO	1	<u>today</u>	Date	Time

- [2] IF Start method requires an "SI Actuation Test Signal", **THEN**

**ENSURE** Unit 1 Train "B" SSPS is in service.

N/A

**NOTE** If an ambient start is required to satisfy PMT requirements, this start can be used to fulfill periodic ambient or non-ambient start requirements.

- [3] **PERFORM ONE** of the following four substeps (N/A the other three):

- [a] IF performance of this instruction is to satisfy a PMT **AND** Periodic testing requirements, **THEN**

**PERFORM** Section 6.1 for Ambient Start

**OR**

**PERFORM** Section 6.2 for Non-Ambient Start, **AND** **ENSURE** periodic testing requirements in substep [c] met.

N/A

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**4.4 Approvals and Notifications (Cont.)**

[b] IF performance of this instruction is to satisfy a  
PMT ONLY, THEN

**PERFORM** Section 6.1 for Ambient Start

**OR**

**PERFORM** Section 6.2 for Non-Ambient Start.

L/E

[c] IF the calendar date is January or July, and this  
is the first performance during the month,

**THEN**

— **PERFORM** Section 6.1, Ambient Start  
Performance.

N/A

[d] IF the calendar date is February, March, April,  
May, June, August, September, October,  
November, or December,

**OR**

IF the calendar date is January or July, and this  
is NOT the first performance of the month,

**THEN**

**PERFORM** Section 6.2, Non-Ambient  
Performance.

N/A

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## 5.0 ACCEPTANCE CRITERIA

- A. The D/G is synchronized, then loaded to between 3.96 and 4.4 MW in less than or equal to 60 seconds. Load requirements may be reduced to  $\geq 2.2$  MW with both units in mode 5 or 6.
- B. Fuel Oil Transfer Pumps start and transfer fuel from the D/G 7-Day tank to the engine Day Tank.
- C. The fuel oil in the D/G Day Tank is verified  $\geq 250$  gallons and the fuel oil level in the 7-Day tanks is verified  $\geq 4.7$  feet.
- D. The Diesel generator (D/G) is started by one of the following signals with startup on each signal verified at least once per 124 days.
  - 1. Manual
  - 2. Simulated Loss of Offsite Power
  - 3. SI (ESF) Actuation Test Signal
- E. D/G starts from ambient conditions and achieves in less than or equal to 10 seconds voltage and frequency of  $\geq 6800$  volts and  $\geq 58.8$  Hz and achieves a steady state voltage of  $\geq 6800$  and  $\leq 7260$  volts and frequency of  $\geq 58.8$  and  $\leq 61.2$  Hz. All other D/G starts for the purpose of this surveillance testing, may be preceded by an engine idle start and gradual acceleration to synchronous speed.
- F. If specific acceptance criteria stated in the instruction steps are not met, notify the SM as soon as practical after observation of the noncompliance.

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**6.0 PERFORMANCE**

**6.1 Ambient Start Performance**

**NOTE** For purposes of this Instruction, Ambient Start is defined as a D/G startup where the machine is started from zero speed and ambient temperature conditions of lube oil and jacket water. When started the machine is brought to  $\geq 6800$  volts and  $\geq 58.8$  Hz in less than or equal to 10 seconds. Then, once synchronized to the energized Shutdown Board, it is loaded between 3.96 and 4.4 MW in  $\leq 60$  seconds. Ambient Start is required at least once per 184 days in accordance with SR 4.8.1.1.2.a.4 and 5.

- [1] **DISPATCH** an AUO to D/G building for duration of test. RHE
- [2] **DIRECT** D/G building AUO to perform Appendix A, D/G Pre-Run Condition Checkout. RHE
- [3] **IF** D/G-DAQ is to be used for start timing, **THEN**  
**ENSURE** DG-DAQ has been installed. RHE
- [4] **IF** breaker [1934] is installed in its Shutdown Board compartment, **THEN**  
**ENSURE** breaker [1934] is in the **DISCONNECT** position. N/A
- [5] **ENSURE** Appendix A completed with all parameters within acceptable ranges for Ambient Start. RHE

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**6.1 Ambient Start Performance (Continued)**

**CAUTION** If performing this instruction for a PMT AND to fulfill periodic testing requirements, the required periodic start method must be used.

**NOTE** Steps [6], [7] and [8] choose the start method and direct the performer to the appropriate appendix.

[6] IF any of the following conditions exist:

A. Calendar date is January or July,

**OR**

B. Performance is a Post-Maintenance-Test (PMT) that requires an ambient manual start, **THEN**

**PERFORM** Appendix C, Ambient Manual Start Method. \_\_\_\_\_

[7] IF Performance is a Post-Maintenance-Test (PMT), **AND** an Ambient Simulated Loss of Offsite Power start is required, **THEN**

**PERFORM** Appendix D, Ambient Simulated Loss of Offsite Power Start Method. \_\_\_\_\_

[8] IF Performance is a Post-Maintenance-Test (PMT), **AND** an Ambient SI Actuation Test Signal start is required, **THEN**

**PERFORM** Appendix E, Ambient SI Actuation Test Signal Start Method. \_\_\_\_\_

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**6.1 Ambient Start Performance (Continued)**

**[9] PERFORM** the following to wipe the Automatic Voltage Control Rheostat:

- [a] RECORD** voltage from **[0-EI-82-34]**. \_\_\_\_\_
- [b] ENSURE [0-HS-82-42]**, DG 1A-A Voltage Regulator Switch in the PULL-P-AUTO position. \_\_\_\_\_
- [c] DECREASE** voltage to 6700 volts on **[0-EI-82-34]** USING **[0-HS-82-42]**. \_\_\_\_\_
- [d] INCREASE** voltage to 7300 volts on **[0-EI-82-34]** USING **[0-HS-82-42]**. \_\_\_\_\_
- [e] RETURN** voltage to value recorded in **[9][a]**. \_\_\_\_\_

**[10] PLACE [0-HS-82-48]**, DG 1B-B Mode Selector Switch in the **PARALLEL** position. \_\_\_\_\_

**[11] ADJUST [0-HS-82-43]**, DG 1B-B Speed Control Switch to obtain a synchroscope indication of slowly rotating in the **[FAST]** direction. \_\_\_\_\_

**NOTE 1** With Ambient Start being performed, the generator must be loaded between 3.96 and 4.4 MW immediately after breaker 1914 is closed.

**NOTE 2** During steps **[14]** and **[15]** the Load vs. VAR limits of Attachment 1 must be observed when loading the Diesel Generator. The load requirement of 3.96 to 4.4 MW may be reduced to  $\geq 2.2$  MW if both units are in MODE 5 and/or 6.

**NOTE 3** When closing the Diesel Generator Output Breaker at the 12 o'clock position, consideration should be given to the speed of rotation of the synchroscope needle and the response time it takes to close the breaker.

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**6.1 Ambient Start Performance (Continued)**

**NOTE 4**

The following table provides an approximation of expected values at various DG loading plateaus. These values shall be monitored to provide alternative M-26 indications thus ensuring proper diesel generator loading. The values given are calculated approximations and may vary due to system variables. (e.g. If amps are 370 and Mvar have been adjusted to 2.0 Mvar then MW should be approx. 4.0.)

<b>MW (0-EI-82-40A)</b>	<b>Mv (0-EI-82-41A)</b>	<b>Amps (0-EI-82-39B)</b>
0.5 MW	0.5 Mvar	60 Amps
1.0 MW	0.75 Mvar	100 Amps
2.0 MW	1.0 Mvar	185 Amps
3.0 MW	1.0 Mvar	260 Amps
4.0 MW	1.5 Mvar	350 Amps
4.0 MW	2.0 Mvar	370 Amps
4.2 MW	1.5 Mvar	370 Amps
4.2 MW	2.0 Mvar	385 Amps
4.4 MW	1.5 Mvar	385 Amps
4.4 MW	2.0 Mvar	400 Amps
4.8 MW*	1.5 Mvar	415 Amps
4.8 MW*	2.0 Mvar	430 Amps

\* 2 Hr rating limitations apply

**NOTE 5**

CSST A LTC X, Tap Position Indication on 0-ECB-5 should be observed prior to and during paralleling to the 6.9 kv Shutdown Board. Tap changer operation during this time can cause a D/G voltage change.

**[12] ENSURE [0-HS-82-42], DG 1B-B Voltage Regulator Switch in PULL-P-AUTO position, AND**

**ADJUST** to match incoming voltage with running voltage. \_\_\_\_\_

**\*\*\*\*\*CRITICAL STEP\*\*\*\*\***

**[13] WHEN** the Synchroscope DG 1B-B **[0-XI-82-31]** indicates 12 O'Clock position, **THEN**  
**CLOSE** breaker **[1914]** via **[1-HS-57-73A]**, 1914 DG 1B-B to SD BD 1B-B, **AND**

**START** stopwatch. \_\_\_\_\_

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**6.1 Ambient Start Performance (Continued)**

**NOTE** Steps [14] and [15] must be completed within 60 seconds.

**[14] IMMEDIATELY LOAD D/G 1B-B to  $\geq 1.0$  MW by performing the following:**

- [a] **PLACE [0-HS-82-43]**, DG 1B-B Speed Control Switch in **RAISE** and obtain  $\geq 1.0$  MW on **[0-EI-82-40A]** DG 1B-B Megawatts.
- [b] **ADJUST [0-HS-82-42]**, DG 1B-B Voltage Regulator Switch to 0.75 MVARs Outgoing as indicated on **[0-EI-82-41A]**, DG 1B-B Megavars.
- [c] **ENSURE** DG indications (MW, Mvars, and Amps) -match the expected indications of Table in NOTE 4.
- [d] **IF DG** indications not as expected, **THEN NOTIFY US.**

**CAUTION** Care must be taken to not exceed 4.84MW (2-hour rating).

**NOTE 1** Adjustment of MVARs may be performed simultaneously with DG loading to ensure MVARs are maintained within limits.

**NOTE 2** Table in Note 4 (prior to step [12]) should be referred to ensure proper indications during loading of DG.

**[15] IMMEDIATELY LOAD D/G 1B-B to  $\geq 3.96$  and  $\leq 4.4$  MW ( $\geq 2.2$  MW if both units in modes 5 or 6) by performing the following:**

- [a] **PLACE [0-HS-82-43]**, DG 1B-B Speed Control Switch in **RAISE** and obtain  $\geq 3.96$  and  $\leq 4.4$  MW in  $\leq 60$  seconds on **[0-EI-82-40A]** DG 1B-B Megawatts.
- [b] **ADJUST [0-HS-82-42]**, DG 1B-B Voltage Regulator Switch to  $\geq 0.75$  and  $\leq 2.37$  MVARs Outgoing as indicated on **[0-EI-82-41A]** DG 1B-B Megavars.
- [c] **STOP** stopwatch.

**[16] RECORD** the following:

A. Loading time

\_\_\_\_\_.  
Seconds

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Date \_\_\_\_\_

**6.1 Ambient Start Performance (Continued)**

B. Load achieved [0-EI-82-40A]. \_\_\_\_\_  
MW

C. Time load achieved. \_\_\_\_\_  
Time

**ACCEPTANCE CRITERIA:** The D/G is synchronized, then loaded to  $\geq 3.96$  and  $\leq 4.4$  MW in less than or equal to 60 seconds.

**NOTE** Appendix B Table 1 Running Condition Checklist provides DG operating parameters and limits which must be monitored at all times when the DG is running. DG System Inspections (Table 2) may be performed at any point after DG full load is attained. DG Running Condition data (Table 1) should be taken approximately 45 minutes after DG full load is attained.

**[17] NOTIFY** Diesel Generator Building assigned AUO to **PERFORM** Appendix B, **AND**

**PROVIDE** D/G Building AUO time D/G achieved final load.  
(Step [16]) \_\_\_\_\_

**[18] MAINTAIN** load at predetermined test value for  $\geq 60$  minutes by adjusting [0-HS-82-43], DG 1B-B Speed Control Switch, as needed. \_\_\_\_\_

**[19] ENSURE** at-load time requirement met as follows:

**[a] RECORD** time test load achieved. \_\_\_\_\_  
Time

**[b] RECORD** finish time. \_\_\_\_\_  
Time

**[c] SUBTRACT** [a] from [b] **AND**

**RECORD** results. \_\_\_\_\_   
Min

**ACCEPTANCE CRITERIA:** D/G 1B-B operated with a load of  $\geq 3.96$  and  $\leq 4.4$  MW for  $\geq 60$  minutes. Load requirement may be reduced to  $\geq 2.2$  MW with both units in mode 5 or 6.

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Date \_\_\_\_\_

**6.1 Ambient Start Performance (Continued)**

[20] **ENSURE** Appendix B complete before continuing.

**CAUTION**      **Overshooting load drop will result in a reverse power condition.**

**NOTE**            Adjustment of Mvars may be performed simultaneously with DG unloading to ensure Mvars are maintained within limits.

[21] **UNLOAD** D/G 1B-B via **[0-HS-82-43]**, DG 1B-B Speed Control Switch, to  $\leq 0.5$  MW while observing **[0-EI-82-40A]**, DG 1B-B Megawatts.

[22] **REDUCE** reactive load to near zero via **[0-HS-82-42]**, DG 1B-B Voltage Regulator Switch.

[23] **IF** 1-SI-TFT-082-102.B, Functional Test of D/G 1B-B Protective Relays, is to be performed, **THEN**

**COORDINATE** with TPS personnel **AND**

**PERFORM** 1-SI-TFT-082-102.B. \_\_\_\_\_

[24] **OPEN** breaker **[1914]**, D/G 1B-B to SD BD 1B-B breaker. \_\_\_\_\_

[25] **ENSURE** D/G voltage is  $\geq 6800$  and  $\leq 7260$  volts on **[0-EI-82-34]**, **AND**

**ENSURE** D/G frequency is  $\geq 58.8$  and  $\leq 61.2$  Hz on **[0-XI-82-32]**.

**NOTE**            The D/G will accelerate toward rated speed for 2 seconds upon initiation of the following step before decelerating back to idle speed.

[26] **PLACE** **[0-HS-82-44]**, D/G 1B-B Control Start-Stop Switch in **STOP** position momentarily. \_\_\_\_\_

[27] **PLACE** **[0-HS-82-48]**, D/G 1B-B Mode Selector Switch in the **UNIT** position. \_\_\_\_\_

[28] **NOTIFY** AUO assigned to DG to obtain engine crankcase oil levels at idle speed condition per Appendix B. \_\_\_\_\_

[29] **PLACE** **[1-HS-57-74]**, Synchronize Switch in the **OFF** position. \_\_\_\_\_

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**6.1 Ambient Start Performance (Continued)**

[30] **NOTIFY** Radiochemical Laboratory of need to sample engine-mounted fuel tanks (day tanks) for condensate in accordance with Technical Standard 04.06.07.14.03 and TS SR 4.8.1.1.2.b.

**NOTE** Steps [31], [32] and [33] need to be verified after 1B-B D/G is no longer running.

[31] **VERIFY** [0-LI-18-61/2]  $\geq$  250 gals, Diesel Generator Day Tank 1 Level (local on tank).

\_\_\_\_\_ Gals

[32] **VERIFY** [0-LI-18-76/2]  $\geq$  250 gals, Diesel Generator Day Tank 1 Level (local on tank).

\_\_\_\_\_ Gals

[33] **ENSURE** [0-LI-18-40]  $\geq$  4.7 ft level of fuel oil in 7-Day Tank (local at west end of D/G).

\_\_\_\_\_ Ft

[34] **PERFORM** Appendix I, Verification of Diesel Generator Return to Standby Readiness.

[35] **ENSURE** the following **RECORDED** in 0-SI-OPS-082-007.M:

- A. D/G start.
- B. Method used.
- C. Date of ambient start and due date for next required ambient start.
- D. Return-to-service time, if test method caused inoperability of D/G (NA otherwise).

**ACCEPTANCE CRITERIA:** Each step [21] through [34] was completed satisfactorily and the D/G response was as prescribed.

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Date \_\_\_\_\_

**6.2 Non-Ambient Performance**

**NOTE**            Deviation from the scheduled start method or start type may result in exceeding a surveillance interval requirement of either 124 or 184 days respectively. SRO approval is required for deviation from schedule.

- [1] **DISPATCH** an AUO to D/G building for duration of test. \_\_\_\_\_
- [2] **DIRECT** D/G building AUO to perform Appendix A, D/G Pre-Run Condition Checkout. \_\_\_\_\_
- [3] **IF** breaker **[1934]** is installed in its Shutdown Board compartment, **THEN**  
  
**ENSURE** breaker **[1934]** is in the **DISCONNECT** position. \_\_\_\_\_
- [4] **ENSURE** Appendix A completed with all parameters within acceptable ranges. \_\_\_\_\_

**CAUTION**        **If performing this instruction for a PMT AND to fulfill periodic testing requirements, the required periodic start method must be used.**

**NOTE**            Steps **[5]**, **[6]** and **[7]** choose the start method and direct the performer to the appropriate appendix.

- [5] **IF** any of the following conditions exist:
  - A. Calendar date is January, March, May, July, September, or November,
  - B. Performance is a Post-Maintenance-Test (PMT) only,
  - C. Performance is for increased frequency requirement,
  - D. Calendar date is February, April, June, August, October, or December, **and** this is NOT the first performance of the month, **THEN**  
  
**PERFORM** Appendix F, Non-Ambient Manual Start Method. **[C.3]** (Refer to current 0-SI-OPS-082-007.M for last performance date.) \_\_\_\_\_

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Date \_\_\_\_\_

**6.2 Non-Ambient Performance (Continued)**

[6] IF the calendar date is February, June, October, and this is the first performance during the month, THEN

PERFORM Appendix G, Non-Ambient Simulated Loss of Offsite Power Start Method. [C.3] (Refer to current 0-SI-OPS-082-007.M for last performance date.) \_\_\_\_\_

[7] IF the calendar date is April, August, December, and this is the first performance during the month, THEN

PERFORM Appendix H, Non-Ambient SI Actuation Test Signal Start Method. [C.3] (Refer to current 0-SI-OPS-082-007.M for last performance date.) \_\_\_\_\_

[8] PERFORM the following to wipe the Automatic Voltage Control Rheostat:

[a] RECORD voltage from [0-EI-82-34]. \_\_\_\_\_

[b] ENSURE [0-HS-82-42], DG 1A-A Voltage Regulator Switch in the PULL-P-AUTO position. \_\_\_\_\_

[c] DECREASE voltage to 6700 volts on [0-EI-82-34] USING [0-HS-82-42]. \_\_\_\_\_

[d] INCREASE voltage to 7300 volts on [0-EI-82-34] USING [0-HS-82-42]. \_\_\_\_\_

[e] RETURN voltage to value recorded in [8][a]. \_\_\_\_\_

[9] PLACE [0-HS-82-48], DG 1B-B Mode Selector Switch, in the PARALLEL position. \_\_\_\_\_

[10] ADJUST [0-HS-82-43], DG 1B-B Speed control Switch to obtain a synchroscope indication of slowly rotating in the [FAST] direction. \_\_\_\_\_

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Date \_\_\_\_\_

**6.2 Non-Ambient Performance (Continued)**

**NOTE 1** During steps [13] through [19] the Load vs. VAR limits of Attachment 1 must be observed when loading the Diesel Generator. The load requirement of 3.96 MW to 4.4 MW may be reduced to  $\geq 2.2$  MW if both units are in MODE 5 and/or 6.

**NOTE 2** When closing the Diesel Generator Output Breaker at the 12 o'clock position consideration should be given to the speed of rotation of the synchroscope needle and the response time it takes to close the breaker.

**NOTE 3** The following table provides an approximation of expected values at various DG loading plateaus. These values shall be monitored to provide alternative M-26 indications thus ensuring proper diesel generator loading. The values given are calculated approximations and may vary due to system variables. (e.g. If amps are 370 and Mvar have been adjusted to 2.0 Mvar then MW should be approx 4.0.)

MW (0-EI-82-40A)	Mv (0-EI-82-41A)	Amps (0-EI-82-39B)
0.5 MW	0.5 Mvar	60 Amps
1.0 MW	0.75 Mvar	100 Amps
2.0 MW	1.0 Mvar	185 Amps
3.0 MW	1.0 Mvar	260 Amps
4.0 MW	1.5 Mvar	350 Amps
4.0 MW	2.0 Mvar	370 Amps
4.2 MW	1.5 Mvar	370 Amps
4.2 MW	2.0 Mvar	385 Amps
4.4 MW	1.5 Mvar	385 Amps
4.4 MW	2.0 Mvar	400 Amps
4.8 MW*	1.5 Mvar	415 Amps
4.8 MW*	2.0 Mvar	430 Amps

\* 2 Hr rating limitations apply

**NOTE 4** CSST A LTC X, Tap Position Indication on 0-ECB-5 should be observed prior to and during paralleling to the 6.9 kv Shutdown Board. Tap changer operation during this time can cause a D/G voltage change.

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Date \_\_\_\_\_

**6.2 Non-Ambient Performance (Continued)**

[11] **ENSURE** [0-HS-82-42], DG 1B-B Voltage Regulator Switch in the **PULL-P-AUTO** position, **AND**

**ADJUST** to match incoming voltage with running voltage. \_\_\_\_\_

**\*\*\*\*\*CRITICAL STEP\*\*\*\*\***

[12] **WHEN** the Synchroscope DG 1B-B [0-XI-82-31] indicates 12 O'Clock position, **THEN** **CLOSE** breaker [1914] via [1-HS-57-73A], 1914 DG 1B-B to SD BD 1B-B. \_\_\_\_\_

**CAUTION** Care must be taken to not exceed 4.84 MW (2-hour rating).

**NOTE** Adjustment of Mvars may be performed simultaneously with DG loading to ensure MVARs are maintained within limits.

[13] **LOAD** D/G 1B-B to 1.0 MW by performing the following:

[a] **PLACE** [0-HS-82-43], DG Speed Control Switch in **RAISE** position and obtain 1.0 MW on [0-EI-82-40A], DG Megawatts.

[b] **ADJUST** [0-HS-82-42], DG Voltage Regulator Switch to obtain .75 MVARS Outgoing, as indicated on [0-EI-82-41A], DG Megavars.

[c] **RECORD** time 1.0 MW achieved: \_\_\_\_\_   
Time

[d] **ENSURE** DG indications (MW, Mvars and Amps) match the expected indications of Table in NOTE 3.

[e] **IF** DG indications not as expected **THEN NOTIFY US.**

[14] **MAINTAIN** 1.0MW for 5 minutes, **THEN**

**INCREASE** load to 2.2 MW as in [13] above. \_\_\_\_\_

[15] **RECORD** time 2.2 MW achieved \_\_\_\_\_   
Time

[16] **IF** 3.96 to 4.4 MW test load required and 5 minutes have elapsed, **THEN**

**INCREASE** load between 3.96 and 4.4 MW as in step [13]. \_\_\_\_\_

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**6.2 Non-Ambient Performance (Continued)**

[17] **RECORD** the following:

A. Final load \_\_\_\_\_ **[0-EI-82-40A]**.  
MW

B. Time final load achieved \_\_\_\_\_  
Time

**NOTE**

Appendix B Table 1 Running Condition Checklist provides DG operating parameters and limits which must be monitored when the DG is running. DG System Inspections (Table 2) may be performed at any point after DG full load is attained. DG Running Condition data (Table 1) should be taken approximately 45 minutes after DG full load is attained.

[18] **NOTIFY** Diesel Generator Building assigned AUO to perform Appendix B, **AND** **PROVIDE** D/G Building AUO time D/G achieved final load. (Step [17]) \_\_\_\_\_

[19] **MAINTAIN** load at predetermined test value for  $\geq 60$  minutes by adjusting **[0-HS-82-43]**, DG 1B-B Speed Control Switch as needed. \_\_\_\_\_

[20] **ENSURE** at-load time requirement met as follows:

[a] **RECORD** time test load achieved. \_\_\_\_\_  
Time

[b] **RECORD** finish time. . \_\_\_\_\_  
Time

[c] **SUBTRACT** [a] from [b] **AND**

[d] **RECORD** results. . \_\_\_\_\_  
Min



**ACCEPTANCE CRITERIA:**

D/G 1B-B operated with a load of  $\geq 3.96$  and  $\leq 4.4$  MW for  $\geq 60$  minutes. Load requirement may be reduced to  $\geq 2.2$  MW with both units in mode 5 or 6.

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**6.2 Non-Ambient Performance (Continued)**

[21] **ENSURE** Appendix B complete before continuing.

**CAUTION**      **Overshooting load drop will result in a reverse power condition.**

**NOTE**            Adjustment of Mvars may be performed simultaneously with DG unloading to ensure MVARs are maintained within limits.

[22] **UNLOAD** D/G 1B-B via **[0-HS-82-43]**, DG 1B-B Speed Control Switch, to  $\leq 0.5$  MW while observing **[0-EI-82-40A]**, DG 1B-B Megawatts. \_\_\_\_\_

[23] **REDUCE** reactive load to near zero via **[0-HS-82-42]**, DG 1B-B Voltage Regulator Switch. \_\_\_\_\_

[24] **IF** 1-SI-TFT-082-102.B, Functional Test of D/G 1B-B Protective Relays, is to be performed, **THEN**  
**COORDINATE** with TPS personnel **AND**  
**PERFORM** 1-SI-TFT-082-102.B. \_\_\_\_\_

[25] **OPEN** breaker **[1914]**, D/G 1B-B to SD BD 1B-B breaker. \_\_\_\_\_

[26] **ENSURE** D/G voltage is  $\geq 6800$  and  $\leq 7260$  volts on **[0-EI-82-34]**, **AND**   
**ENSURE** D/G frequency is  $\geq 58.8$  and  $\leq 61.2$  Hz on **[0-XI-82-32]**.

**NOTE**            The D/G will operate at rated speed for 2 seconds upon initiation of the following step before decelerating back to idle speed.

[27] **PLACE** **[0-HS-82-44]**, D/G 1B-B Control Start-Stop Switch in the **STOP** position momentarily. \_\_\_\_\_

[28] **NOTIFY** AUO assigned to DG to obtain engine crankcase levels at idle condition per Appendix B. \_\_\_\_\_

[29] **PLACE** **[0-HS-82-48]**, D/G 1B-B Mode Selector Switch in the **UNIT** position. \_\_\_\_\_

[30] **PLACE** **[1-HS-57-74]**, Synchronize Switch in the **OFF** position. \_\_\_\_\_

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**6.2 Non-Ambient Performance (Continued)**

**[31] NOTIFY** Radiochemical Laboratory of need to sample engine-mounted fuel tanks (day tanks) for condensate in accordance with Technical Standard 04.06.07.14.03 and TS SR 4.8.1.1.2.b. \_\_\_\_\_

**NOTE** Steps **[32]**, **[33]** and **[34]** need to be verified after 1B-B D/G is no longer running.

**[32] VERIFY [0-LI-18-61/2] ≥ 250 gals, Diesel Generator Day Tank 1 Level (local on tank).** \_\_\_\_\_  
Gals

**[33] VERIFY [0-LI-18-76/2] ≥ 250 gals, Diesel Generator Day Tank 2 Level (local on tank).** \_\_\_\_\_  
Gals

**[34] ENSURE [0-LI-18-40] ≥ 4.7 ft level of fuel oil in 7-Day Tank (local at west end of D/G).** \_\_\_\_\_  
Ft

**[35] PERFORM** Appendix I, Verification of Diesel Generator Return to Standby Readiness. \_\_\_\_\_

**[36] ENSURE** the following **RECORDED** in 0-SI-OPS-082-007.M:

- A. D/G start.
- B. Method used.
- C. Date of ambient start and due date for next required ambient start.
- D. Return-to-service time, if test method caused inoperability of D/G (NA otherwise).

**ACCEPTANCE CRITERIA:**

Each step **[22]** through **[35]** was completed satisfactorily and the D/G response was as prescribed.

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**7.0 POST PERFORMANCE ACTIVITIES**

[1] **IF DG-DAQ** computer was installed for timing DG voltage and frequency, **THEN**

**ENSURE** 0-MI-EDG-082-001.0, *Installation and Removal of the D/G Data Acquisition (DAQ) System*, included with package.

\_\_\_\_\_

[2] **DELIVER** SI package to Unit SRO for review and approval.

\_\_\_\_\_

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**APPENDIX A**

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**1B-B DIESEL GENERATOR PRE-RUN CONDITION CHECKOUT**

**NOTE** This Appendix is to be performed just prior to running the diesel generator for operability test. The D/G should already be in Standby Mode in accordance with 0-SO-82-2 and prestart manual rolling completed as required

**TABLE 1**

NO.	PARAMETER OBSERVED	LIMITS	INSTR UNID	UNITS	Readings	
					1B1	1B2
1	Engine Circulating Lube Oil Pressure [C.1] (on control panel)	≥ 5 psig	0-PI-82-5016/2 0-PI-82-5015/2	psig	_____psig	_____psig
2	Engine Lube Oil Crankcase Level, Dip Stick	> Low < Full	Dipstick	√	<input type="checkbox"/>	<input type="checkbox"/>
3	Overvoltage Alarm	Not Illuminated (NOTE 4)	D/G 1B-B Local Pnl Light BB-1	√	<input type="checkbox"/>	
4	Engine Jacket Water Temperature	> 100° F < 125°F (NOTE 3)	0-TI-82-5006/2 0-TI-82-5003/2	°F	_____°F	_____°F
5	Engine Lube Oil Temperature	> 80°F, <125°F (NOTE 3)	0-TI-82-5010/2 0-TI-82-5008/2	°F	_____°F	_____°F
6	Engine Cooling Water Expansion Tank Level	> Min Shutdown ≤ Max Shutdown	0-LI-82-5004/2 0-LI-82-5001/2	√	<input type="checkbox"/>	<input type="checkbox"/>
7	Engine Woodward Governor Oil Level	NOTE 1	N/A	√	<input type="checkbox"/>	<input type="checkbox"/>
8	Engine Circulating Lube Oil Pressure to Turbocharger [C.1]	≥ 10 psig	0-PI-82-346 0-PI-82-347	psig	_____psig	_____psig
9	Generator Bearing Oil Levels	NOTE 2	NA	√	<input type="checkbox"/>	<input type="checkbox"/>
10	Engine Day Tank Fuel Oil Level	≥ 250 gal	0-LI-18-61/2 0-LI-18-76/2	gals	_____gals	_____gals
<b>Performers Initials</b>					_____	

NOTE 1 Single line style sight glasses: Oil level above indicator line. Two line style sight glasses: Oil level above lower indicator line.

NOTE 2 Any observable oil level present in sightglass. √ indicates oil level is acceptable

NOTE 3 Limits for Non-Ambient performance are identified in Appendix A Table 2 Step [4].

NOTE 4 IF light illuminated, **RESET** 59 relay by pushing up on target reset rod (bottom left corner of 59 relay)

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**APPENDIX A**  
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**TABLE 1 (Continued)**

NO.	PARAMETER OBSERVED	LIMITS	INSTR UNID	UNITS	Readings	
					1B1	1B2
11	7-Day Fuel Oil Tank Level	≥ 4.7 Ft	0-LI-18-40	Ft	_____ ft	_____ ft
12	Air Intake Oil Bath (muffler and exhaust room)	NOTE 2	NA	√	<input type="checkbox"/>	<input type="checkbox"/>
<b>Performers Initials</b>					_____	

NOTE 2 Any observable oil level present in sightglass. √ indicates oil level is acceptable

<b>START AIR SYSTEM CHECKS</b>						
13	Engine 1B1(A) Starting Air Receiver Pressure	≥ 250 psig	0-PI-82-190	psig	_____ psig	
14	Engine 1B1(B) Starting Air Receiver Pressure	≥ 182.5 psig ≤ 200 psig <sup>(1)</sup>	0-PI-82-200	psig	_____ psig	
15	Engine 1B2(A) Starting Air Receiver Pressure	≥ 250 psig	0-PI-82-191	psig	_____ psig	
16	Engine 1B2(B) Starting Air Receiver Pressure	≥ 182.5 psig ≤ 200 psig <sup>(1)</sup>	0-PI-82-201	psig	_____ psig	
<b>Performers Initials</b>						_____

<sup>(1)</sup> IF pressure less than 182.5 psig, **THEN INITIATE** WO to connect M&TE gauge to verify actual pressure is >150 psig. IF pressure greater than 200 psig, **THEN REQUEST** maintenance to determine whether the associated PCV or the indicator is out of calibration and recalibrate as appropriate.

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**APPENDIX A**

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**TABLE 2**

**[1] CONTACT UO to DETERMINE** start method for the D/G:

AMBIENT

NON-AMBIENT

**[2] IF** start method is Non-Ambient, **THEN**

**CHECK** DG Engine Priming pump by performing the following:

**[a] DEPRESS AND HOLD [HS-82-59]** Fuel Priming Pump to start both priming pumps.

**[b] VERIFY** Fuel Oil pressure increases to  $\geq 20$  psig on 0-PI-18-69/2 or 0-PI-18-84/2, **AND**

**RECORD** Maximum Output Pressure achieved:  
0-PI-18-69/2 \_\_\_\_\_ 0-PI-18-84/2 \_\_\_\_\_

**[c] RELEASE [HS-82-59]** DG Priming Pumps

**ACCEPTANCE CRITERIA:** Fuel Oil Priming Pumps start and pressure increases to  $\geq 20$  psig.

**[3] CHECK** Starting Air Compressors and Receivers by performing the following:

**NOTE** Air compressor oil levels must be taken when air compressor is not running.

**[a] IF** start method is Non-Ambient, **THEN**

1. **STOP** Air Compressors by placing handswitches to **OFF** position.

Handswitch	Component	Position	√
HS-82-210	Air Compressor No. 1	OFF	<input type="checkbox"/>
HS-82-211	Air Compressor No. 2	OFF	<input type="checkbox"/>

2. **CHECK** Air Compressor Oil Levels:

Engine No. 1 compressor oil level between low and full on dipstick

Engine No. 2 compressor oil level between low and full on dipstick

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**TABLE 2**

**NOTE**

Substeps [3] through [5] may be performed on one compressor at a time if desired.

**3. START** Air Compressors by placing handswitches to **MANUAL** position:

Handswitch	Component	Position	√
HS-82-210	Air Compressor No. 1	MANUAL	<input type="checkbox"/>
HS-82-211	Air Compressor No. 2	MANUAL	<input type="checkbox"/>

**4. CHECK** Air Compressor Oil pressure:

Engine No. 1 compressor oil pressure on  
1-PI-82-210/1B1 ≥ 20 psig

Engine No. 2 compressor oil pressure on  
1-PI-82-211/1B2 ≥ 20 psig

**5. PLACE** Air Compressors in **AUTO**:

Handswitch	Component	Position	Initial	IV
HS-82-210	Air Compressor No. 1	AUTO		
HS-82-211	Air Compressor No. 2	AUTO		

**[b] INSPECT** Starting Air system for leaks/degradation to ensure no detrimental leaks present. (SNOOP may be utilized in performing inspection)

**[c] BLOWDOWN** Air Receiver Tanks and Air Compressor unloader sensing line for both engines until free of excessive water utilizing the following valves:

ENGINE 1B1	√	ENGINE 1B2	√
0-82-510-1B1	<input type="checkbox"/>	0-82-536-1B2	<input type="checkbox"/>
0-82-509-1B1	<input type="checkbox"/>	0-82-537-1B2	<input type="checkbox"/>
0-82-557-1B1	<input type="checkbox"/>	0-82-557-1B2	<input type="checkbox"/>

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**TABLE 2**

**[4] ENSURE** the Acceptance Criteria conditions listed below are met for the applicable method of DG start.

AMBIENT START PERFORMANCE All parameters in Table 1 are within prescribed limits

**OR**

NON-AMBIENT START PERFORMANCE All parameters in Table 1 are within prescribed limits except as follows:

Check 3: Jacket water temperature maximum may be as high as 175°F on prescribed indicators.

Check 4: Oil temperature maximum may be as high as 195°F on prescribed indicators.

**[5] ENSURE** the following have been performed prior to start of DG:

**CAUTION** Care should be used when changing lamps on the diesel generator local control panel. A short circuit in a lamp socket has the potential for rendering the diesel generator inoperable.

**[a] PERFORM LAMP TEST** on D/G local control panel  
**AND**

**REPLACE** any burned out lamps.

**[b] IF [0-TR-82-5036/2A]** 1B-B Generator Stator Winding Temperature Recorder is operable, **THEN**

**ENSURE** recorder is **IN SERVICE**. **[C.4]**

**[c] IF [0-TR-82-5036/2B]** 1B-B Generator Bearing Temperature Recorder is operable, **THEN**

**ENSURE** recorder is **IN SERVICE**. **[C.4]**

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**TABLE 2**

**[d] IF [0-TR-82-5036/2A] or [0-TR-82-5036/2B]**

Stator Winding or Generator Bearing RTD  
Temp Recorder is NOT operable, **THEN**

**[1] ENSURE** MIG installs M&TE to provide means to monitor temperatures for 1B-B D/G. \_\_\_\_\_

**[2] CONTINUOUSLY MONITOR** bearing and stator temperatures. \_\_\_\_\_

**[3] REPORT** to the MCR if any bearing temperatures exceed 80°C or stator temperatures exceed 125°C. \_\_\_\_\_

**NOTE** — If dial settings in step [6] are not correct, Systems Engineering should be contacted for evaluation. Operators should not adjust dial settings.

**[6] VERIFY** correct Woodward governor dial settings for the following:

Parameter	ENGINE 1B1	√	ENGINE 1B2	√
Speed	18.89-19.39	<input type="checkbox"/>	19.83-20.33	<input type="checkbox"/>
Load Limit	2 Increments before Max Fuel	<input type="checkbox"/>	2 Increments before Max Fuel	<input type="checkbox"/>

**[7] RECORD** Woodward Governor Speed Droop Dial Settings for both engines:

Engine 1B1 \_\_\_\_\_ Engine 1B2 \_\_\_\_\_

**[8] NOTIFY** Unit operator that checkout is complete. \_\_\_\_\_

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**1B-B DIESEL GENERATOR RUNNING CONDITION CHECKLIST**

- NOTE 1** The operating parameters listed in this table must be monitored anytime the DG is running. Data is obtained approximately 45 minutes after DG 3.96 MW.  
If both units are in MODE 5 and/or MODE 6 test load may be reduced to  $\geq 2.2$  MW.
- NOTE 2** Any parameter exceeding its prescribed normal operating limit should be reported to the UO and US as soon as possible. Engineering should be notified if parameter exceeds operating limit.
- NOTE 3** Exceeding a shutdown parameter may cause extensive damage to the D/G. If any parameter exceeds its shutdown limit it should be immediately reported to the Unit Control Room and the D/G should be shutdown immediately. Notify Engineering for assistance.
- NOTE 4** Inspections of DG subsystems for leaks and component degradation (Table 2) may be recorded at any time after the DG attains a full loaded condition.

Time of Full Load Conditions _____				TABLE 1		READINGS (~45 mins after full load attained)	
PARAMETER OBSERVED	NORMAL RANGE	OPERABLE LIMIT	SHUTDOWN LIMIT	UNID <u>1B1</u> 1B2	UNITS	1B1	1B2
Lube Oil Pressure (on control panel)	60-95 psig	> 40 < 120	$\leq 20$	0-PI-82-5016/2 0-PI-82-5015/2	psig		
Fuel Oil Pressure (on control panel))	~40 psig	> 20 < 70	$\leq 15$	0-PI-18-69/2 0-PI-18-84/2	psig		
Lube Oil Temperature from Engine	175°-225°F	> 170 < 230	$\geq 250$	0-TI-82-5009/2 0-TI-82-5007/2	°F		
Jacket Water Temperature to Engine	150° - 175°F	> 145 < 180	N/A	0-TI-82-5006/2 0-TI-82-5003/2	°F		
Jacket Water Temperature from Engine	160° - 185°F	> 155 < 190	> 205	0-TI-82-5004/2 0-TI-82-5001/2	°F		
Fuel Rack Actuator Position	.62-1.96	NA	NA	NA	Enter Numerical data		
<u>Performers initials</u>							

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TABLE 1(Cont.)

PARAMETER OBSERVED	NORMAL RANGE	OPERABLE LIMIT	SHUTDOWN LIMIT	UNID 1B1 1B2	UNITS	READINGS (45 mins after full load attained)	
						1B1	1B2
Lube Oil Temperature to Engine	155° - 195°F	> 150 < 200	N/A	0-TI-82-5010/2 0-TI-82-5008/2	°F		
Water Jacket Temperature to Cooler	N/A	N/A	N/A	0-TI-82-5005/2 0-TI-82-5002/2	°F		
Jacket Water Expansion Tank Level	Between High & Lo Run Marks	> Low < High	N/A	0-LI-82-5004/2 0-LI-82-5001/2	(√)		
Day Tank Fuel Level	~300 to ~500 Gals	≥ 250	N/A	0-LI-18-61/2 0-LI-18-76/2	Gal		
Heat Exchanger ERCW Flow	~650 gpm – ~1320 gpm	≥ 350 gpm	N/A	1-FI-67-74 1-FI-67-280	gpm		

IDLE RUN DATA						READINGS	
Lube Oil Crankcase Oil Level @ idle speed	Note 1	NA	NA	dipstick	(√)		
<u>Performers initials</u>							

Note 1 Oil level to be obtained during idle condition after running at full loaded conditions. If level is @ 4" mark or lower THEN initiate WO to add oil.

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**TABLE 1(Cont.)**

**NOTE** DG Running Condition data (Table 1) should be taken approximately 45 minutes after DG full load is attained.

[1] **LOG** Current MW Load from **[0-EI-82-40A]** immediately prior to taking readings. \_\_\_\_\_ MW \_\_\_\_\_

[2] **LOG** current Voltage Regulator Control Current (Located inside Panel 1) immediately prior to taking readings. \_\_\_\_\_ Amps \_\_\_\_\_

<b>DIESEL GENERATOR EXHAUST TEMPERATURES</b>						
Parameter Observed	Normal Range	Oper Limit	SD Limit	UNID	Readings	
					Engine 1B1	Engine 1B2
Engine Cylinder Temperatures	850°F-1050°F	< 1100°F	> 1300°F	0-TI-82-5011/2		
<b>NOTE</b> An indication of $\geq 1500^{\circ}\text{F}$ is indicative of an open TC circuit.				TC #1		
				TC #2		
				TC #3		
				TC #4		
				TC #5		
				TC #6		
				TC #7		
				TC #8		
				TC #9		
				TC #10		
				TC #11		
				TC #12		
				TC #13		
				TC #14		
			TC #15			
			TC #16			
Engine Exhaust Temperature	800°F-1000°F	< 1050°F	> 1200°F	0-TI-82-5011/2		
				TC #17		

**Instructions for Inoperable Engine Cylinder Temperatures:**

**IF** an Inoperable TC exists **THEN**

(1) Obtain surface temp measuring device from MTE (i.e. contact or infra-red type pyrometer). \_\_\_\_\_

**NOTE** When taking manual temperatures for comparison, the exhaust manifold surface temperature must be taken near the TC boss to attempt to avoid influences from irregular surface conditions.

(2) Obtain surface temperature of the cylinder with failed TC and record temperature in parenthesis in "readings" blank \_\_\_\_\_

(3) Obtain surface temperature of a cylinder adjacent or as near as possible to the cylinder with failed TC and record temperature in parenthesis in the "readings" blank. (This blank should contain both good TC reading and surface reading) \_\_\_\_\_

(4) **IF** surface readings are comparable **THEN** cylinder with inop TC may be considered to be within normal range. \_\_\_\_\_

**IF** cylinder with inop TC is  $\geq 200^{\circ}\text{F}$  higher **THEN** consider cylinder temperature as exceeding SD limit. \_\_\_\_\_

(5) **IF** TC 17 is inoperable **THEN** a contact or infrared pyrometer should be used to obtain the surface temperature at the inlet of both turbochargers in close proximity to the TC connection nipple. Compare the two temperatures to ensure balanced engine loading. The difference should be no more than 100°F. \_\_\_\_\_

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**TABLE 1(Cont.)**

<b>DIESEL GENERATOR STATOR TEMPERATURES</b>					
Parameter Observed	Normal Range	Oper Limit	SD Limit	UNID	Readings
Stator Temperatures	NA	NA	> 145°C	0-TR-82-5036/2A	
A phase				Pt #1 (Red)	
A phase				Pt #2 (Green)	
B phase				Pt #3 (Blue)	
B phase				Pt #4 (Violet)	
C phase				Pt #5 (Orange)	
C phase				Pt #6 (Cyan)	
<b>DIESEL GENERATOR BEARING TEMPERATURES</b>					
Bearing Temperatures	NA	< 80°C	> 90°C	0-TR-82-5036/2B	
Bearing No. 1				Pt #1 (Red)	
Bearing No. 1				Pt #2 (Green)	
Bearing No. 1				Pt #3 (Blue)	
Bearing No. 2				Pt #4 (Violet)	
Bearing No. 2				Pt #5 (Orange)	
Bearing No. 2				Pt #6 (Cyan)	
<b>Performers Initials</b>					

Acceptance Criteria: All data within minimum/maximum limit(s) as specified on this table.

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**TABLE 2**  
**System Inspections During DG Run**

**NOTE** This table may be performed at any time after the DG attains a full loaded condition.

[1] **ENSURE** Vibration data COLLECTED for DG bearing (to be provided to Predictive Maintenance Section) \_\_\_\_\_

[2] **CHECK** Fuel Oil Transfer Pumps by performing the following:

[a] **RECORD** Engine Day Tank Levels Engine 1B1 \_\_\_\_\_  
gals

Engine 1B2 \_\_\_\_\_  
gals

[b] **START** Fuel Transfer Pump #1 from D/G local control panel with **[HS-18-55/2]** **AND**

**VERIFY** level increase in Engine Day Tanks. Day Tank 1B1

Day Tank 1B2

[c] **ENSURE** **[HS-18-55/2]** is in **AUTO** position. \_\_\_\_\_ / \_\_\_\_\_  
1st IV

[d] **START** Fuel Transfer Pump #2 from D/G local control panel with **[HS-18-54/2]** **AND**

**VERIFY** level increase in Engine Day Tanks. Day Tank 1B1

Day Tank 1B2

[e] **ENSURE** **[HS-18-54/2]** is in **AUTO** position. \_\_\_\_\_ / \_\_\_\_\_  
1st IV

**ACCEPTANCE CRITERIA** Fuel Transfer Pump starts, transferring oil from the 7-day Tank **AND** both Engine Day Tank levels increase with DG operating at full loaded condition.

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**TABLE 2(Cont.)  
System Inspections During DG Run**

**[3] CHECK** Airbox vent path not obstructed by verifying that air flow is present downstream of the following valves: (check at drain trough for airflow or if drain is not observable then check if downstream piping is hot to touch. A √ indicates airflow observed or piping is hot thus indicating airflow.)

<b>ENGINE 1B1</b>	√	<b>ENGINE 1B2</b>	√
1-DRV-82-1B1*	<input type="checkbox"/>	1-DRV-82-1B2*	<input type="checkbox"/>

\*Valves are maintained open at all times.

**ACCEPTANCE CRITERIA:** Air flow present downstream of valves.

**[4] INSPECT** the following DG subsystems for significant leakage or signs of degradation. IF any signs of leakage or degradation **THEN** Initiate WR AND Notify US. (A √ indicates acceptable conditions)

System	Components	(√)
Engine Cooling System	Flexible couplings Temperature Regulating Valve Immersion Heaters, Engine water pumps and pump seals Water Expansion Tank, gauge glass and piping Water connections, valves and plugs on engine.	<input type="checkbox"/>
Fuel Oil System	Fuel Transfer pumps, piping connections, and pumps seals Filters Engine driven pump and piping Day tank connections Fuel transfer system and piping connections Priming Pumps and piping connections.	<input type="checkbox"/>
Lubricating Oil System	Filters and piping connections Circulating pump and strainer Connections to the lube oil cooler Turbocharger filter and oil lines	<input type="checkbox"/>
Air intake & Exhaust System	Air Intake and Exhaust System for leaks and degradation	<input type="checkbox"/>
Start air system	Start air system piping, components and connections	<input type="checkbox"/>
Cylinder leakage	Inspect for signs of packing leaks around cylinder test plugs. Feel for air leakage around plugs during operation of DG.	<input type="checkbox"/>
<b>Performers Initials</b>		_____

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**APPENDIX C**  
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**AMBIENT MANUAL START METHOD**

**NOTE** All steps in this Appendix refer to 1B-B Diesel Generator (D/G) and are performed from Main Control Room Panel 0-M-26B unless otherwise specifically noted.

[1] **ENSURE [0-HS-82-48]**, D/G 1B-B Mode Selector Switch in the **UNIT** position. \_\_\_\_\_

[2] **PLACE [1-HS-57-74]**, D/G 1B-B Synchronize Switch in the **SYN** position. \_\_\_\_\_

**NOTE 1** Close communication and coordination with field personnel is required to accomplish the following step. Parts [a], [b], and [c] are to be performed with the D/G-DAQ (if used) started just prior to the D/G start actuation,.

**NOTE 2** A stopwatch must be used as a backup to the D/G DAQ. If there is any timing discrepancy between the two, the DAQ should take precedence due to its superior accuracy.

**NOTE 3** If the D/G DAQ is not used, two stopwatches must be used to time the D/G start.

**NOTE 4** To ensure consistency and accuracy when timing DG starts the following guidelines are provided:

- 1 -Start stopwatch when emergency start handswitch is depressed (manual start).
- 2 -Monitor voltage until the meter indicates >6800 volts (voltage stabilizes before frequency).
- 3 -Monitor frequency until meter indicates >58.8 Hz  
STOP the watch.

[3] **PERFORM** the following to initiate the D/G start signal:

- [a] **IF** the D/G-DAQ is to be used, **THEN NOTIFY** D/G-DAQ Operator to **START** D/G-DAQ. \_\_\_\_\_

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- [b] **PROCEED** with the countdown: 3, 2, 1, **START**. \_\_\_\_\_
- [c] **DEPRESS** [0-HS-82-46A], DG 1B-B Emergency Start Switch, **AND** **START** stopwatch. \_\_\_\_\_
- [d] **WHEN** voltage > 6800 volts **AND** frequency > 58.8 Hz, **THEN** **STOP** stopwatch. \_\_\_\_\_

**\*\*\*\*\*CRITICAL STEP\*\*\*\*\***

- [4] **ENSURE** [1-FCV-67-67], ERCW cooling water supply valve is **OPEN**. \_\_\_\_\_
- [5] **RECORD** steady state values for following:
  - A. [0-EI-82-34], DG 1B-B Incoming Voltage \_\_\_\_\_  
Reading
  - B. [0-XI-82-32], DG 1B-B Incoming Frequency. \_\_\_\_\_  
Reading
  - C. Time from Stopwatch(es):
 

Seconds	Stopwatch ID Number	
Seconds	Stopwatch ID Number	

**ACCEPTANCE CRITERIA:** D/G 1B-B achieves steady state generator voltage of  $\geq 6800$  and  $\leq 7260$  volts and frequency of  $\geq 58.8$  Hz and  $\leq 61.2$  Hz.

**NOTE** Voltage Regulator Current Ammeter is in panel 1 of exciter cabinet.

- [6] **RECORD** Voltage Regulator Control Current \_\_\_\_\_  
Reading

**ACCEPTANCE CRITERIA:** Voltage Regulator Control Current between 1.0 - 2.5 dc amps. The Voltage regulator card must be functioning properly to consider DG operable.

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[7] **ENSURE** D/G 1B-B **[86LOR]** red light NOT ILLUMINATED, at  
D/G local relay panel. \_\_\_\_\_

**NOTE** Do not hold **[86LOR]** in RESET position if it does not latch on the first attempt. Coil failure may result if relay is held in RESET position.

[8] **RESET** **[86LOR]**, Lockout Relay, on D/G local relay panel. \_\_\_\_\_

[9] **VERIFY** **[86LOR]** is reset by amber light **[0-XI-82-49]**  
ILLUMINATED on 0-M-26B. \_\_\_\_\_

[10] **IF** the D/G-DAQ was used, **THEN**

**RECORD** the time required to achieve  $\geq 6800$  volts and  $\geq 58.8$   
Hz. from D/G-DAQ computer:

\_\_\_\_\_  
Seconds

\_\_\_\_\_  
DG-DAQ Operator

**ACCEPTANCE CRITERIA:** D/G 1B-B start from ambient condition achieves in less than or equal to 10 seconds generator voltage  $\geq 6800$  volts and  $\geq 58.8$  Hz.

[11] **RECORD** start as ambient in 0-SI-OPS-082-007.M. \_\_\_\_\_

[12] **RETURN** to Section 6.1 Step [9] of this Instruction.

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**AMBIENT SIMULATED LOSS OF OFFSITE POWER START METHOD**

**NOTE** All steps in this Appendix Refer to 1B-B Diesel Generator (D/G) and are performed from Main Control Room Panel 0-M-26B unless otherwise specifically noted.

[1] **ENSURE [0-HS-82-48]**, D/G 1B-B Mode Selector Switch is in the **UNIT** position. \_\_\_\_\_

[2] **PLACE [1-HS-57-74]**, D/G 1B-B Synchronize Switch in the **SYN** position. \_\_\_\_\_

[3] **REMOVE [CES1BY]** fuses in Auxiliary Relay Room rack 1-R-76, to prevent startup of other D/Gs:

A. 1-FU1-500-R076K21

B. 1-FU1-500-R076K22

\_\_\_\_\_

1st

\_\_\_\_\_

CV

[4] **VERIFY** the following:

A. NORMAL white light left of **[43T(L)]** is **NOT** illuminated.

B. TEST white light right of **[43T(L)]** is **NOT** illuminated.

C. ES1BY amber light by switch **[43DT]** is illuminated.

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**CAUTION**      **Placing 43MT(X) in TEST renders loss of voltage relays inoperable (TS LCO 3.3.3.11 and 3.8.1.1 or 3.8.1.2).**

**NOTE**            Handswitch **[43MT]** in the TEST position will prevent load shedding of the Shutdown Board. These handswitches are located in the 6.9kV SD Bd. Logic Panel 1B-B.

**[5] PLACE [43MT(X)]** master test switch in the TEST position **AND**

**VERIFY** adjoining UVX white lights (eleven) are illuminated.

**[6] PLACE [43MT(Y)]** master test switch in the TEST position **AND**

**VERIFY** adjoining UVY white lights (eleven) are illuminated.

**[7] IF** any of the eleven UVX or UVY white lights are **NOT** illuminated in steps **[5]** and **[6]**, **THEN**

**DO NOT** continue with this instruction until the Unit SRO has been notified, problem evaluated, and corrective actions completed.

\_\_\_\_\_  
Unit SRO

**[8] PERFORM** the following:

**[a] ENSURE** communications has been established between the control room operator at 0-M-26B, AUO at the DG, and operations personnel at the applicable Shutdown Board and DG-DAQ operator (if used).

**[b] NOTIFY** AUO at the DG Local Panel that the red light above **[86LOR]** at D/G local panel should illuminate during the simulated undervoltage condition (TEST pushbuttons are depressed) and when the TEST buttons on the undervoltage relays are released the red light above **[86LOR]** will **NOT** be illuminated.

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[c] **NOTIFY** operations personnel at the 6.9kV Shutdown Board that the undervoltage relays are located on the 6.9kV SD Bds., panel 7, and labeled as **[27TS1A]**, **[27TS1B]**, and **[27TS1C]**. A 2 out of 3 logic for undervoltage requires the undervoltage relay TEST pushbutton of 2 relays to be actuated together for greater than 1.25 seconds.

[9] **NOTIFY** Operations personnel to **REMOVE** covers from 27TS1A, 27TS1B, and 27TS1C relays.

[10] **ENSURE** all personnel involved with the performance of this instruction **REVIEW** step [11] prior initiating the simulated undervoltage condition.

**NOTE 1** Close communication and coordination with field personnel is required to accomplish the following step.

**NOTE 2** A stopwatch must be used as a backup to the D/G DAQ. If there is any timing discrepancy between the two, the DAQ should take precedence due to its superior accuracy.

**NOTE 3** If the D/G DAQ is not used, two stopwatches must be used to time the D/G start.

**NOTE 4** To ensure consistency and accuracy when timing DG starts the following guidelines are provided:

- 1 -Start stopwatch when amber light (Emergency Start lockout) goes out on O-M-26.
- 2 -Monitor voltage until the meter indicates >6800 volts (voltage stabilizes before frequency).
- 3 -Monitor frequency until meter indicates >58.8 Hz  
STOP the watch.

[11] **INITIATE** the simulated undervoltage condition by performing the following:

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**NOTE**

Operations personnel at the Shutdown Board will initiate the starting sequence.

[a] **IF** the D/G DAQ is to be used, **THEN**

**NOTIFY** DG-DAQ operator to START DG-DAQ.

[b] **PROCEED** with the countdown: 3, 2, 1, START.

[c] **WHEN** START is communicated by the personnel at the Shutdown Board, **THEN**

**NOTE**

The following four steps must be performed at the same time.

**6.9kV Shutdown Board 1B-B, Compartment 7**

1. **PRESS AND HOLD** TEST pushbuttons on any two of the three undervoltage relays **[27TS1A]**, **[27TS1B]**, and/or **[27TS1C]**.

**UNTIL** completion of step [12].

\_\_\_\_\_ 1st      \_\_\_\_\_ CV

**Diesel Generator Local Panel**

2. **VERIFY** red light above **[86LOR]** illuminated.

3. **START** stopwatch(es) per note [4]  
**STOP** stopwatch(es) per note [4], **AND**  
**RECORD** the following:

Time required to achieve  $\geq 58.8\text{Hz}$  and  $\geq 6800$  volts:

\_\_\_\_\_ Time (seconds)      \_\_\_\_\_ Time (seconds)

\_\_\_\_\_ Stopwatch ID      \_\_\_\_\_ Stopwatch ID      \_\_\_\_\_

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4. IF the D/G-DAQ was used, THEN,

**RECORD** the following from the DG-DAQ computer:

Time required to achieve  $\geq 58.8$  Hz and  
 $\geq 6800$  volts:

	_____	_____
	Seconds	DG-DAQ Operator
<b><u>ACCEPTANCE CRITERIA:</u></b>	D/G 1B-B start from ambient condition achieves in less than or equal to 10 seconds generator voltage $\geq 6800$ volts and $\geq 58.8$ Hz.	

**1B-B Shutdown Bd Logic Relay Panel**

[12] **VERIFY** the following:

- A. Red targets on undervoltage relays.
- B. All eight UVX amber lights go out.
- C. All eight UVY amber lights go out.
- D. ES1BY amber light goes out.

[13] **RELEASE** the TEST pushbuttons.

**Main Control Room 0-M-26B Panel**

\*\*\*\*\***CRITICAL STEP**\*\*\*\*\*

[14] **ENSURE** [1-FCV-67-67], ERCW cooling water supply valve is **OPEN**. \_\_\_\_\_

[15] **RECORD** the steady state values for the following:

A. [0-EI-82-34], DG 1B-B Incoming Voltage \_\_\_\_\_  
Reading

B. [0-XI-82-32], DG 1B-B Incoming Frequency. \_\_\_\_\_  
Reading

**ACCEPTANCE CRITERIA:** D/G 1B-B achieves steady state generator voltage of  $\geq 6800$  and  $\leq 7260$  volts and frequency of  $\geq 58.8$  and  $\leq 61.2$  Hz.

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**6.9kV Shutdown Board Area**

[16] **RESET** the targets on the undervoltage relays.

[17] **REPLACE** covers on undervoltage relays.

[18] **VERIFY** ES1BY amber light is illuminated.

[19] **VERIFY** UVX group test lights illuminated in 6.9kV SD Bd.  
Logic Panel 1B-B:

43TA	<input type="checkbox"/>	43TD	<input type="checkbox"/>	43TG	<input type="checkbox"/>
43TB	<input type="checkbox"/>	43TE	<input type="checkbox"/>	43TK	<input type="checkbox"/>
43TC	<input type="checkbox"/>	43TF	<input type="checkbox"/>		

[20] **PLACE** 43MT(X) master test switch in the **NORMAL** position  
**AND**

**VERIFY** adjoining UVX white lights (eleven) are **NOT**  
illuminated.

\_\_\_\_\_  
1st      CV

[21] **VERIFY** UVY group test lights illuminated in 6.9kV SD Bd.  
Logic Panel 1B-B:

43TA	<input type="checkbox"/>	43TD	<input type="checkbox"/>	43TG	<input type="checkbox"/>
43TB	<input type="checkbox"/>	43TE	<input type="checkbox"/>	43TK	<input type="checkbox"/>
43TC	<input type="checkbox"/>	43TF	<input type="checkbox"/>		

[22] **PLACE** 43MT(Y) master test switch in the **NORMAL**  
position **AND**

**VERIFY** adjoining UVY white lights (eleven) are **NOT**  
illuminated.

\_\_\_\_\_  
1st      CV

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**Diesel Generator Local Panel**

**NOTE** Voltage Regulator Current Ammeter is in panel 1 of exciter cabinet.

[23] **RECORD** Voltage Regulator Control Current \_\_\_\_\_  
Reading

**ACCEPTANCE CRITERIA:** Voltage Regulator Control Current between 1.0 - 2.5 dc amps. The voltage regulator card must be functioning properly to consider DG operable.

[24] **VERIFY** red light above **[86LOR]** is **NOT** illuminated.

**NOTE** Do not hold **[86LOR]** in reset position if it does not latch on the first attempt. Coil failure may result if relay is held in **RESET** position.

[25] **RESET** **[86LOR]**, Lockout Relay, on D/G local relay panel. \_\_\_\_\_

**Main Control Room 0-M-26B Panel**

[26] **VERIFY** applicable annunciators for the DG being tested are **RESET**.

[27] **REINSTALL** **[CES1BY]** fuses removed for test in Auxiliary Instrument Room, Rack 1-R-76 **AND**

A. 1-FU1-500-R076K21

B. 1-FU1-500-R076K22

\_\_\_\_\_  
1st CV

[28] **NOTIFY** Control Room operator when **[CES1BY]** fuses have been installed.

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**1B-B Shutdown Bd Logic Relay Panel**

[29] **VERIFY** the following:

- A. NORMAL white light left of **[43T(L)]** is illuminated.
- B. TEST white light right of **[43T(L)]** is **NOT** illuminated.
- C. ES1BY amber light by switch **[43DT]** is illuminated.

[30] **IF** all acceptance criteria have been met, **THEN**

**EVALUATE** exiting the LCO actions which were previously entered.

Unit 1 SRO	/	/	Date	/	Time
Unit 2 SRO	/	/	Date	/	Time

[31] **RECORD** start as Ambient Start in 0-SI-OPS-082-007.M. \_\_\_\_\_

[32] **RETURN TO** Section 6.1 Step [9]. \_\_\_\_\_

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**APPENDIX E**

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**AMBIENT SI ACTUATION TEST SIGNAL START METHOD**

**CAUTION** During the performance of this appendix, slave relay K609B will be energized, resulting in the following equipment alignment considerations:

- A. Reactor building floor and equipment drain sump pump 1B will trip or not start as normal. It may be necessary to rotate to 1A pump if water entering sump warrants.
- B. Component Cooling Water Pump 1B-B will not come back on if blackout sequence is started during test.
- C. 1-FCV-63-67 cold leg accumulator isolation valve will open if power is available to valve.

[1] **ENSURE [0-HS-82-48]**, D/G 1B-B Mode Selector Switch is in the **UNIT** position. \_\_\_\_\_

[2] **PLACE [1-HS-57-74]**, D/G 1B-B Synchronize Switch in the **SYN** position. \_\_\_\_\_

**NOTE 1** Normal white light will go **DARK** and Test white light will **ILLUMINATE** when 43T(L) is placed in **TEST** position.

**NOTE 2** Placing 43T(L) switch in test position will make the associated D/G inoperable (LCO 3.8.1.1 or 3.8.1.2).

[3] **PLACE [43T(L)]** test switch, 1B-B SD Bd Logic Relay Panel in **TEST** position to prevent other 3 D/Gs from starting on this SI signal.

\_\_\_\_\_

1st

\_\_\_\_\_

IV

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- NOTE 1** Red light above **[86LOR]** at D/G local panel should illuminate while Safety Injection condition is simulated. AJO assigned should observe. Light will only be on while **[K609B]** relay is engaged.
- NOTE 2** Close communication and coordination with field personnel is required to accomplish the following step. Parts **[a]**, **[b]**, and **[c]** are to be performed such that the D/G-DAQ is started just prior to the D/G start actuation (if used).
- NOTE 3** A stopwatch must be used as a backup to the D/G DAQ. If there is any timing discrepancy between the two, the DAQ should take precedence due to its superior accuracy.
- NOTE 4** – If the D/G DAQ is not used, two stopwatches must be used to time the D/G start.
- NOTE 5** To ensure consistency and accuracy when timing DG starts the following guidelines are provided:
- 1 -Start stopwatch when amber light (Emergency Start lockout) goes out on O-M-26.
  - 2 -Monitor voltage until the meter indicates > 6800 volts (voltage stabilizes before frequency).
  - 3 -Monitor frequency until meter indicates > 58.8 Hz  
STOP the watch.
- NOTE 6** Actuating the K609 relay will result in “Safeguards Test Rack Train B in Test” (1-XA-55-6A, window E-7) annunciation, which will clear when the relay is reset.

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**[4] PERFORM** the following to initiate the D/G start signal:

**[a] IF** the D/G-DAQ is to be used, **THEN**

**NOTIFY** D/G Operator to

**START** D/G-DAQ computer. \_\_\_\_\_

**[b] PROCEED** with the countdown: 3, 2, 1 **START**. \_\_\_\_\_

**NOTE**

Step **[4][c]** and step **[5]** must be performed at the same time.

**\*\*\*\*\*CRITICAL STEP\*\*\*\*\***

**[c] PERFORM** the following GO TEST to pickup K609B relay:

**[1] ROTATE AND DEPRESS** Test Switch **[S828]**, in B Train Safeguards Test Cabinet, 1-R-53, CB el 685 Auxiliary Instrument Room. \_\_\_\_\_

\_\_\_\_\_ 1st \_\_\_\_\_ CV

**[2] RELEASE** **[S828]**. \_\_\_\_\_

**[3] PLACE** **[S821]**, Reset Test switch, in **RESET** position, **AND** **RELEASE** **[S821]**, Reset Test Switch. \_\_\_\_\_

**[4] VERIFY** **[K609]**, **RESET** by observation of the relay. (K609 is located in 1-R-51, the cabinet west of 1-R-53) \_\_\_\_\_

\_\_\_\_\_ 1st \_\_\_\_\_ CV

**[5] START** stopwatch(es) per note **[5]**, **STOP** stopwatch(es) per note **[5]**, **AND** **RECORD** the following:

Time required to achieve  $\geq 58.8$  Hz and  $\geq 6800$  volts:

\_\_\_\_\_ Time (seconds)

\_\_\_\_\_ Stopwatch ID

\_\_\_\_\_ Time (seconds)

\_\_\_\_\_ Stopwatch ID

**[6] IF** the D/G-DAQ was used, **THEN**,

**RECORD** the following from the D/G-DAQ computer:

Time required to achieve  $\geq 6800$  volts and  $\geq 58.8$  Hz.

\_\_\_\_\_ Seconds

\_\_\_\_\_ DG-DAQ Operator

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**\*\*\*\*\*CRITICAL STEP\*\*\*\*\***

[7] **ENSURE [1-FCV-67-67]**, ERCW cooling water supply valve is **OPEN**. \_\_\_\_\_

**ACCEPTANCE CRITERIA:** D/G 1B-B start from ambient condition achieves in less than or equal to 10 seconds generator voltage  $\geq 6800$  volts and  $\geq 58.8$  Hz.

[8] **RECORD** the steady state values for the following:

A. **[0-EI-82-34]**, DG 1B-B Incoming Voltage \_\_\_\_\_

Reading

B. **[0-XI-82-32]**, DG 1B-B Incoming Frequency. \_\_\_\_\_

Reading

**ACCEPTANCE CRITERIA:** D/G 1B-B achieves steady state generator voltage of  $\geq 6800$  and  $\leq 7260$  volts and frequency of  $\geq 58.8$  and  $\leq 61.2$  Hz.

[9] **VERIFY [ES1BY]** amber light is **ILLUMINATED** in 1B-B 6.9kV SD Board Logic Relay Panel. \_\_\_\_\_

[10] **PLACE [43T(L)]**, Test Switch, in **NORMAL** position, in 1B-B 6.9kV SD Board Logic Relay Panel, **AND**

**NOTIFY** control room operator. \_\_\_\_\_

**NOTE** Voltage Regulator Current Ammeter is in panel 1 of exciter cabinet.

[11] **RECORD** Voltage Regulator Control Current. \_\_\_\_\_

Reading

**ACCEPTANCE CRITERIA:** Voltage Regulator Control Current between 1.0 - 2.5 dc amps. The voltage regulator card must be functioning properly to consider DG operable.

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[12] **ENSURE** D/G 1B-B **[86LOR]** red light is **NOT ILLUMINATED**,  
at D/G local relay panel. \_\_\_\_\_

**NOTE** Do not hold **[86LOR]** in **RESET** position if it does not latch on the first attempt. Coil failure may result if relay is held in **RESET** position.

[13] **RESET** **[86LOR]**, Lockout Relay, on D/G local relay panel. \_\_\_\_\_

[14] **RECORD** start as Ambient Start in 0-SI-OPS-082-007.M. \_\_\_\_\_

[15] **RETURN** to Section 6.1 Step [9]. \_\_\_\_\_

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**APPENDIX F**

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**NON-AMBIENT MANUAL START METHOD**

**NOTE** All steps in this Appendix refer to 1B-B Diesel Generator (D/G) and are performed from Main Control Room Panel 0-M-26B unless otherwise specifically noted.

- [1] **ENSURE [0-HS-82-48]**, DG 1B-B Mode Selector Switch is in the **UNIT** position. \_\_\_\_\_
- [2] **PLACE [1-HS-57-74]**, DG 1B-B Synchronize Switch in the **SYN** position. \_\_\_\_\_
- [3] **PLACE [0-HS-82-48]**, DG 1B-B Mode Selector Switch in the **PULL-TO-LOCAL** position. \_\_\_\_\_
- [4] **DEPRESS [0-HS-82-52]**, Trip To Local Generator 1B-B, pushbutton to place D/G controls in **LOCAL** (D/G local control panel). \_\_\_\_\_

**NOTE** Idle start should bring the D/G to approximately 400 rpm. The idle speed should be maintained for > 5 minutes but not to exceed 10 minutes; therefore, be prepared to release idle start when 5 minute warmup period is complete.

- [5] **DEPRESS [0-HS-82-55]**, Idle Start Generator 1B-B Pushbutton on D/G local control panel. \_\_\_\_\_

**\*\*\*\*\*CRITICAL STEP\*\*\*\*\***

- [6] **ENSURE [1-FCV-67-67]**, ERCW cooling water valve **OPEN** locally in D/G 1B-B room. \_\_\_\_\_
- [7] **VERIFY [TACHOMETER]**, Local Speed Indicator stabilizes at approximately 400 rpm. \_\_\_\_\_

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**CAUTION**      When the engine is idle started and running at idle speed, a normal stop initiation will cause the D/G to accelerate toward rated speed for 2 seconds before decelerating back to idle speed for 10 minutes.

[8]    **ENSURE [LRX1B]**, Lockout Control Relay **RESET** to restore control to Main Control Room panel, (D/G local relay panel). \_\_\_\_\_

[9]    **PLACE [0-HS-82-48]**, D/G 1B-B Mode Selector Switch in the **UNIT** position, (0-M-26B, push in). \_\_\_\_\_

**NOTE**    When DG passes through 550 rpm (SS-3) 64X relay may cause momentary annunciation of Protective Relay Operation ( Window D-3)

[10]   **WHEN** D/G 1B-B has idled for  $\geq 5$  minutes, **THEN**  
  
      **DEPRESS [0-HS-82-46A]**, D/G 1B-B Emergency Start Switch on 0-M-26B panel. \_\_\_\_\_

[11]   **VERIFY [TACHOMETER]**, D/G speed, stabilizes at ~ 900 rpm (D/G local control panel). \_\_\_\_\_

[12]   **VERIFY** voltage  $\geq 6800$  and  $\leq 7260$  volts and frequency  $\geq 58.8$  and  $\leq 61.2$  Hz. \_\_\_\_\_

A.    **[0-EI-82-34]**, D/G 1B-B Incoming Voltage.  
      Reading \_\_\_\_\_ volts

B.    **[0-XI-82-32]**, D/G 1B-B Incoming Frequency.  
      Reading \_\_\_\_\_ Hz \_\_\_\_\_

**ACCEPTANCE CRITERIA:**      D/G 1B-B stabilizes at a voltage  $\geq 6800$  and  $\leq 7260$  volts and frequency stabilizes at  $\geq 58.8$  and  $\leq 61.2$  Hz.

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[13]      **RECORD** Voltage Regulator Control Current      \_\_\_\_\_

Reading

**ACCEPTANCE CRITERIA:**      Voltage Regulator Control Current between 1.0 - 2.5 dc amps.  
The voltage regulator card must be functioning properly to  
consider DG operable.

[14]      **ENSURE** D/G 1B-B **[86LOR]** red light NOT ILLUMINATED, at  
D/G local relay panel.      \_\_\_\_\_

**NOTE**      Do not hold **[86LOR]** in RESET position if it does not latch  
on the first attempt. Coil failure may result if relay is held in  
RESET position.

[15]      **RESET** **[86LOR]**, Lockout Relay, on D/G local relay panel.      \_\_\_\_\_

[16]      **VERIFY** **[86LOR]** is RESET by amber light **[0-XI-82-49]**  
ILLUMINATED on 0-M-26B.      \_\_\_\_\_

[17]      **RETURN** to Section 6.2 step **[8]** of this Instruction.      \_\_\_\_\_

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**NON-AMBIENT SIMULATED LOSS OF OFFSITE POWER START METHOD**

**[1] REMOVE [CES1BY] fuses in Auxiliary Relay Room rack  
1-R-76, to prevent startup of other D/Gs.**

- A. 1-FU1-500-R076K21
- B. 1-FU1-500-R076K22

\_\_\_\_\_ 1st      \_\_\_\_\_ CV

**[2] VERIFY** the following:

- A. NORMAL white light left of **[43T(L)]** is **NOT** illuminated.
- B. TEST white light right of **[43T(L)]** is **NOT** illuminated.
- C. ES1BY amber light by switch **[43DT]** is illuminated.

**CAUTION**      **Placing 43MT(X) in TEST renders loss of voltage relays inoperable (TS LCO 3.3.3.11 and 3.8.1.1 or 3.8.1.2).**

**NOTE**      **[43MT]** handswitch in the TEST position will prevent load shedding of the Shutdown Board. These handswitches are located in the 6.9kV SD Bd. Logic Panel 1B-B.

- [3] PLACE [43MT(X)] master test switch in the TEST position AND  
VERIFY adjoining UVX white lights (eleven) are illuminated.**
- [4] PLACE [43MT(Y)] master test switch in the TEST position AND  
VERIFY adjoining UVY white lights (eleven) are illuminated.**

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- [5] IF any of the eleven UVX or UVY white lights are **NOT** illuminated in steps [3] and [4], **THEN**

**DO NOT** continue with this instruction until the Unit SRO has been notified, problem evaluated, and corrective actions completed.

\_\_\_\_\_  
Unit SRO

- [6] PLACE [1-HS-57-74], D/G 1B-B Synchronize Switch in the **SYN** position on 0-M-26B.
- [7] PLACE [0-HS-82-48], D/G 1B-B Mode Selector Switch in the **PULL-TO-LOCAL** position on 0-M-26B.
- [8] **DEPRESS** [0-HS-82-52], Trip-To-Local pushbutton on D/G 1B-B local control panel to place D/G controls in **LOCAL**.

**NOTE** Idle start should bring the D/G to approximately 400 rpm. The idle speed should be maintained for  $\geq 5$  minutes but not to exceed 10 minutes; therefore, be prepared to initiate auto start when 5 minute warmup period is complete.

- [9] **DEPRESS** [0-HS-82-55], Idle Start Gen 1B-B pushbutton on the D/G local control panel.

**\*\*\*\*\*CRITICAL STEP\*\*\*\*\***

- [10] **VERIFY** [1-FCV-67-67] **OPENS** to provide cooling water to heat exchanger (locally in D/G room). \_\_\_\_\_

- [11] **VERIFY** [TACHOMETER], Local Speed Indicator stabilizes at approximately 400 rpm. \_\_\_\_\_

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**CAUTION**      When the engine is idle started and running at idle speed, a normal stop initiation will cause the D/G to accelerate toward rated speed for 2 seconds before decelerating back to idle speed for 10 minutes.

[12] **ENSURE [LRX1B]**, Lockout Control Relay **RESET** on D/G local relay panel.

[13] **PLACE [0-HS-82-48]**, D/G 1B-B Mode Selector Switch, in the **UNIT** position, on 0-M-26B in Main Control Room. \_\_\_\_\_

[14] **NOTIFY** AUO at the DG Local Panel that the red light above **[86LOR]** at D/G local panel should illuminate during the simulated undervoltage condition (TEST pushbuttons are depressed) and when the TEST buttons on the undervoltage relays are released the red light above **[86LOR]** will **NOT** be illuminated.

[15] **NOTIFY** operations personnel at the 6.9kV Shutdown Board that the undervoltage relays are located on the 6.9kV SD Bd., panel 7, and labeled as **[27TS1A]**, **[27TS1B]**, and **[27TS1C]**. A 2 out of 3 logic for undervoltage requires the undervoltage relay TEST pushbutton of 2 relays to be actuated together for greater than 1.25 seconds.

[16] **NOTIFY** operations personnel at the 6.9 kV Shutdown Board to **REMOVE** covers from 27TS1A, 27TS1B, and 27TS1C relays.

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- NOTE 1** Close communication and coordination with field personnel is required to accomplish the following step.
- NOTE 2** Operations personnel at the Shutdown Board will initiate the starting sequence.
- NOTE 3** A 2 out of 3 logic for undervoltage requires the undervoltage relay TEST pushbutton of 2 relays to be actuated together for greater than 1.25 seconds.

**[17] WHEN D/G 1B-B has idled for  $\geq 5$  minutes, THEN**

**INITIATE** the simulated undervoltage condition by performing the following:

[a] **PROCEED** with the countdown: 3, 2, 1, START.

[b] **WHEN START** is communicated by the personnel at the Shutdown Board, **THEN**

**NOTE** The following four substeps must be performed at the same time.

**6.9kV Shutdown Board 1B-B, Compartment 7**

1. **PRESS AND HOLD TEST** pushbuttons on any two of the three undervoltage relays **[27TS1A]**, **[27TS1B]**, and/or **[27TS1C]**

**UNTIL** completion of step **[18]**.

\_\_\_\_\_ 1st

\_\_\_\_\_ CV

**Diesel Generator Local Panel**

2. **VERIFY** red light above **[86LOR]** illuminated.

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**Main Control Room 0-M-26B Panel**

3. **VERIFY** D/G 1B-B Incoming Voltage, **[0-EI-82-34]**, is  $\geq 6800$  and  $\leq 7260$  volts.

\_\_\_\_\_ Volts \_\_\_\_\_

4. **VERIFY** D/G 1B-B Incoming Frequency, **[0-XI-82-32]**, is  $\geq 58.8$  and  $\leq 61.2$  Hz.

\_\_\_\_\_ Hz \_\_\_\_\_

**ACCEPTANCE CRITERIA:** D/G 1B-B stabilizes at a voltage  $\geq 6800$  and  $\leq 7260$  volts and frequency stabilizes at  $\geq 58.8$  and  $\leq 61.2$  Hz.

**1B-B Shutdown Bd Logic Relay Panel**

- [18] **VERIFY** the following:

- A. Red targets on undervoltage relays.
- B. All eight UVX amber lights go out.
- C. All eight UVY amber lights go out.
- D. ES1BY amber light goes out.

- [19] **RELEASE** the TEST pushbuttons.

- [20] **RESET** the targets on the undervoltage relays.

- [21] **REPLACE** covers on undervoltage relays.

- [22] **VERIFY** ES1BY amber light is illuminated.

- [23] **VERIFY** UVX group test lights illuminated in 6.9kV SD Bd.  
Logic Panel 1B-B:

43TA	<input type="checkbox"/>	43TD	<input type="checkbox"/>	43TG	<input type="checkbox"/>
43TB	<input type="checkbox"/>	43TE	<input type="checkbox"/>	43TK	<input type="checkbox"/>
43TC	<input type="checkbox"/>	43TF	<input type="checkbox"/>		

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**[24] PLACE [43MT(X)]** master test switch in the **NORMAL** position  
**AND**

**VERIFY** adjoining UVX white lights (eleven) are  
**NOT** illuminated.

\_\_\_\_\_  
1st      CV

**[25] VERIFY** UVY group test lights illuminated in 6.9kV SD Bd.  
Logic Panel 1B-B:

43TA	<input type="checkbox"/>	43TD	<input type="checkbox"/>	43TG	<input type="checkbox"/>
43TB	<input type="checkbox"/>	43TE	<input type="checkbox"/>	43TK	<input type="checkbox"/>
43TC	<input type="checkbox"/>	43TF	<input type="checkbox"/>		

**[26] PLACE [43MT(Y)]** master test switch in the **NORMAL** position  
**AND**

**VERIFY** adjoining UVY white lights (eleven) are  
**NOT** illuminated.

\_\_\_\_\_  
1st      CV

**Diesel Generator Local Panel**

**NOTE:** Voltage Regulator Current Ammeter is in panel 1 of exciter cabinet.

**[27] RECORD** Voltage Regulator Control Current

\_\_\_\_\_  
Reading

**ACCEPTANCE CRITERIA:**

Voltage Regulator Control Current between 1.0-2.5 dc amps.  
The voltage regulator card must be functioning properly to  
consider DG operable.

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**APPENDIX G**

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Date \_\_\_\_\_

[28] **VERIFY** red light above **[86LOR]** is **NOT** illuminated.

**NOTE** Do not hold **[86LOR]** in **RESET** position if it does not latch on the first attempt. Coil failure may result if relay is held in **RESET** position.

[29] **RESET** **[86LOR]**, Lockout Relay, on D/G local relay panel.

**Main Control Room 0-M-26B Panel**

[30] **VERIFY** applicable D/G annunciators **RESET**.

[31] **REINSTALL** **[CES1BY]** fuses removed for test in Auxiliary Instrument Room, Rack 1-R-76:

A. 1-FU1-500-R076K21

B. 1-FU1-500-R076K22

\_\_\_\_\_  
1st      CV

[32] **NOTIFY** Control Room Operator when **[CES1BY]** fuses have been installed.

**1B-B Shutdown Bd Logic Relay Panel**

[33] **VERIFY** the following:

A. **NORMAL** white light left of **[43T(L)]** is illuminated.

B. **TEST** white light right of **[43T(L)]** is **NOT** illuminated.

C. **ES1BY** amber light by switch **[43DT]** is illuminated.

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Date \_\_\_\_\_

**[34] IF** all acceptance criteria have been met, **THEN**

**EVALUATE** exiting the LCO actions which were previously entered.

\_\_\_\_\_ / \_\_\_\_ / \_\_\_\_  
Unit 1 SRO                      Date      Time

\_\_\_\_\_ / \_\_\_\_ / \_\_\_\_  
Unit 2 SRO                      Date      Time

**[35] RETURN TO** Section 6.2 Step **[8]** of this Instruction.

\_\_\_\_\_

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## APPENDIX H

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### NON-AMBIENT SI ACTUATION TEST SIGNAL START METHOD

**CAUTION** During the performance of this appendix, slave relay K609B will be energized, resulting in the following equipment alignment considerations:

- A. Reactor building floor and equipment drain sump pump 1B will trip or not start as normal. It may be necessary to rotate to 1A pump if water entering sump warrants.
- B. Component Cooling Water Pump 1B-B will not come back on if blackout sequence is started during test.
- C. 1-FCV-63-67 cold leg accumulator isolation valve will open if power is available to valve.

**NOTE 1** Normal white light will go **DARK** and Test white light will **ILLUMINATE** when 43T(L) is placed in **TEST** position.

**NOTE 2** Placing 43T(L) switch in test position will make the associated D/G inoperable (LCO 3.8.1.1 or 3.8.1.2).

[1] **PLACE [43T(L)]**, Test Switch, in 1B-B SD Bd Logic Relay Panel in the **TEST** position to prevent other 3 D/Gs from starting on this SI signal.

\_\_\_\_\_  
1st      IV

[2] **PLACE [1-HS-57-74]**, D/G 1B-B Synchronize Switch in the **SYN** position on 0-M-26B.

[3] **ENSURE [0-HS-82-48]**, D/G 1B-B Mode Selector Switch, is in the **PULL-TO-LOCAL** position on 0-M-26B.

[4] **DEPRESS [0-HS-82-52]**, Trip-To-Local pushbutton Gen 1B-B to place D/G controls in **LOCAL** operation.

\_\_\_\_\_

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**APPENDIX H**

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**NOTE**

Idle start should bring the D/G to approximately 400 rpm. The idle speed should be maintained for  $\geq 5$  minutes but not to exceed 10 minutes; therefore, be prepared to initiate auto start when 5 minute warmup period is complete.

- [5] **DEPRESS [0-HS-82-55]**, Idle Start Gen 1B-B pushbutton on the D/G local control panel. \_\_\_\_\_

**\*\*\*\*\*CRITICAL STEP\*\*\*\*\***

- [6] **ENSURE [1-FCV-67-67] OPENS** to provide cooling water to heat exchanger (locally in D/G room). \_\_\_\_\_

- [7] **VERIFY [TACHOMETER]**, Local Speed Indicator stabilizes at approximately 400 rpm. \_\_\_\_\_

**CAUTION**

**When the engine is idle started and running at idle speed, a normal stop initiation will cause the D/G to accelerate toward rated speed for 2 seconds before decelerating back to idle speed for 10 minutes.**

- [8] **ENSURE [LRX1B]**, Lockout Control Relay RESET on D/G local relay panel. \_\_\_\_\_

- [9] **PLACE [0-HS-82-48]**, D/G 1B-B Mode Selector Switch, in the **UNIT** position, on 0-M-26B in Main Control Room. \_\_\_\_\_

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**APPENDIX H**

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**NOTE 1**      Red light above **[86LOR]** at D/G local panel should illuminate while relay **[K609]** is picked up. AUO should observe. Light will only be on until **[K609]** is reset.

**NOTE 2**      Actuating the K609 relay will result in "Safeguards Test Rack Train B in Test" (1-XA-55-6A window E-7) annunciation, which will clear when the relay is reset.

**\*\*\*\*\*CRITICAL STEP\*\*\*\*\***

**[10] WHEN D/G 1B-B has idled for  $\geq 5$  minutes, THEN**

**PERFORM** the following **GO TEST** to pickup K609B relay:

[a]    **ROTATE and DEPRESS** test switch **[S828]**, in B Train Safeguards Test Cabinet, 1-R-53, CB el 685 Auxiliary Instrument Room.

\_\_\_\_\_      \_\_\_\_\_  
1st              CV

[b]    **RELEASE [S828].**

\_\_\_\_\_

[c]    **PLACE [S821], Reset Test Switch, in RESET position, AND**

**RELEASE [S821], Reset Test Switch.**

\_\_\_\_\_

[d]    **VERIFY [K609], RESET** by observation of the relay. (K609 is located in 1-R-51, the cabinet west of 1-R-53)

\_\_\_\_\_      \_\_\_\_\_  
1st              IV

**[11] VERIFY D/G 1B-B Incoming Voltage [0-EI-82-34]**  
 $\geq 6800$  and  $\leq 7260$  volts (0-M-26B).

\_\_\_\_\_      \_\_\_\_\_  
Volts

**[12] VERIFY D/G 1B-B Incoming Frequency [0-XI-82-32]**  
 $\geq 58.8$  and  $\leq 61.2$  Hz (0-M-26B).

\_\_\_\_\_      \_\_\_\_\_  
Hz

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**APPENDIX H**  
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Date \_\_\_\_\_

**ACCEPTANCE CRITERIA:**

Non-Ambient Start

D/G 1B-B stabilizes at a voltage  $\geq 6800$  and  $\leq 7260$  volts  
and frequency stabilizes at  $\geq 58.8$  and  $\leq 61.2$  Hz.

[13] **VERIFY** **[ES1BY]** amber light is **ILLUMINATED** in  
1B-B 6.9kV SD Board Logic Relay Panel. \_\_\_\_\_

[14] **PLACE** **[43T(L)]** test switch, in **NORMAL** position, in 1B-B  
6.9kV SD Board Logic Relay Panel and **NOTIFY** control  
room operator. \_\_\_\_\_

**NOTE** Voltage Regulator Current Ammeter is in panel 1 of exciter  
cabinet.

[15] **RECORD** Voltage Regulator Control Current Reading: \_\_\_\_\_

Reading  
\_\_\_\_\_

**ACCEPTANCE CRITERIA:**

Voltage Regulator Control Current between 1.0 - 2.5 dc amps.  
The voltage regulator card must be functioning properly to  
consider DG operable.

[16] **ENSURE** D/G 1B-B **[86LOR]** red light **NOT ILLUMINATED**, at  
D/G local relay panel. \_\_\_\_\_

**NOTE** Do not hold **[86LOR]** in **RESET** position if it does not latch on  
the first attempt. Coil failure may result if relay is held in **RESET** position.

[17] **RESET** **[86LOR]**, Lockout Relay, on D/G local relay panel. \_\_\_\_\_

[18] **RETURN** to Section 6.2 Step **[8]** of this Instruction. \_\_\_\_\_

SQN 1	<b>ELECTRICAL POWER SYSTEM DIESEL GENERATOR 1B-B</b>	1-SI-OPS-082-007.B Rev: 39 Page 74 of 78
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**APPENDIX I**  
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Date \_\_\_\_\_

**VERIFICATION OF DIESEL GENERATOR RETURN TO STANDBY READINESS  
480V Diesel Aux Bd**

[1] **PLACE [1-HS-30-465C]** Diesel Gen 1B-B Muffler Room Exhaust Fan in **STOP** position.

[2] **ENSURE [1-HS-30-465C]** Diesel Gen 1B-B Muffler Room Exhaust Fan is in **P-AUTO** position (1B1-B, Compt 6D). \_\_\_\_\_/\_\_\_\_\_  
1st IV

[3] **ENSURE** one of the following Diesel Gen 1B-B Room Exhaust Fans in **P-AUTO** position: (**N/A** fan NOT selected)

1-HS-30-449C	1B Exhaust Fan	1B1-B, Compt. 6A	<b>P-AUTO</b>	_____/_____ 1st IV
1-HS-30-453C	2B Exhaust Fan	1B2-B, Compt. 6D	<b>P-AUTO</b>	_____/_____ 1st IV

[4] **ENSURE** Diesel Gen 1B-B Room Exhaust Fan not selected in step [3] in **PULL-TO-STANDBY** position: (**N/A** other fan)

1-HS-30-449C	1B Exhaust Fan	1B1-B, Compt. 6A	<b>PULL-TO-STANDBY</b>	_____/_____ 1st IV
1-HS-30-453C	2B Exhaust Fan	1B2-B, Compt. 6D	<b>PULL-TO-STANDBY</b>	_____/_____ 1st IV

[5] **ENSURE [1-HS-30-317]** Gen and Elec Pnl 1B-B Vent Fan switch in **AUTO** position (1B1-B, Compt 4A). \_\_\_\_\_/\_\_\_\_\_  
1st IV

**Exhaust Rm**

**NOTE** The following local fan room exhaust fan handswitches will not stop fans if room temperature is above thermostat setpoint.

[6] **PRESS [1-HS-30-449B]** Diesel Gen 1B-B Room Exhaust Fan 1-B STOP pushbutton.

[7] **PRESS [1-HS-30-453B]** Diesel Gen 1B-B Room Exhaust Fan 2-B STOP pushbutton.

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**Exhaust Rm (continued)**

- [8] **ENSURE [0-HS-30-467]** DG Bldg Corridor Air Intake Damper in **OPEN** position (1B-B DG Exhaust Fan Room, north wall).

\_\_\_\_\_  
1st      /      IV

**Local D/G Control Panel**

- [9] **ENSURE [0-HS-82-53]** Maint-Auto Switch Gen 1B-B in **AUTO** position.

\_\_\_\_\_  
1st      /      IV

**Local Exciter Panel**

- [10] **ENSURE [0-HS-82-217]** Voltage Regulator switch in **AUTO** position.

\_\_\_\_\_  
1st      /      IV

- [11] **ENSURE [0-HS-82-198]** Diesel Gen 1B-B Local Mode switch in **OFF** position.

\_\_\_\_\_  
1st      /      IV

- [12] **ENSURE** Loss Of Field Cutout Switch in **ON** position.

\_\_\_\_\_  
1st      /      IV

- [13] **ENSURE** Diesel Generator Fault Shutdown relay **RESET** by **DEPRESSING [0-HS-82-58]**.

\_\_\_\_\_  
1st      /      IV

- [14] **ENSURE** Overvoltage 59 Relay **RESET** and Overvoltage light (BB-1) **DARK** by **PUSHING UP** on relay target reset rod (bottom left corner of relay).

\_\_\_\_\_  
1st      /      IV

**Local Relay Board**

- [15] **ENSURE [86LOR]** relay is **RESET**.

\_\_\_\_\_

- [16] **ENSURE [LRX1B]** is **RESET**.

\_\_\_\_\_  
1st      /      IV

- [17] **ENSURE [86 GA]** is **RESET**.

\_\_\_\_\_  
1st      /      IV

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Date \_\_\_\_\_

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**2A-A D/G Rm**

[18] CHECK [0-XR-52-77], Seismic Event Monitor.

[19] IF [0-XR-52-77], Seismic Monitor is actuated  
(Event Indicator RED light lit or flashing), THEN  
NOTIFY the Maintenance Instrument Group (MIG) to  
reset the monitor in accordance with SI-657.

**Panel 0-M-26**

[20] ENSURE [1-HS-57-74] DG 1B-B Synchronize switch in OFF  
position.

\_\_\_\_\_  
1st            /            IV

[21] ENSURE [0-HS-82-48] DG 1B-B Mode Selector switch in  
PUSH IN UNIT position.

\_\_\_\_\_  
1st            /            IV

[22] ENSURE [1-HS-57-73A] 1914 DG 1B-B To Sd Bd  
1B-B switch in A-AUTO position.

\_\_\_\_\_  
1st            /            IV

[23] CHECK annunciation panel [0-XA-55-26B] CLEAR of  
alarms, OR

EVALUATE any alarms present for operability concern as  
required.

[24] CHECK [0-XI-82-49] Emerg Start Lockout Relay  
ILLUMINATED.

\_\_\_\_\_  
1st            /            IV

[25] ENSURE [1-FCV-67-67] ERCW Cooling Water Valve is  
CLOSED AND

[1-HS-67-67A] is in AUTO position.

\_\_\_\_\_  
1st            /            IV

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**Panel 0-M-26 (continued))**

**[26] IF DG-DAQ** computer was installed for timing DG voltage and frequency, **THEN**

**ENSURE** Electrical Maintenance has disconnected DG-DAQ in accordance with 0-MI-EDG-082-001.0.

**6.9V Logic Panel 1B-B**

**[27] ENSURE** 1B-B Shutdown Board Logic Panel **[43T(L)]** switch in **NORMAL** position.

\_\_\_\_\_  
1st / IV

**6.9kv Shutdown Board 1B-B**

**[28] ENSURE** red targets on relays AX 914 and CX 914 on Compartment 7 are reset.

\_\_\_\_\_

**END OF APPENDIX**

<b>SQN</b>  1	<b>ELECTRICAL POWER SYSTEM DIESEL GENERATOR 1B-B</b>	1-SI-OPS-082-007.B Rev: 39 Page 78 of 78
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**SOURCE NOTES**

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<b>REQUIREMENTS STATEMENT</b>	<b>SOURCE DOCUMENT</b>	<b>IMPLEMENTING STATEMENT</b>
Commitment made to provide continuous prelubrication of the engine or to perform prior to all test starts. SQN has a continuous lubrication system for parts of the engine and the turbocharger and prelude checks are made prior to any manual or routine Diesel Starts.	NER 830137005  INPO SOER 83-001	<b>[C.1]</b>
Commitment made to consider manufacturer's recommendations in procedures governing test frequency, loading, and duration. SQN T/S stipulates test frequency, load, and duration for the D/Gs.	NER 830137006  INPO SOER 83-001	<b>[C.2]</b>
Commitment made that procedures should state initial conditions, steps to be followed for each type of test normally performed, and actions required to restore the unit to standby conditions for automatic start.	NER 830137008  INPO SOER 83-001	<b>[C.3]</b>
Commitment made to include steps to ensure that the generator bearing and stator temperature recorder is in service prior to start.	AFI SQA 900I071002	<b>[C.4]</b>
Procedures that do not contain appropriate verification requirements will be revised. (This item is not annotated within the procedure, since the entire procedure must meet the verification program requirements.)	NCO 970071001	<b>[C.5]</b>



TENNESSEE VALLEY AUTHORITY  
SEQUOYAH NUCLEAR PLANT  
ANNUNCIATOR RESPONSE

**0-AR-M26-B**

**ANNUNCIATOR**

**0-XA-55-26B**

Revision 27

**QUALITY RELATED**

PREPARED/PROOFREAD BY: DARRELL W. LUNSFORD

RESPONSIBLE ORGANIZATION: OPERATIONS

APPROVED BY: W. T. LEARY

EFFECTIVE DATE: 01/18/2007

LEVEL OF USE: **CONTINUOUS USE**

REVISION

DESCRIPTION: Window A-2, addressed probable cause of alarm as depressing the local panel PB per NB050676. Window C-6, added action to open alternate cooling supply per NB050748 (PER-85166). Window C-7, corrected referenced Tech Spec per TSC 04-01. Window D-1, corrected referenced procedure number per NB060835 (editorial). Changed from reference us to continuous use.

# ANNUNCIATOR

## 0-XA-55-26B

	1	2	3	4	5	6	7	
A	DIESEL GEN 1B-B UNIT LOCKOUT AUTO START RDY FAILURE	DIESEL GEN 1B-B CONTROL POWER FAILURE	DIESEL GEN 1B-B MAINTENANCE POSITION	DIESEL GEN 1B-B FAIL TO START OR RUN	DIESEL GEN 1B-B RUNNING >40 RPM	SPARE	SPARE	A
B	DIESEL GEN 1B-B GOV ACTUATOR DIFFERENCE	DIESEL GEN 1B-B EXHAUST TEMP DIFFERENCE	DIESEL GEN 1B-B BATTERY TROUBLE	DIESEL GEN 1B-B LUBE OIL PRESS LOW ENGINE 1 OR 2	PS-18-66A/2 FULE OIL PRESS LOW ENG 1 OR 2	SPARE	6900 SD BD 1B-B OVERVOLTAGE	B
C	PS-82-192 DIESEL GEN 1B-B START AIR PRESS LOW ENG 1 OR 2	LS-18-63A/2 DAY TANK 1 OR 2 FUEL OIL LEVEL ABNORMAL	DIESEL GEN 1B-B OVERSPEED TRIP ENGINE 1 OR 2	DIESEL GEN 1B-B JACKET WATER TEMP HIGH-LOW ENGINE 1 OR 2	DIESEL GEN 1B-B WATER LEVEL OR PRESS ABN ENGINE 1 OR 2	480V PWR TRAIN 1B-B MCC UNDERVOLTAGE	6900V SD BD 1B-B FAILURE OR BUS UNDERVOLTAGE	C
D	DIESEL GEN 1B-B LUBE OIL LEVEL LOW ENGINE 1 OR 2	DIESEL GEN 1B-B CRANKCASE PRESS HIGH ENGINE 1 OR 2	DIESEL GEN 1B-B PROTECTIVE RELAY OPERATION	LS-18-40A DIESEL GEN 1B-B 7 DAY DSL OIL TANK LVL ABN	POWER TRAIN 1B 480v TRANS TEMP HIGH	480V SD BD 1B1-B FAILURE OR UNDERVOLTAGE	SPARE	D
E	DG RM 1B-B VENTILATION SYS TROUBLE	DIESEL GEN 1B-B HIGH TEMPERATURE	SPARE	480V BD RM 1B A/C SYS MALFUNCTION	6900V SD BD LOGIC PNL 1B-B LOAD STRIPPING RYLS OUT OF SYNC	480V SD BD 1B2-B FAILURE OR UNDERVOLTAGE	6900V SD BD 1B-B BKR 1914/ 1934 OVERLOAD	E
	1	2	3	4	5	6	7	

SQN

1 & 2

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0-AR-M26-B

Rev. 27

Source	Setpoint
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SER 946

0-PS-82-330 or 331 (Circulating oil pump)	20 psig
0-PS-82-346 or 347 (Turbocharger supply)	10 psig
0-PS-82-5029/2 or 5030/2 (Idle run)*	25 psig
0-PS-82-5021/2 or 5022/2 (Running)*	40 psig

\*Placed I/S 60 sec after D/G reaches 200 rpm.

<b>DIESEL GEN 1B-B LUBE OIL PRESS LOW ENGINE 1 OR 2</b>
---

**Probable Causes**

1. Low lube oil level.
2. Strainer or filter dirty.
3. Oil temperature abnormal.
4. Worn oil pump or worn diesel bearings.
5. Soakback oil pump (AC Aux. Lube Oil Circ Pump) tripped.
6. Lube Oil Circulating Pump tripped.

**Corrective Actions**

- [1] **IF** D/G running with no valid accident (blackout or SI) signal present, **THEN**  
**ENSURE** D/G shutdown by depressing emergency stop pushbutton 0-HS-82-47A.
- [2] **IF** D/G in standby mode, **THEN**  
**ENSURE** Lube Oil Circulating Pump and the AC soakback oil pump (AC Aux. Lube Oil Circ Pump) running.

**NOTE**

Provided special restrictions are implemented an INOP Lube Oil Circulating pump (6 gpm) does not INOP the D/G. Restrictions are checking oil temperature  $\geq 85^{\circ}\text{F}$  and the engine must have been prelubricated within the last 48 hours (using Lube Oil Circ pump). D/G is INOP if either of these restrictions are not met.

- [3] **IF** Lube Oil Circulating Pump (6 gpm) is inoperable with the D/G in Standby, **THEN**

[a] **MONITOR** the following at 30 minute frequency:

1. Engine lube oil temperature  $\geq 85^{\circ}\text{F}$ . Use a contact pyrometer on suction/supply line of 3 gpm Soakback (Aux) Lube Oil circulating pump in close proximity to exit of crankcase sump.
2. Soakback pump in service.

[b] **RESTORE** Lube Oil Circ pump to service (in <48 hours to maintain DG operable).

- [4] **IF** the soakback oil pumps (AC Aux. Lube Oil Circ Pump and DC Lube Oil Circulation Pump) (3 gpm) inoperable, **THEN**  
**DECLARE** 1B-B D/G inoperable.

- [5] **IF** D/G running due to emergency start, **THEN**  
**EVALUATE** emergency stop of D/G.

- [6] **EVALUATE** Plant Technical Specification Requirements LCO 3.8.1.1 and 3.8.1.2.

**References**

45N767-1, 45N767-6, 45N767-9, 45N767-10, 45B655-26B

<b>SQN</b>	<b>Page 15 of 41</b>	<b>0-AR-M26-B</b>
<b>1 &amp; 2</b>		<b>Rev. 27</b>

# SEQUOYAH NUCLEAR PLANT JOB PERFORMANCE MEASURE

## B.1.c JPM 153/SIM

### Emergency Mode Control Room Isolation due to High Rad

Original Signatures on File

**PREPARED/  
REVISED BY:**

Date/

**VALIDATED BY:**

\*

Date/

**APPROVED BY:**

Date/

(Operations Training Manager)

**CONCURRED:**

\*\*

Date/

(Operations Representative)

\* Validation not required for minor enhancements, procedure Rev changes that do not affect the JPM, or individual step changes that do not affect the flow of the JPM.

\*\* Operations Concurrence required for new JPMs and changes that affect the flow of the JPM (if not driven by a procedure revision).





**SPECIAL INSTRUCTIONS TO EVALUATOR:**

1. Sequenced steps identified by an "s"
2. Any UNSAT requires comments
3. Initialize Simulator in IC-77.
4. **NOTE: This JPM requires support from the Console Operator at several steps.**
5. **Ensure B Train Control Building A/C AHU and Electrical Board Room A/C AHU is in service [M-10].**
6. **Ensure 0-HS-311-105A and 0-HS-311-106A (Control Bldg fresh air inlet) is placed in A-Auto [M-10].**
7. NOTE: This JPM has been pre-shot in IC-77. Should IC-77 be erased or fail to perform as expected then use the following set-up instructions.
8. Initialize the simulator in IC-16:
9. Load the following malfunctions and overrides.
  - Initiate malfunction CH07A, failure of Train A Control Room Isolation
  - Initiate malfunction CH07B, failure of Train B Control Room Isolation
  - Initiate malfunction RM90125 to 10500 to set RM-90-125, Control Room Radmonitor, to a high rad condition.
  - Initiate malfunction RM90126 to 10500 to set RM-90-126, Control Room Radmonitor, to a high rad condition.
  - Override AN\_OV\_1255 to ON to set Control Room Isolation Train A alarm
  - Override AN\_OV\_1262 to ON to set Control Room Isolation Train B alarm
  - Override ZLOXX559A\_10 to OFF
  - Override ZLOXX559A\_9 to ON
  - Override ZLOXX559B\_32 to OFF
  - Override ZLOXX559B\_31 to ON
  - Override ZLOXX559A\_44 to OFF
  - Override ZLOXX559A\_43 to ON
  - Override ZLOXX559B\_20 to OFF
  - Override ZLOXX559B\_19 to ON
  - Override AN\_OV\_771 to ON (MCR intake monitor 125 hi rad)
  - Override AN\_OV\_776 to ON (MCR intake monitor 126 hi rad)
6. Acknowledge all alarms.
7. Ensure operator performs the following required actions for **SELF-CHECKING**;
  - a. Identifies the correct unit, train, component, etc.
  - b. Reviews the intended action and expected response.
  - c. Compares the actual response to the expected response.

**Validation Time: CR.** 15 mins                      **Local** \_\_\_\_\_

**Tools/Equipment/Procedures Needed:**  
0-SO-30-2 section 8.1

**References:**

	Reference	Title	Rev No.
1.	0-SO-30-2	Control Room Isolation	13

=====

**READ TO OPERATOR**

**Directions to Trainee:**

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM. I will provide initiating cues and reports on other actions when directed by you. When you complete the task successfully, the objective for this job performance measure will be satisfied. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

**INITIAL CONDITIONS:**

Both units are in MODE 1.  
All systems are aligned in automatic control.  
You are the CRO

**INITIATING CUES:**

You are to monitor the control boards and respond to conditions as required.

When all necessary actions have been completed notify the US.

—

Job Performance Checklist:

<b>STEP/STANDARD</b>		<b>SAT/UNSAT</b>
<p><u>STEP 1.:</u> Acknowledge Control Room Ventilation Isolation alarm.</p> <p><u>STANDARD:</u> Operator verifies Control Room Ventilation Isolation alarm acknowledged. Pulls AR-M6-C windows E-5 and E-6. Determines the need to perform the actions of 0-SO-30-2.</p> <p><u>COMMENTS:</u></p>	<p style="text-align: right;">___ SAT</p> <p style="text-align: right;">___ UNSAT</p> <p style="text-align: right;">Start Time ___</p>	
<p><u>STEP 2.:</u> Obtain proper procedure.</p> <p><u>STANDARD:</u> 0-SO-30-2 Section 8.1 identified as appropriate procedure.</p> <p><u>COMMENTS:</u></p>	<p style="text-align: right;">___ SAT</p> <p style="text-align: right;">___ UNSAT</p>	
<p><u>STEP 3.:</u> <b>[1] ACKNOWLEDGE</b> Control Room Ventilation Isolation alarm.</p> <p><u>STANDARD:</u> CRI alarm acknowledged.</p> <p><u>COMMENTS:</u></p>	<p style="text-align: right;">___ SAT</p> <p style="text-align: right;">___ UNSAT</p>	
<p><u>STEP 4.:</u> <b>[2] IF</b> CRI is from a valid SIS or High Radiation signal, <b>THEN</b></p> <p style="padding-left: 40px;"><b>NOTIFY</b> RADCON to monitor Control Building el. 732 work areas for habitability.</p> <p><u>STANDARD:</u> Operator determines that alarm is valid by observing RM-90-125 and 126 in alarm and notifies the Radiochemical Laboratory to take air samples and determine if the MCR must be evacuated.</p> <p><u>COMMENTS:</u></p>	<p style="text-align: right;">___ SAT</p> <p style="text-align: right;">___ UNSAT</p>	
<p><u>STEP 5.:</u> <b>[3] ENSURE</b> either Control Building A/C AHU <b>RUNNING</b> and associated AHU inlet <b>OPEN</b>.</p> <p><u>STANDARD:</u> Operator verifies that B Train Control Building A/C AHU is running and 0-FCO-311-23 is open</p> <p><u>COMMENTS:</u></p>	<p style="text-align: right;">___ SAT</p> <p style="text-align: right;">___ UNSAT</p>	

Job Performance Checklist:

STEP/STANDARD	SAT/UNSAT
<p><b>STEP 6:</b> [4] <b>IF</b> Control Building A/C AHUs stopped, <b>THEN...</b></p> <p><b>STANDARD:</b> Operator NAs this step.</p> <p><b>COMMENTS:</b></p>	<p>___ SAT</p> <p>___ UNSAT</p>
<p><b>STEP 7:</b> [5] <b>ENSURE</b> either Electrical Board Room Chiller <b>RUNNING</b> and associated AHU inlet <b>OPEN</b>.</p> <p><b>STANDARD:</b> Operator verifies that B Train Electrical Board Room A/C AHU is running and 0-FCO-311-28 is open</p> <p><b>COMMENTS:</b></p>	<p>___ SAT</p> <p>___ UNSAT</p>
<p><b>STEP 8:</b> [6] <b>ENSURE</b> either Control Building Emergency Air Cleanup fan <b>RUNNING</b> and associated fan inlet <b>OPEN</b>.</p> <p><b>STANDARD:</b> Operator verifies:</p> <p>0-HS-311-10A, Fan B, running and verify RED light LIT and verify RED light LIT for 0-FCO-311-11, Fan B Inlet.</p> <p><b>COMMENTS:</b></p>	<p>___ SAT</p> <p>___ UNSAT</p> <p><b>Critical Step</b></p>
<p><b>STEP 9:</b> [7] <b>ENSURE</b> at least one Emergency Air Pressurizing Fan <b>RUNNING</b> and associated fan inlet <b>OPEN</b>.</p> <p><b>STANDARD:</b> Operator starts ONE of the following Emergency Air Pressurizing fans and verifies its inlet open:</p> <p>Place 0-HS-311-108A, Fan A, to Start and verify RED light LIT and verify RED light LIT for 0-FCO-311-108, Fan A Inlet.</p> <p><b>OR</b></p> <p>Place 0-HS-311-109A, Fan B, to Start and verify RED light LIT and verify RED light LIT for 0-FCO-311-109, Fan B Inlet. <b>This step is critical to maintain positive pressure in the control room.</b></p> <p><b>COMMENTS:</b></p>	<p>___ SAT</p> <p>___ UNSAT</p> <p><b>Critical Step</b></p>

Job Performance Checklist:

STEP/STANDARD	SAT/UNSAT												
<p><b>STEP 10.: [8] ENSURE MCR and Spreading Room Fresh Air Fans STOPPED.</b></p> <p><b>STANDARD:</b> Operator verifies the following Spreading Room Supply and Exhaust Fans are stopped by the fan's GREEN light LIT <b>OR</b> places the handswitch to the STOP position and verify the GREEN light LIT:</p> <p>Spreading Room Supply Fan, 0-HS-311-36A</p> <p>Spreading Room Exhaust Fan A, 0-HS-311-79A [NOT critical, fan is already off]</p> <p>Spreading Room Exhaust Fan B, 0-HS-311-80A.</p> <p><b>This step is critical to maintain clean air to the control building.</b></p> <p><b>COMMENTS:</b></p>	<p>___ SAT</p> <p>___ UNSAT</p> <p><b>Critical Step</b></p>												
<p><b>NOTE</b> During Train testing the dampers that are not applicable to the Train being <u>tested</u> can be N/A.</p>													
<p><b>STEP 11.: [9] ENSURE MCR and Spreading Room Fresh Air Dampers CLOSED:</b></p> <table border="0"> <tr> <td>0-FCV-311-105A</td> <td>MCR fresh air</td> </tr> <tr> <td>0-FCV-311-106A</td> <td>MCR fresh air</td> </tr> <tr> <td>0-FCV-311-105B</td> <td>Spreading room fresh air (<b>Not Critical</b>)</td> </tr> <tr> <td>0-FCV-311-106B</td> <td>Spreading room fresh air (<b>Not Critical</b>)</td> </tr> <tr> <td>0-FCV-311-79</td> <td>Spreading Room Exhaust Fan A outlet (<b>Not Critical</b>)</td> </tr> <tr> <td>0-FCV-311-80</td> <td>Spreading Room Exhaust Fan B outlet (<b>Not Critical</b>)</td> </tr> </table> <p><b>NOTE:</b> The next two dampers in the procedure step are covered in the subsequent JPM step.</p> <p><b>STANDARD:</b> Operator closes the following dampers:</p> <p>Places 0-HS-311-105A to CLOSE to close 0-FCV-311-105A and -105B and verify GREEN lights LIT [<b>critical step</b>]</p> <p>Places 0-HS-311-106A to CLOSE to close 0-FCV-311-106A and -106B and verify GREEN lights LIT [<b>critical step</b>]</p> <p>Verifies 0-FCV-311-105B CLOSED by GREEN light LIT  Verifies 0-FCV-311-106B CLOSED by GREEN light LIT  Verifies 0-FCV-311-79 CLOSED by GREEN light LIT  Verifies 0-FCV-311-80 CLOSED by GREEN light LIT</p> <p><b>COMMENTS:</b></p>	0-FCV-311-105A	MCR fresh air	0-FCV-311-106A	MCR fresh air	0-FCV-311-105B	Spreading room fresh air ( <b>Not Critical</b> )	0-FCV-311-106B	Spreading room fresh air ( <b>Not Critical</b> )	0-FCV-311-79	Spreading Room Exhaust Fan A outlet ( <b>Not Critical</b> )	0-FCV-311-80	Spreading Room Exhaust Fan B outlet ( <b>Not Critical</b> )	<p>___ SAT</p> <p>___ UNSAT</p> <p><b>Critical Step</b></p>
0-FCV-311-105A	MCR fresh air												
0-FCV-311-106A	MCR fresh air												
0-FCV-311-105B	Spreading room fresh air ( <b>Not Critical</b> )												
0-FCV-311-106B	Spreading room fresh air ( <b>Not Critical</b> )												
0-FCV-311-79	Spreading Room Exhaust Fan A outlet ( <b>Not Critical</b> )												
0-FCV-311-80	Spreading Room Exhaust Fan B outlet ( <b>Not Critical</b> )												

Job Performance Checklist:

STEP/STANDARD	SAT/UNSAT
<b>EVALUATOR NOTE</b> This is a continuation of procedure step 9 from previous page.	
<b>Booth Operator:</b> Insert the following to close 0-FCO-311-17. Override ZLOXX559A_10 to ON Override ZLOXX559A_9 to OFF Insert the following to close 0-FCO-311-102. Override ZLOXX559B_32 to ON Override ZLOXX559B_31 to OFF	
<p><u>STEP 11 Continued:</u>   ENSURE the Spreading Room Fresh Air Dampers CLOSED:</p> <p>0-FCV-311-17           Spreading Room supply discharge  0-FCV-311-102         Spreading Room supply discharge</p> <p><b>NOTE:</b>           Spreading room supply discharge dampers 0-FCO-311-17 &amp; 102 have control room indications only, personnel will have to be dispatched locally to close these dampers.</p> <p><b>NOTE:</b>           Close 0-FCO-311-17 and 0-FCO-311-102 with overrides above</p> <p><b>Cue:</b>             <i>Role-play as an AUO when requested to locally close the dampers.</i></p> <p><u>STANDARD:</u>       Operator dispatches personnel locally to close them:   Requests SM/SRO to dispatch personnel or dispatches personnel to CLOSE 0-FCV-311-17 &amp; 0-FCV-311-102 locally.   <b>This step is critical to maintain clean air to the control room.</b></p> <p><u>COMMENTS:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p> <p><b>Critical Step</b></p>
<p><u>STEP 12:</u> [10] ENSURE Locker Room Exhaust Fan STOPPED.</p> <p><u>STANDARD:</u>       Operator places 0-HS-311-81A to the PTL position and verifies the GREEN light LIT.   <b>This step is critical to maintain clean air to the control room.</b></p> <p><u>COMMENTS:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p> <p><b>Critical Step</b></p>



Job Performance Checklist:

STEP/STANDARD	SAT/UNSAT
<p><b>Booth Operator:</b>  Insert the following to close 0-FCO-311-17.  Override ZLOXX559A_44 to ON  Override ZLOXX559A_43 to OFF  Insert the following to close 0-FCO-311-102.  Override ZLOXX559B_20 to ON  Override ZLOXX559B_19 to OFF</p>	
<p><b>STEP 13.: [11] ENSURE</b> Locker Room Exhaust Dampers <b>CLOSED:</b></p> <p>0-FCO-311-103, Toilet and Locker Room Exhaust Fan Discharge  0-FCO-311-104, Toilet and Locker Room Exhaust Fan Discharge</p> <p><b>Note:</b> These dampers have control room indications only, personnel will have to be dispatched locally to close these dampers.</p> <p><b>Note:</b> Close 0-FCO-311-103 and 0-FCO-311-103 with overrides above</p> <p><b>Cue:</b> <i>Role-play as an AUO when requested to locally close the dampers.</i></p> <p><b>STANDARD:</b> Operator requests SM/SRO to dispatch personnel or dispatches personnel requests SM/SRO to locally close 0-FCO-311-103 and 0-FCV-311-104.</p> <p>This step is critical to maintain clean air to the control room.</p> <p><b>COMMENTS:</b></p>	<p>___ SAT</p> <p>___ UNSAT</p> <p><b>Critical Step</b></p>
<p><b>NOTE</b> Battery Room Exhaust Fans are started and stopped, via their respective breakers on the 480V C&amp;A Vent Boards.</p>	
<p><b>STEP 14.: [12] IF</b> one Electrical Board Room AHU in service, <b>THEN ENSURE</b> one of the following Battery Room Exhaust Fans are <b>RUNNING.</b></p> <p>[a] Battery Room Exhaust Fan A. [C&amp;A Vent Board 1A1-A / 12A]  [b] Battery Room Exhaust Fan B. [C&amp;A Vent Board 1B1-B / 11E]  [c] Battery Room Exhaust Fan C. [C&amp;A Vent Board 2B1-B / 11E]</p> <p><b>STANDARD:</b> Operator verifies one of the following Battery Room Exhaust Fans are running by RED light LIT or places one of the handswitches to START and verifies RED light LIT:</p> <p>0-HS-311-33A, Battery Room Exhaust Fan A  0-HS-311-34A, Battery Room Exhaust Fan B  0-HS-311-35A, Battery Room Exhaust Fan C</p> <p><b>COMMENTS:</b></p>	<p>___ SAT</p> <p>___ UNSAT</p>

Job Performance Checklist:

STEP/STANDARD	SAT/UNSAT
<p><b>STEP 15.: [13] IF</b> Electrical Board Room AHUs stopped, <b>THEN PERFORM</b> the following:</p> <p><b>STANDARD:</b> Operator N/As the step because one Electrical Board Room AHU is running.</p> <p><b>COMMENTS:</b></p>	<p>___ SAT</p> <p>___ UNSAT</p>
<p><b>STEP 16.: [14] IF</b> Battery Room Exhaust Fans off and either Electrical Board Room AHU running, <b>THEN</b></p> <p><b>CLOSE</b> damper, <b>[31A-157]</b> (Located above Auxiliary Instrument Room Access Door).</p> <p><b>STANDARD:</b> Operator N/As the step because one Battery Room Exhaust Fan is running.</p> <p><b>COMMENTS:</b></p>	<p>___ SAT</p> <p>___ UNSAT</p>
<p><b>STEP 17.: [15] ENSURE</b> Shutdown Board Room Pressurizing Fans A and B <b>STOPPED.</b></p> <p><b>STANDARD:</b> Operator places the following fans handswitches to the STOP position and verifies the GREEN light is LIT for each fan:</p> <p>0-HS-313-383A, 1A-A Pressurizing Fan  0-HS-313-384A, 1B-B Pressurizing Fan  0-HS-313-391A, 2A-A Pressurizing Fan  0-HS-313-392A, 2B-B Pressurizing Fan</p> <p><b>This step is critical to maintain clean air to the SDBd Room.</b></p> <p><b>COMMENTS:</b></p>	<p>___ SAT</p> <p>___ UNSAT</p> <p><b>Critical Step</b></p>
<p><b>STEP 18.: [16] IF</b> it is desired to align the Train A Control Room Emergency Ventilation System (CREVS) P-AUTO (standby mode operation), <b>THEN PERFORM</b> the following.</p> <p><b>Cue:</b> <i>Direct the operator that Train A CREVS is not to be placed in standby at this time.</i></p> <p><b>STANDARD:</b> Operator N/As this step.</p> <p><b>COMMENTS:</b></p>	<p>___ SAT</p> <p>___ UNSAT</p>

Job Performance Checklist:

STEP/STANDARD	SAT/UNSAT
<p><b>STEP 19.: [17]</b> IF it is desired to align the Train B Control Room Emergency Ventilation System (CREVS) to P-AUTO (standby mode operation), <b>THEN PERFORM</b> the following.</p> <p><b>Cue:</b> <i>Direct the operator that Train B CREVS is not to be placed in standby at this time.</i></p> <p><b>STANDARD:</b> Operator N/As this step.</p> <p><b>COMMENTS:</b></p>	<p>___ SAT</p> <p>___ UNSAT</p>
<p><b>STEP 20.: [18]</b> IF paint or solvents were used on Control Building el 732 or the Control Building roof within the 24 hours prior to CREVS startup, <b>THEN</b></p> <p><b>NOTIFY</b> Systems Engineering to evaluate affect on CREVS charcoal filters and to ensure compliance with Tech Spec 4.7.7.c.</p> <p><b>Cue:</b> <i>Paint or solvents have not been used in the last 24 hours.</i></p> <p><b>STANDARD:</b> Operator N/As this step and notifies the US/SRO that Emergency Mode Control Room Isolation has been completed.</p> <p><b>COMMENTS:</b></p>	<p>___ SAT</p> <p>___ UNSAT</p> <p>Stop Time___</p>

END Of JPM

**CANDIDATE CUE SHEET**  
**(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)**

**DIRECTION TO TRAINEE:**

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

**INITIAL CONDITIONS:**

Both units are in MODE 1.

All systems are aligned in automatic control.

You are the CRO

**INITIATING CUES:**

You are to monitor the control boards and respond to conditions as required.

When all necessary actions have been completed notify the US.