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May 9 1995

UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION  
Before the Atomic Safety and Licensing Board

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OFFICE OF SECRETARY  
DOCKETING & SERVICE

In the Matter of	)	Docket Nos. 50-424-OLA-3
	)	50-425-OLA-3
GEORGIA POWER COMPANY,	)	
et al.	)	Re: License Amendment
	)	(Transfer to Southern
	)	Nuclear)
(Vogtle Electric Generating	)	
Plant, Units 1 and 2)	)	
	)	ASLBP No. 93-671-01-OLA-3

GEORGIA POWER COMPANY RESPONSE TO BOARD QUESTION  
CONCERNING THE DEFINITION OF SUCCESSFUL START

The Licensing Board's presiding officer suggested that it would be helpful to the Board to have the part of Plant Vogtle procedures, specifically VEGP Procedure 13145, which defines "successful start." Tr. 4282-83. The context of the presiding officer's comment was the record-keeping requirements placed on operators for recording starts in the control room logs.

Georgia Power previously provided the Licensing Board with copies of Vogtle Unit 1 Procedure 13145-1 entitled "Diesel Generators", and Procedure 14980-1 in effect at the time of the March 20, 1990 site area emergency. Georgia Power Company's Response to Board's Memorandum and Order (Board Questions and Concerns), dated June 9, 1994. Additional copies of these procedures are attached hereto as Attachments A and B, respectively.

The logkeeping requirements of these two procedures are found at Section 2.2.9 of Procedure 13145-1 (page 5) and Section

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3.6 of Procedure 14980-1 (page 2)<sup>1</sup>. Both procedures have "Completion Sheet 1" forms (page 30 of Procedure 13145-1 and page 27 of the Procedure 14980). These Completion Sheets contain "Diesel Generator Start Evaluation" sections, including a check off for "Successful Start." Section 4.3.1.11 of Procedure 13145-1 (page 15) and Section 7.2.3 of Procedure 14980-1 (page 21) require the Completion Sheet notification to the Diesel Generator System Engineer.

Neither Procedure 13145-1 nor Procedure 14980-1 define a "successful start." Both contain a "Table 1" entitled "D/G Valid Test and Failure Evaluation Criteria" which refers to successful starts (Procedure 13145-1, page 29; Procedure 14980-1, page 24). These tables refer to Regulatory Guide 1.108 and the applicable Technical Specification requirement for reporting all diesel generator failures, valid or nonvalid, pursuant to a Special Report.<sup>2</sup>

Vogtle Procedure 55038-C, entitled "Diesel Start Log", addresses the Engineering Support Department's diesel log. While

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<sup>1</sup> A third procedure, entitled "Logkeeping" and designated Procedure 10001-C, provides guidance for keeping operations narrative logs, including Shift Supervisor Log (Section 2.2) and Unit Control Logs (Section 2.3). A copy of this procedure is attached as Attachment C.

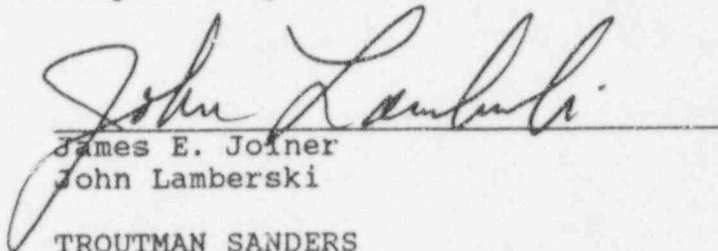
<sup>2</sup> These tables contain diesel start evaluation guidance that comes directly from Regulatory Guide 1.108, Section C.2.e. The Regulatory Guide also uses the "successful starts" terminology but does not explicitly define it. However, it does define the term "failure" (i.e., "the failure to start, accelerate, and assume the design-rated load within and for the time prescribed during an emergency or valid test"), and provides additional information such that one can reasonably determine the meaning of "successful start."

this procedure does not define "successful start," Section 3.1 defines "failure" as:

The diesel does not start, accelerate and assume the design rated load within and for the time prescribed during an emergency or a valid test.<sup>3</sup>

Section 3.3 contains criteria for "Valid Tests and Failures" comparable to Table 1 in Procedures 13145 and 14980. A copy of Procedure 55038 was enclosed with Georgia Power's July 20, 1994 Response to the Board's Memorandum and Order dated June 9, 1994. An additional copy of the procedure is attached hereto for convenience as Attachment D.

Respectfully submitted

  
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<sup>3</sup> This definition of "failure" is taken from Regulatory Guide 1.108, Section B.

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UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION  
BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of  
GEORGIA POWER COMPANY,  
et al.

(Vogtle Electric Generating Plant,  
Units 1 and 2)

*	Docket Nos. 50-424-OLA-3
*	50-425-OLA-3
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*	Re: License Amendment
*	(Transfer to Southern Nuclear)
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*	ASLBP No. 93-671-01-OLA-3

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Date

2-5-90

Vogtle Electric Generating Plant  
NUCLEAR OPERATIONS

Georgia Power

Procedure No.

13145-1

Revision No.

20

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DIESEL GENERATORS

FOR INFORMATION ONLY

1.0

PURPOSE

This procedure provides instructions for the operation of the Diesel Generators. This procedure should be used for maintenance troubleshooting or maintenance testing. Operability of the Diesel Generator is proven using 14980-1, "Diesel Generator Operability Test". Specific instructions are provided in the following subsections:

- 4.1.1 Preparing Train A(B) Diesel Generator For Automatic Operation
- 4.1.2 Local Startup Of Train A(B) Diesel Generator
- 4.1.3 Startup Of Train A(B) Diesel Generator From The Control Room
- 4.3.1 Stopping Train A(B) Diesel Generator
- 4.4.1 Cylinder Moisture Check
- 4.4.2 Emergency Stopping Train A(B) Diesel Generator
- 4.4.3 Diesel Generator Operation Under LOCA Conditions
- 4.4.4 Adding Lube Oil To The Diesel Generator Sump
- 4.4.5 Switching From In-Service Lube Oil Filter To Standby Filter With Diesel Generator In Operation.
- 4.4.6 Switching From In-Service Fuel Oil Filter To Standby Filter With Diesel Generator In Operation.
- 4.4.7 Switching From In-Service Fuel Oil Strainer To Standby Strainer With Diesel Generator In Operation
- 4.4.8 Generator Failure During Loss of Offsite Power

EXHIBIT A

EXHIBIT

92 PROJECT 062262

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## 2.0 PRECAUTIONS AND LIMITATIONS

### 2.1 PRECAUTIONS

2.1.1 A Diesel Generator must be taken out of service if any resistance to engine rotation is encountered while operating the Pneumatic Barring Device.

2.1.2 The following Diesel Generator Electrical Protection Relays are bypassed during a Normal Start when the Diesel Generator is not paralleled to the off-site power grid.

- a. Reverse Power 132,
- b. Underfrequency 181,
- c. Negative Phase Sequence 146.

2.1.3 When operating under actual Safety Injection Emergency Start conditions, the only active Diesel Generator protective devices are:

- a. Generator Differential 187A, B, C,
- b. Low Lube Oil Pressure,
- c. High Jacket Water Temperature,
- d. Engine Overspeed.

2.1.4 The Lube Oil and Jacket Water Keep-Warm Pumps and Heaters and the Generator Space Heater should be operating whenever a Diesel Generator is aligned for automatic startup.

2.1.5 The governor Load Limit, Speed or Speed Droop settings should not be altered unless:

- a. Required by an approved test procedure, or
- b. The Torque Seal has been damaged or broken.

The Maintenance Department should be notified per 00350-C, "Maintenance Program" to make any changes or corrections to the governor settings.

2.1.6 If the Diesel Generator is in continuous operation, additional supplies of fuel oil shall be ordered on or before the fifth day of continuous operation.

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2.1.7	The emergency Diesel Generators shall not be used for peaking service.		
2.1.8	If the Diesel Generator is being operated in the Parallel mode never transfer the LOCAL-REMOTE Switch 1-HS-4516 (4517) on PDG1 (PDG3) to LOCAL as this will take governor and voltage regulator out of the droop mode.		
2.1.9	When the Diesel Generator is paralleled to the offsite power grid the kVAR load should be maintained OUT and less than one half of the kilowatt load.		
2.1.10	The Diesel Generators should not be operated in parallel with the offsite grid for prolonged periods of time. This is to keep disturbances in the grid from affecting the Diesel Generators.		
2.1.11	Only one Diesel Generator should be operated at a time except during emergency conditions.		
2.2	LIMITATIONS		
2.2.1	A Diesel Generator will not accept an Emergency Start signal from the Control Room if any of the following conditions exist:		
	a. Local/Remote Switch 1-HS-4516 (4517) at PDG1 (PDG3) is in LOCAL,		
	b. Starting air pressure in both air headers is less than 150 psig,		
	c. Engine controls are in the maintenance mode,		
	d. Emergency Stop circuit energized,		
	e. Overspeed trip not reset.		



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#### NOTE

A Diesel Generator Emergency Start is initiated by closure of the Train A or B Engineered Safety Feature Safety Injection contacts or operation of the manual break-glass station at the Engine Control Panel. All other Diesel Generator start signals are considered to be a Normal Start.

- 2.2.2 The following Diesel Engine shutdown signals are bypassed during an Emergency Start:
  - a. High crankcase pressure,
  - b. High engine/turbocharger vibration,
  - c. Low turbocharger oil pressure,
  - d. High engine bearing temperature,
  - e. High engine lube oil temperature,
  - f. Low jacket water pressure.
- 2.2.3 The rated capacity of a Diesel Generator is 7000 kW, load should not be permitted to exceed 7000 kW during testing unless specifically required by the test procedure. A 10% overload of 7700 kW is allowed for 2 hours during emergency operation.
- 2.2.4 The Diesel Generators should not be operated at less than 30% load (2100 kW) for prolonged periods of time.
- 2.2.5 If prolonged operation at less than 30% load cannot be avoided, the Diesel Generator should be loaded to 50% (3500 kW) for a 2 hour period for each 24 hour period of low or no-load operation.
- 2.2.6 The Diesel Generators can operate at full load for 3 minutes with no Nuclear Service Cooling Water (NSCW) flow. If NSCW flow is not established within 3 minutes to a running Diesel Generator, the Diesel Generator should be tripped.
- 2.2.7 The pneumatic engine barring device will only operate when the engine is in the MAINTENANCE mode and must be disengaged before the engine can return to the OPERATION mode.

- 2.2.8 Once initiated, the Diesel Generator shutdown signals remain in effect for 90 seconds. During this period, the Diesel Generator will only respond to an Emergency Start signal generated by a Safety Injection Actuation signal or the local break glass station. To preclude the depletion of starting air, wait until local red stopping light is OFF (approximately 90 seconds) after a normal stop before attempting to start the diesel normally.
- 2.2.9 All start attempts, including those from bona fide start signals, shall be logged in the Unit Shift Supervisor's or Unit Control logbook. The log entry shall include the following information:
- a. Start time,
  - b. Reason for start,
  - c. Success or failure of the start attempt.
- 2.2.10 Two separate and independent Diesel Generators shall be operable in Modes 1,2,3, and 4. Technical specification 3.8.1.1.
- 2.2.11 One Diesel Generator shall be operable in Modes 5 and 6. Technical specification 3.8.1.2.
- 2.2.12 If a Diesel Generator has been operated for a period of one hour or greater, the Diesel Fuel Oil Day Tank shall be checked for water. Technical Specification 4.8.1.1.2b.
- 2.2.13 If during a Diesel Engine start the Fail To Start alarm comes in but the engine keeps running, the support systems will operate as if the engine was shut down. To reset these systems the START Pushbutton must be pressed. This will stop the Keep Warm Pumps, turn off the Keep Warm Heaters, stop the Crankcase Fans and place the alarms in service that are bypassed when shut down.
- 3.0 PREREQUISITES OR INITIAL CONDITIONS
- 3.1 The NSCW System is in service to provide cooling water to the Diesel Generator Jacket Water Heat Exchangers.
- 3.2 The Diesel Generator Building HVAC System is available to provide ventilation during diesel operation.
- 3.3 The Starting Air Dryers have been energized for at least 24 hours. (Applies to Sub-subsection 4.1.1 only unless alternate means of heating are available with Engineering concurrence.)



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#### 4.0 INSTRUCTIONS

##### NOTE

This procedure is written using Train A component designations. Train B designations are shown in parenthesis.

#### 4.1 STARTUP

- 4.1.1 Preparing Train A (B) Diesel Generator For Automatic Operation
  - 4.1.1.1 COMPLETE 11145-1, "Diesel Generator Alignment".
  - 4.1.1.2 PLACE the Jacket Water Circulating Pump and Standpipe Heater in service:
    - a. CHECK that the LOW LEVEL JACKET WATER annunciator is not lit,
    - b. CHECK the Jacket Water Standpipe Level 1-LI-5741 (5742) is greater than 90%,
    - c. At 480V MCC 1NBI (1NBO), START Jacket Water Circulating Pump 1-2403-G4-001(002)-P04 by placing the local handswitch in AUTO,
    - d. At 480V MCC 1NBI (1NBO), ENERGIZE Jacket Water Heater 1-2403-G4-001(002)-H01 by placing the local handswitch in AUTO.

##### NOTE

Oil should be added via the Lube Oil Sump Dipstick connection to bring the level into specification.

- 4.1.1.3 CHECK Lube Oil Sump Dipstick level between HIGH STATIC and LOW STATIC.

## NOTE

If the Lube Oil Circulating Pump (Keep-Warm Pump) cannot be started, the Diesel Generator should be declared inoperable and maintenance initiated to repair the pump.

4.1.1.4 PLACE the Lube Oil Circulating Pump and Lube Oil Heater in service:

- a. CHECK the Low Level Lube Oil Annunciator is reset,

## NOTE

The Lube Oil Circulating Pump Discharge Relief Valve may lift until the lube oil temperature is above 125°F.

- b. At 480V MCC 1NBI (1NBO), START Lube Oil Circulating Pump 1-2403-G4-001(002)-P07 by placing the local handswitch in AUTO,
- c. At 480V MCC 1NBI (1NBO), ENERGIZE Lube Oil Heater 1-2403-G4-001(002)-H02 by placing the local handswitch in AUTO.

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#### 4.1.1.5 PLACE the Starting Air System in service:

##### CAUTION

120V AC power must be available to the Air Dryers at least 24 hours prior to starting the refrigeration units unless alternate means of heating are available with Engineering concurrence.

- a. START Air Dryer 1-2403-G4-001(002)-K01 and K02 refrigeration units,

##### NOTE

The red High Air Temperature light will come on when the refrigeration unit is started and will remain on for approximately 15 minutes. The Air Compressor should not be started until the red light on the Air Dryer goes off.

- b. At MCC 1NBI (1NBO), PLACE Air After Cooler Fans 1-2403-G4-001(002)-E01 and E02 in AUTO by placing the local handswitches in AUTO,
- c. At MCC 1NBI (1NBO), START Air Compressors 1-2403-G4-001(002)-C01 and C02 by placing the local handswitches in AUTO.

- 4.1.1.6 When Starting Air Receiver pressure reaches 25 psig, CRACK OPEN Receiver Drain Valves 1-2403-X4-762 (723) and 772 (728) to remove accumulated water and sediment, then CLOSE; independent verification closed required.
- 4.1.1.7 When Starting Air Receiver pressure reaches 245 to 255 psig, CHECK that the Air Compressors automatically shut down.
- 4.1.1.8 INITIATE 13146-1, "Diesel Generator Fuel Oil Transfer System" to establish a fuel oil supply to the engine.
- 4.1.1.9 COMPLETE Checklist 1 (2), Train A (B) Diesel Generator Standby Mode Status Check.
- 4.1.1.10 The Train A (B) Diesel Generator is now available for automatic starting.

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#### 4.1.2 Local Startup Of Train A (B) Diesel Generator

##### CAUTION

Prior to removing a Diesel Generator from standby, in modes 1, 2, 3 or 4, ensure that all of the safety related equipment for the other train is in service.

- 4.1.2.1 REQUEST permission to take the Train A (B) Diesel Generator out of standby.
- 4.1.2.2 If the engine cylinders have not been checked for moisture within the last 4 hours, PERFORM Sub-subsection 4.4.1, Cylinder Moisture Check.
- 4.1.2.3 At Generator Control Panel PDG1 (PDG3):
  - a. PLACE Local Remote Switch 1-HS-4516 (4517) in LOCAL,
  - b. If the generator is not to be paralleled to the off-site grid, PLACE Diesel Generator Output Breaker Control Switch 1-HS-1AA0219 (1BA0319) on QEAB in the PULL-TO-LOCK position.
- 4.1.2.4 At Engine Control Panel PDG2 (PDG4), VERIFY the ENGINE CONTROL IN LOCAL annunciator alarm energizes.

##### CAUTION

The Turbo Lube Oil Orifice Bypass Valve should be opened 1-2 minutes prior to diesel start, and should be promptly closed after the start. Excess prelubrication may result in oil accumulation in the exhaust piping and an exhaust fire upon engine start.

- 4.1.2.5 OPEN the Turbo Lube Oil Orifice Bypass Valve 1-2403-U4-130 (131) one to two minutes prior to starting the Diesel Generator.
- 4.1.2.6 ALERT personnel in the vicinity of the Train A (B) Diesel Generator Building that engine startup is commencing.

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### CAUTIONS

- a. Turbocharger Oil Pressure Gauges 1-PI-19170 (19171) and 1-PI-19170A (19171A) should be monitored during startup, and the STOP pushbutton depressed if oil pressure is not indicated within 15 seconds.
- b. If the Generator Field fails to flash, immediately stop the diesel and notify Engineering for an evaluation of the problem.

### NOTE

When the Diesel Generator is started, the Generator Trouble Alarm may annunciate due to a spurious actuation of the Generator Field Ground relay. This is a normal startup alarm.

- 4.1.2.7 DEPRESS Manual Start pushbutton 1-HS-4569A (4570A).
- 4.1.2.8 CLOSE the Turbo Lube Oil Orifice Bypass Valve 1-2403-U4-130 (131); independent verification required.
- 4.1.2.9 If the Generator Field Ground relay flag is visible, then PERFORM the following at Generator Control Panel PDG1 (PDG3):
  - a. RESET the DG1A (DG1B) Generator Field Ground relay flag by placing the Generator Field Ground relay test switch to the RESET position,
  - b. DEPRESS the Relay Target Reset Pushbutton.
- 4.1.2.10 At 480V MCC 1NBI (1NBO), CHECK the following:
  - a. The Generator Space Heater is OFF,
  - b. The Jacket Water Circulating Pump is OFF,
  - c. The Lube Oil Circulating Pump is OFF.



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- 4.1.2.11 While the Diesel Generator is operating, CHECK for rubbing or excessive vibrations of small diameter tubing supporting Diesel Generator operation, e.g., fuel lines, instrumentation or instrument air tubing.
- 4.1.2.12 If the Diesel Engine is operated for more than 10 minutes, INITIATE 11885-C, "Diesel Generator Operating Log".
- 4.1.3 Startup Of Train A (B) Diesel Generator From The Control Room

#### NOTE

Complete instructions for paralleling a Diesel Generator to its respective Class 1E bus are contained in 13427-1, "4160V AC 1E Electrical Distribution". The following steps are provided for engine startup.

- 4.1.3.1 DISPATCH an operator to the Train A (B) Diesel Generator Building.
- 4.1.3.2 If the engine cylinders have not been checked for moisture within the last 4 hours, COMPLETE Sub-subsection 4.4.1, Cylinder Moisture Check.

#### CAUTION

The Turbo Lube Oil Orifice Bypass Valve should be opened 1-2 minutes prior to diesel start, and should be promptly closed after the start. Excess prelubrication may result in oil accumulation in the exhaust piping and an exhaust fire upon engine start.

- 4.1.3.3 OPEN the Turbo Lube Oil Orifice Bypass Valve, 1-2403-U4-130 (131) one to two minutes prior to starting the Diesel Generator.
- 4.1.3.4 ALERT personnel in the vicinity of the Train A (B) Diesel Generator Building that engine startup is commencing.



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#### CAUTIONS

- a. Turbocharger Oil Pressure Gauges 1-PI-19170 (19171) and 1-PI-19170A (19171A) should be monitored during startup, and the STOP pushbutton depressed if oil pressure is not indicated within 15 seconds.
- b. If the Generator Field fails to flash, immediately stop the Diesel and notify Engineering for an evaluation of the problem.

#### NOTE

When the Diesel Generator is started, the Generator Trouble Alarm may annunciate due to a spurious actuation of the Generator Field Ground relay. This is a normal startup alarm.

- 4.1.3.5 At the Electrical Auxiliary Board, DEPRESS Start pushbutton 1-HS-4569B (4570B).
- 4.1.3.6 CLOSE the Turbo Lube Oil Orifice Bypass Valve 1-2403-U4-130 (131); independent verification required.
- 4.1.3.7 If the Generator Field Ground relay flag is visible, then PERFORM the following at Generator Control Panel PDG1 (PDG3):
  - a. RESET the DG1A (DG1B) Generator Field Ground relay flag by placing the Generator Field Ground relay test switch to the RESET position,
  - b. DEPRESS the Relay Target Pushbutton.
- 4.1.3.8 At 480V AC MCC 1NBI (1NBO), CHECK the following:
  - a. The Generator Space Heater is OFF,
  - b. The Jacket Water Circulating Pump is OFF,
  - c. The Lube Oil Circulating Pump is OFF.
- 4.1.3.9 While the Diesel Generator is operating, CHECK for rubbing or excessive vibrations for small diameter tubing supporting Diesel Generator operation, e.g., fuel lines, instrumentation or instrument air tubing.
- 4.1.3.10 If the Diesel Engine is operated for more than 10 minutes, INITIATE 11885-C, "Diesel Generator Operating Log".

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4.1.3.11 If the Diesel Generator is to be synchronized to its associated Class 1E bus, PERFORM the following:

- a. NOTIFY the System Operator that the Diesel Generator is being synchronized,
- b. GO to 13427-1, "4160V AC 1E Electrical Distribution System".

4.2 SYSTEM OPERATION

NONE

4.3 SHUTDOWN

4.3.1 Stopping Train A (B) Diesel Generator

#### CAUTION

If a Safety Injection (SI) signal is received during engine coastdown, monitor lube oil pressure and trip the Diesel Generator if pressure falls below the trip setpoint of 30 psi.

4.3.1.1 To stop Train A (B) Diesel Generator from the Electrical Auxiliary Board:

- a. DEPRESS Stop Pushbutton 1-HS-4571B (4572B),
- b. OBSERVE generator voltage drops to zero,
- c. PLACE the Unit/Parallel Switch 1-HS-4414B (4452B) to UNIT, momentarily.

4.3.1.2 To stop Train A (B) Diesel Generator from the Diesel Generator Building:

- a. At the Generator Control Panel, PLACE the LOCAL/REMOTE Switch 1-HS-4516 (4517) to LOCAL,
- b. At the Engine Control Panel, DEPRESS Stop pushbutton 1-HS-4571A (4572A),
- c. CHECK red STOPPING lamp lit,
- d. PLACE the Unit/Parallel Switch 1-HS-4414A (4452A) in UNIT, momentarily,
- e. PLACE 1-HS-4516 (4517) in REMOTE; independent verification required.

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4.3.1.3 VERIFY the following:

- a. The Generator Space Heater is ON,
- b. The Jacket Water Keep-Warm Pump starts,
- c. The Lube Oil Keep-Warm Pump starts.

4.3.1.4 After approximately 2 minutes, VERIFY that the blue UNIT AVAILABLE lamp is ON, and the red STOPPING light is off.

4.3.1.5 If after approximately 2 minutes, the red STOPPING light is NOT off, RESET as follows:

NOTE

Handswitch is found on the front of the engine auxiliary skid.

- a. PLACE the pushbutton 1-HS-4688 (4689), DG1A (DG1B) RUN/STOP, in the PUSH-TO-STOP position for approximately 10 seconds,
- b. PLACE the pushbutton 1-HS-4688 (4689), DG1A (DG1B) RUN/STOP, in the PULL-TO-RUN position,
- c. VERIFY the red STOPPING light is off and the blue UNIT AVAILABLE light is ON.

4.3.1.6 If the UNIT AVAILABLE lamp does not light, CHECK the following:

- a. Power available status lights ON,
- b. Generator Differential Protection Relay 186A reset,
- c. Emergency stop signal reset,
- d. Overspeed trip reset,
- e. Starting air pressure is greater than 210 psig,
- f. Control air pressure is greater than 45 psig.

4.3.1.7 CHECK that lube oil and jacket cooling water temperatures stabilize between 142° and 170°F.

4.3.1.8 If the Diesel Generator is to be returned to standby readiness, PERFORM Checklist 1 (2), "Diesel Generator Standby Mode Status Check".

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- 4.3.1.9 SHUT DOWN and ALIGN for STANDBY the Diesel Generator Building HVAC System per 13325-1 "Auxiliary Feedwater Pump House And Diesel Generator HVAC Systems".

NOTE

Accumulated water must be drained from the Fuel Oil Day Tank per Technical Specification 4.8.1.1.2.b.

- 4.3.1.10 If the Diesel Generator was operated for a period of one hour or more, SAMPLE the Diesel Generator Diesel Fuel Oil (DFO) Day Tank for water:
- a. OBTAIN a clear container one liter size or larger,
  - b. DRAIN a small amount of fuel oil into the container from the DFO Day Tank Drain, 1-2403-U4-035 (036),
  - c. EXAMINE the sample for water on the bottom of the container,
  - d. If water is detected, REPEAT the sample until no water is found,
  - e. Independently verify locked closed 1-2403-U4-035 (036).
- 4.3.1.11 NOTIFY the Diesel Generator System Engineer of the Diesel Generator operation by dispatching the following:
- a. A completed copy of Completion Sheet 1,
  - b. A copy of every completed 11885-C, "Diesel Generator Operating Log" if taken.



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#### 4.4 NON-PERIODIC OPERATION

##### 4.4.1 Cylinder Moisture Check

###### CAUTIONS

- a. While performing the cylinder moisture check the Diesel Generator is not available for standby service.
- b. If the Diesel Generator is out of service for more than one hour, ensure the action items of Technical Specification 3.8.1 are completed.
- c. A cylinder moisture check should not be performed if in an action statement of Technical Specification 3.8.1.1 or 3.8.1.2.

- 4.4.1.1 REQUEST permission to remove Train A (B) Diesel Generator from standby.
- 4.4.1.2 At the Generator Control Panel, PLACE Local/Remote Switch 1-HS-4516 (4517) in LOCAL.
- 4.4.1.3 At the Engine Control Panel, DEPRESS Maintenance Mode Pushbutton 1-HS-4577 (4578).
- 4.4.1.4 VERIFY that the Fuel and Air Shutdown Cylinders fully extend.

###### CAUTION

If any water is discovered in the Intake Air Manifold, notify the Unit Shift Supervisor (USS) and discontinue this procedure until the problem has been identified and corrected.

- 4.4.1.5 CHECK the Intake Air Manifold for water by opening each of the Drain Valves checking for water then closing:
  - a. 1-2403-X4-427 (428),
  - b. 1-2403-X4-431 (432),
  - c. 1-2403-X4-425 (426),
  - d. 1-2403-X4-429 (430).
- 4.4.1.6 Fully OPEN all cylinder cocks.

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#### NOTE

Any moisture in the Barring Device Air Filter should be removed by blowing down the filter.

- 4.4.1.7 OPEN 1-2403-X4-761 (724) the Air Receiver 1 Supply To Engine Barring Device.
- 4.4.1.8 UNLOCK the Pneumatic Barring Device by removing the lockout pin.

#### CAUTION

Any evidence of water in the engine during the following steps should be brought to the attention of the USS and this procedure should be discontinued.

- 4.4.1.9 ENGAGE the barring device and bar the engine over two revolutions while monitoring the cylinder cock for evidence of moisture.
- 4.4.1.10 CHECK all cylinder cocks for evidence of moisture.
- 4.4.1.11 DISENGAGE and LOCKOUT the Pneumatic Barring Device.
- 4.4.1.12 VERIFY the BARRING DEVICE ENGAGED annunciator alarm resets.
- 4.4.1.13 CLOSE 1-2403-X4-761 (724) Air Receiver 1 Supply To Engine Barring Device.
- 4.4.1.14 OPEN the Turbo Lube Oil Orifice Bypass Valve 1-2403-U4-130 (131) for approximately 30 seconds then close.

#### NOTES

- a. Due to oiling of the cylinders, some oil is expected to be discharged from the cylinder head indicator cocks while rolling the engine.
  - b. A small amount of moisture mist is expected to be discharged from the indicator cocks while rolling the engine.
- 4.4.1.15 DEPRESS the Engine Roll Pushbutton, and ROLL the engine on starting air for at least two revolutions.



- 4.4.1.16 CHECK all cylinder cocks for evidence of moisture.
- 4.4.1.17 CLOSE all cylinder cocks.
- 4.4.1.18 DEPRESS the OPERATIONAL mode pushbutton 1-HS-4575 (4576).
- 4.4.1.19 OBSERVE the blue UNIT AVAILABLE light is lit.
- 4.4.1.20 PLACE the LOCAL/REMOTE Switch 1-HS-4516 (4517) in REMOTE.
- 4.4.1.21 COMPLETE Checklist 3, "Cylinder Moisture Check Independent Verification".
- 4.4.2 Emergency Stopping Train A (B) Diesel Generator.

## CAUTION

An Emergency Stop signal will trip the Diesel Generator under all conditions and will prevent re-starting the engine until manually reset.

- 4.4.2.1 To initiate an Emergency Stop from the Electrical Auxiliary Board:
  - a. DEPRESS both Emergency Stop Pushbuttons 1-HS-4567B (4568B) and 1-HS-4567C (4568C),
  - b. VERIFY that generator voltage drops to zero.
- 4.4.2.2 To initiate an Emergency Stop from the Diesel Generator Building:
  - a. At the Engine Control Panel, DEPRESS Emergency Stop Pushbutton 1-HS-4567A (4568A),
  - b. VERIFY that red EMERGENCY STOP lamp energizes.

## NOTE

An Emergency Stop signal can only be reset from the Engine Control Panel.

- 4.4.2.3 After the engine has stopped, DEPRESS Emergency Stop Reset Pushbutton 1-HS-4581 (4582) at the Engine Control Panel.
- 4.4.2.4 VERIFY that the red EMERGENCY STOP lamp goes out.

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4.4.2.5 NOTIFY the Diesel Generator System Engineer of the Diesel Generator operation by dispatching the following:

- a. A completed copy of Completion Sheet 1,
- b. a copy of every completed 11885-C, "Diesel Generator Operating Log" if taken.

4.4.3 Diesel Generator Operation Under LOCA Conditions

4.4.3.1 To initiate a manual Emergency Start:

- a. At the Engine Control Panel, BREAK glass or UNSCREW and RELEASE the Emergency Start Button 1-HS-4573 (4574),
- b. VERIFY that red STARTING lamp energizes,
- c. VERIFY that green SAFETY INJECTION SIGNAL lamp energizes,

#### NOTE

When operating under Emergency Start conditions, the only active Diesel Generator protective devices are:

- a. Generator Differential Overcurrent Relay,
- b. Low Lube Oil Pressure of 30 psig,
- c. High Jacket Water Temperature of 200°F,
- d. Engine Overspeed of 517 rpm.

4.4.3.2 While the Diesel Generator is operating, closely MONITOR the following to ensure the Diesel Generator is operating properly:

- a. Lube oil pressure,
- b. Lube oil temperature,
- c. Jacket water temperature,
- d. Generator bearing temperature,
- e. Fuel Oil Day Tank level.

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- 4.4.3.3 When the Diesel Generator is to be shut down, INSTALL double thickness of new glass in the Emergency Start Pushbutton and DEPRESS the Reset From LOCA Pushbutton 1-HS-4583 (4584).
- 4.4.3.4 VERIFY the Shutdown Systems Active light energizes.
- 4.4.3.5 SHUT DOWN the Diesel Generator per Sub-subsection 4.3.1.
- 4.4.4 Adding Lube Oil To The Diesel Generator Sump

#### NOTES

- a. The Lube Oil Sump level should go up approximately 1 inch for every 55 gallons of oil added,
  - b. Lube oil can be added to the Diesel Sump Fill Connection while the diesel is operating or shut down,
  - c. When adding oil to the sump, special care should be used to prevent dirt and other contaminants from entering the lube oil sump.
- 4.4.4.1 ENSURE that the proper type of oil has been provided before adding to the Diesel Generator.
  - 4.4.4.2 MEASURE the sump level using the dipstick.
  - 4.4.4.3 Using an electric or hand-driven pump, ADD the oil to the sump through the dipstick connection on the top of the sump.
  - 4.4.4.4 MEASURE the sump level using the dipstick.
  - 4.4.4.5 VERIFY the sump level increases by the expected amount.
  - 4.4.5 Switching From In-Service Lube Oil Filter To Standby Filter With Diesel Generator In Operation
  - 4.4.5.1 Slowly OPEN Lube Oil Duplex Filter Equalizing Valve I-2403-U4-828 (831)
  - 4.4.5.2 CHECK that the filter mounted pressure indicators on the standby filter increase until they read equal to Lube Oil System pressure.

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NOTE

The LOW TEMP LUBE OIL IN annunciator may actuate due to cold lube oil from the standby filter. Disregard the alarm.

- 4.4.5.3 When the pressure indication on the standby filter has stabilized, slowly REPOSITION DIESEL GEN A (B) DUPLEX LUBE OIL FLTR INL and OUT Valves 1-2403-U4-826 (829) and 1-2403-U4-827 (830) until valves indicate mid position.
- 4.4.5.4 ALLOW lube oil flow through both filters to continue for 3 to 5 minute to ensure all air has been purged from the standby filter.

NOTE

If after switching to the Standby Lube Oil Filter, differential pressure remains high REPOSITION valves 1-2403-U4-826 (829) and 1-2403-U4-827 (830) to the mid position to allow flow through both filters.

- 4.4.5.5 CLOSE valve 1-2405-U4-828 (831); independent verification required.
- 4.4.5.6 CONTINUE to reposition valves 1-2403-U4-826 (829) and 1-2403-U4-827 (830) until the standby filter is fully in service. Pressure indication on the filter taken out of service should decrease to zero.
- 4.4.5.7 INITIATE a Work Request Tag (WRT) to replace the filter taken out of service.
- 4.4.6 Switching From In-Service Fuel Oil Filter To Standby Filter With Diesel Generator In Operation

NOTE

The top part of the selection handle points to the Fuel Oil Filter that is in service.

- 4.4.6.1 Slowly REPOSITION selection handle on filter to the mid position.

## NOTE

If after switching to the Standby Fuel Oil Filter, differential pressure remains high, REPOSITION handle to the mid position to allow flow through both filters.

- 4.4.6.2 Slowly POSITION selection handle until the standby filter is fully in service.
- 4.4.6.3 INITIATE an WRT to replace the filter which was removed from service.
- 4.4.7 Switching From In-Service Fuel Oil Strainer To Standby Fuel Oil Strainer With Diesel Generator In Operation

## NOTE

The top of the selector handle points to the Fuel Oil Strainer that is in service.

- 4.4.7.1 Slowly REPOSITION selector handle on strainer to the mid position.

## NOTE

If after switching to the Standby Fuel Oil Strainer, differential pressure remains high, reposition handle to the mid position to allow flow through both strainers.

- 4.4.7.2 Slowly POSITION selection handle until the standby strainer is fully in service.
- 4.4.7.3 INITIATE an WRT to replace the strainer which was removed from service, if cleaning is required or differential pressure is high.



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#### 4.4.8 Generator Failure During Loss Of Offsite Power

##### CAUTION

This section provides instructions for restoring the generator if the engine starts but the generator fails to develop adequate output voltage during startup due to a voltage regulator malfunction. These instructions should only be used to try to restore the generator during a loss of offsite power incident and are not to be used during routine testing or operation.

- 4.4.8.1 CHECK for any tripped relays at the Diesel Generator Control Panel PDG1 (PDG3).
- 4.4.8.2 If any relays are tripped, INITIATE maintenance to correct the problem.
- 4.4.8.3 If no relays are tripped DEPRESS the Field Flash Pushbutton 1-HS-4459 (4460) for 3-5 seconds.
- 4.4.8.4 CHECK that Generator volts raises to 4025-4330 volts.
- 4.4.8.5 If generator voltage goes up but does not stabilize between 4025 and 4330 volts, TRANSFER to the Manual Voltage Regulator per Step 4.4.8.10.
- 4.4.8.6 If generator voltage does not go up to normal TRANSFER the generator to the redundant bridge.

##### NOTE

The diesel engine may be allowed to continue running while transferring the Bridge Transfer Switch.

- a. ENSURE the Diesel Generator Output Breaker 1AA0219 (1BA0319) is open,
- b. DEPRESS the Emergency Shutdown Pushbutton 1-HS-4474 (4475) on PDG1 (PDG3),
- c. VERIFY the generator field volts are zero,



## NOTE

The Bridge Transfer Switch is located in the upper part of the left bay of PDG1 (PDG3).

- d. TRANSFER the Bridge Transfer Switch (S1) to the other bridge (1 or 2),
- e. DEPRESS the Exciter Enable Pushbutton 1-HS-4457 (4458).
- 4.4.8.7 DEPRESS the Field Flash Pushbutton 1-HS-4459 (4460) for 3-5 seconds.
- 4.4.8.8 CHECK that generator volts raise to 4025-4330 volts.
- 4.4.8.9 If generator voltage does not go up,
  - a. SHUT DOWN the Diesel Generator,
  - b. INITIATE maintenance to repair the problem.

## CAUTION

The Manual Voltage Regulator should not be used when the Diesel Generator is paralleled to the offsite grid.

- 4.4.8.10 If generator voltage goes up but does not stabilize between 4025 and 4330 volts, TRANSFER to the Manual Voltage Regulator.

## NOTE

The Manual Voltage Regulator can only be controlled from the local panel.

- a. DEPRESS the Emergency Shutdown Pushbutton 1-HS-4474 (4475) on PDG1 (PDG3),
- b. VERIFY the generator field volts are zero,
- c. PLACE Local/Remote Switch 1-HS-4516 (4517) in LOCAL,
- d. DEPRESS the Manual Voltage Regulator Pushbutton 1-HS-4495 (4496),
- e. VERIFY the Manual Voltage Regulator light is on,
- f. DEPRESS the Exciter Enable Pushbutton 1-HS-4457 (4458).

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- 4.4.8.11 DEPRESS the Field Flash Pushbutton 1-HS-4459 (4460) for 3-5 seconds.
- 4.4.8.12 ADJUST the generator volts to 4025-4330 volts.
- 4.4.8.13 PLACE the Local/Remote Switch 1-HS-4516 (4517) in REMOTE.
- 4.4.8.14 If the generator volts do not go to normal:
  - a. SHUT DOWN the Diesel Generator,
  - b. INITIATE maintenance to repair the Diesel Generator.

## 5.0 REFERENCES

### 5.1 P&ID's

- 5.1.1 1X4DB170-1, Diesel Generator System Train A
- 5.1.2 1X4DB170-2, Diesel Generator System Train B

### 5.2 ONE-LINE DIAGRAMS

- 5.2.1 1X3D-AA-K01, Diesel-Generators 1A & 1B Relays & Meters

### 5.3 ELEMENTARY DRAWINGS

- 5.3.1 1X3D-BA-D02D, 4160V Incm. Brkr 152-1AA0219 From Emergency Diesel Gen. 1A
- 5.3.2 1X3D-BA-D03D, 4160V Incm. Brkr 152-1BA0319 From Emergency Diesel Gen. 1B
- 5.3.3 1X3D-BA-M10B, Class 1E Train A Manual Synchronization
- 5.3.4 1X3D-BA-M10C, Class 1E Train B Manual Synchronization
- 5.3.5 1X3D-BH-G03A, Diesel Generator 1A Cabling Block Diagram
- 5.3.6 1X3D-BH-G03B, Diesel Generator 1B Cabling Block Diagram
- 5.3.7 1X3D-BH-G03C, Diesel Generator 1A Engine Controls
- 5.3.8 1X3D-BH-G03D, Diesel Generator 1A Engine Controls
- 5.3.9 1X3D-BH-G03E, Diesel Generator 1A Engine Controls

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- 5.3.10 1X3D-BH-G03F, Diesel Generator 1A Alarms
- 5.3.11 1X3D-BH-G03G, Diesel Generator 1A Relays and Governor
- 5.3.12 1X3D-BH-G03H, Diesel Generator 1A Voltage Regulator
- 5.3.13 1X3D-BH-G03J, Diesel Generator 1A Generator Controls
- 5.3.14 1X3D-BH-G03M, Diesel Generator 1B Engine Controls
- 5.3.15 1X3D-BH-G03N, Diesel Generator 1B Engine Controls
- 5.3.16 1X3D-BH-G03P, Diesel Generator 1B Engine Controls
- 5.3.17 1X3D-BH-G03Q, Diesel Generator 1B Alarms
- 5.3.18 1X3D-BH-G03R, Diesel Generator 1B Relays and Governor
- 5.3.19 1X3D-BH-G03S, Diesel Generator 1B Voltage Regulator
- 5.3.20 1X3D-BH-G03T, Diesel Generator 1B Generator Controls
- 5.4 CONTROL LOGIC DIAGRAMS
- 5.4.1 1X5DN107-2, Diesel Generator Engine
- 5.4.2 1X5DN107-3, Diesel Generator Excitation
- 5.4.3 1X5DN107-4, Diesel Generator Engine Auxiliaries
- 5.4.4 1X5DN107-5, Diesel Generator Engine Auxiliaries
- 5.5 VENDOR DRAWINGS
- 5.5.1 1X4AK01-25, Exhaust, Intake & Crankcase Piping Schematic
- 5.5.2 1X4AK01-26, Jacket Water Piping Schematic
- 5.5.3 1X4AK01-27, Lube Oil Piping Schematic
- 5.5.4 1X4AK01-28, Fuel Oil Piping Schematic
- 5.5.5 1X4AK01-29, Starting Air Piping Schematic
- 5.5.6 1X4AK01-31, Engine Control Logic Diagram
- 5.5.7 1X4AK01-42, Engine Control Panel Installation
- 5.5.8 1X4AK01-44, Engine Control Panel Schematic
- 5.5.9 1X4AK01-45, Engine Control Panel Schematic

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5.5.10	1X4AK01-46,	Engine Control Panel Schematic	
5.5.11	1X4AK01-48,	Engine Control Panel Schematic	
5.5.12	1X4AK01-49,	Engine Control Panel Schematic	
5.5.13	1X4AK01-50,	Engine Control Panel Schematic	
5.5.14	1X4AK01-52,	Engine Control Panel Schematic	
5.5.15	1X4AK01-291,	Standby Diesel-Gen MCC 1NBI, 1NBO Front View	
5.5.16	1X4AK01-292,	Standby Diesel-Gen Interconnection Diag. For M.C.C.	
5.5.17	1X4AK01-293,	Standby Diesel-Gen Interconnection Diag. For M.C.C.	
5.5.18	1X4AK01-294,	Standby Diesel-Gen Elem. Diag. M.C.C.	
5.5.19	1X4AK01-295,	Standby Diesel-Gen Elem. Diag. M.C.C.	
5.5.20	1X4AK01-296,	Standby Diesel-Gen Elem. Diag. M.C.C.	
5.5.21	1X4AK01-297,	Diesel-Gen. Local Control Panel Outline	
5.5.22	1X4AK01-302,	Gen. Control Panel Outline	
5.5.23	1X4AK01-313,	Standby Diesel Gen. Generator Control Panel Components Bill Of Materials	
5.5.24	1X4AK01-315,	Diesel Gen. Neutral Grounding Cabinet Component List	
5.5.25	1X4AK01-317,	Engine & Skid Electrical Schem. & Wiring	
5.5.26	1X4AK01-318,	Engine & Skid Electrical & Wiring	
5.5.27	1X4AK01-355,	Off-Engine Alarms	
5.5.28	1X4AK01-356,	Gen. Control Panel A.C. Schematic	
5.5.29	1X4AK01-357,	Gen. Control Panel A.C. Schematic	
5.5.30	1X4AK01-358,	Gen. Control Panel A.C. Schematic	
5.5.31	1X4AK01-397,	Standby Diesel Gen. Manual Voltage Reg.	
5.5.32	1X4AK01-438,	Gen. Control Panel Nameplate Schedule	
5.5.33	1X4AK01-439,	Generator Control Schematic	

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- 5.5.34 1X4AK01-440, Generator Control Schematic
- 5.5.35 1X4AK01-441, Generator Control Schematic
- 5.5.36 1X4AK01-442, Generator Control Schematic
- 5.5.37 1X4AK01-443, Engine Pneumatic Schematic
- 5.5.38 1X4AK01-458, Instrument Ident. Sched. For Engine Support Systems
- 5.5.39 1X4AK01-528, Starting Air Comp. Control Schematic
- 5.6 VENDOR MANUALS
- 5.6.1 AX4AK01-509, Standby Diesel Gen. Instruction Manual
- 5.6.2 AX4AK01-510, Standby Diesel Gen. Diesel Engine Parts Manual
- 5.6.3 AX4AK01-563, Standby Diesel Gen. Associated Publications Instruction Manual, Book 1
- 5.6.4 AX4AK01-564, Standby Diesel Gen. Associated Publications Instruction Manual, Book 2
- 5.7 PROCEDURES
- 5.7.1 11885-C, "Diesel Generator Operating Log"
- 5.7.2 13150-1, "Nuclear Service Cooling Water System"
- 5.7.3 13325-1, "Auxiliary Feedwater Pump House And Diesel Generator Building HVAC Systems"
- 5.7.4 13427-1, "4160V AC 1E Electrical Distribution System"

END OF PROCEDURE TEXT



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TABLE 1

D/G VALID TEST AND FAILURE EVALUATION CRITERIA

Valid tests and failures (per Regulatory Guide 1.108, Section C.2.e and Technical Specification 4.8.1.1.3) shall be based on the following criteria:

1. All start attempts (automatic, including those from bona fide signals, or manual) that result in a failure to start, except as noted in (2) below, should be considered valid tests and failures.
2. Unsuccessful start and load attempts that can definitely be attributed to operating error, to spurious operation of a trip that is bypassed in the emergency operating mode, to malfunction of equipment that is not operative in the emergency operating mode (e.g., synchronizing circuitry) or is not part of the defined Diesel Generator unit design should not be considered valid tests or failures.
3. Successful starts, including those initiated by bona fide signals, followed by successful loading (sequential or manual) to at least 50% of continuous rating and continued operation for at least one hour should be considered valid successful tests. (Failures occurring after one hour are not considered valid failures.)
4. Successful starts that are terminated intentionally without loading, as defined in (3) above, should not be considered valid tests or failures.
5. Successful starts followed by an unsuccessful loading attempt should be considered valid tests and failures, except as noted in (2) above.
6. Tests that are terminated intentionally before completion as defined in (3) above because of an alarmed abnormal condition that would ultimately have resulted in Diesel Generator damage or failure should be considered valid tests and failures.
7. Tests performed in the process of troubleshooting should not be considered valid tests. Tests that are performed to verify correction of the problem should be considered valid tests and successes or failures, as appropriate.
8. Cranking and venting procedures that lead to the discovery of conditions (e.g., excessive water or oil in a cylinder) that would have resulted in the failure of the Diesel Generator unit during test or during response to a bona fide signal should be considered a valid test and failure.

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## COMPLETION SHEET 1

TO: DIESEL GENERATOR SYSTEM ENGINEER

FROM: UNIT SHIFT SUPERVISOR (UNIT 1)

Diesel Generator Tested:            ☐ DGLA            ☐ DGLB

Start Date:     /     /

Shutdown Date:     /     /

Start Time: \_\_\_\_\_

Shutdown Time: \_\_\_\_\_

Start Engine Hours: \_\_\_\_\_ Shutdown Engine Hours: \_\_\_\_\_

Start preceded by turbocharger prelubrication: ☐ Yes ☐ No

Reason for start:

☐ Maintenance Troublshooting                  ☐ Functional Testing

☐ SI   ☐ Blackout   ☐ Other: \_\_\_\_\_

Reason for trip or failure to start:

☐ Manual ☐ Equipment failure ☐ Trip signal ☐ Alarm Response

[ ] Other: \_\_\_\_\_

DR# (if known) \_\_\_\_\_ WRT # (If Known) \_\_\_\_\_

List any conditions that would have resulted in Diesel Generator failure to start:

Comments: \_\_\_\_\_

Completed By: \_\_\_\_\_ Date \_\_\_\_\_ Time \_\_\_\_\_

Reviewed By: \_\_\_\_\_  
Unit Shift Supervisor \_\_\_\_\_ Date \_\_\_\_\_ Time \_\_\_\_\_

Diesel Generator Start Evaluation:

[ ] Successful Start

[ ] Valid Test

[ ] Valid Failure

[ ] Non-Valid Test

[ ] Non-Valid Failure

Unit Shift Supervisor

Copy sent to  
Diesel Generator System Engineer

Shift Clerk	Date
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CHECKLIST 1

TRAIN A DIESEL GENERATOR STANDBY MODE STATUS CHECK

ENGINE CONTROL PANEL - PDG2

STATUS

INITIALS

- |                                    |                      |       |
|------------------------------------|----------------------|-------|
| 1. All annunciator windows         | No unexpected alarms | _____ |
| 2. Starting Air Pressure:          |                      |       |
| a. Left Bank 1-PI-9056             | 220-255 psig         | _____ |
| b. Right Bank 1-PI-9052            | 220-255 psig         | _____ |
| 3. Control Air Pressure 1-PI-19174 | 58-62 psig           | _____ |
| 4. UNIT AVAILABLE Light            | ON                   | _____ |
| 5. Thermocouple Selector:          |                      |       |
| a. Lubricating Oil In              | 142-170°F            | _____ |
| b. Lubricating Oil Out             | 142-170°F            | _____ |
| c. Jacket Water In                 | 142-170°F            | _____ |
| d. Jacket Water Out                | 142-170°F            | _____ |

CHECKLIST 1

TRAIN A DIESEL GENERATOR STANDBY MODE STATUS CHECK

ENGINE CONTROL PANEL - PDG2

6. POWER AVAILABLE Lights:

a. A

ON

b. B

ON

c. C

ON

7. STOPPING LIGHT

OFF

GENERATOR CONTROL PANEL - PDG1

1. Unit/Parallel Switch 1-HS-4414A

STATUS

Center  
After Unit

. Local/Remote Switch 1-HS-4516

REMOTE

. Lockout Relays:

a. 186A

RESET

b. 186B

RESET

c. 186C

RESET

4. Voltage Regulator

a. Automatic Voltage Regulator Light

ON

b. Manual Voltage Regulator Light

OFF

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CHECKLIST 1

TRAIN A DIESEL GENERATOR STANDBY MODE STATUS CHECK

<u>MOTOR CONTROL CENTER INBI</u>	<u>STATUS</u>	<u>INITIALS</u>
1. Air After Cooler Fan No. 1	AUTO	_____
2. Air Compressor No. 1	AUTO	_____
3. Air After Cooler Fan No. 2	AUTO	_____
4. Air Compressor No. 2	AUTO	_____
5. Jacket Water Circulating Pump	AUTO	_____
6. Jacket Water Heater	AUTO	_____
7. Lube Oil Circulating Pump	AUTO	_____
8. Lube Oil Heater	AUTO	_____
9. Generator Space Heater	AUTO	_____



CHECKLIST 1

TRAIN A DIESEL GENERATOR STANDBY MODE STATUS CHECK

<u>DIESEL GENERATOR SKID - DG1A</u>	<u>STATUS</u>	<u>INITIALS</u>	<u>IV</u>
1. Governor Settings			
Speed Droop	2.6	_____	_____
Load Limit	MAX FUEL	_____	_____
Speed	14.34	_____	_____
Oil Level	Above centerline of sight glass	_____	_____
2. Overspeed Trip Air Press (Located under right bank Turbocharger)	58-62 psig	_____	
3. Lube Oil Level - Dipstick	MAX STATIC $\pm 1"$	_____	
4. Run/Stop Switch 1-HS-4688	PULL-TO-RUN	_____	
5. Generator Bearing Oil Level	Centerline of sight glass or above	_____	
6. Turbocharger Bearings			
a. Right Bank Sight Glass	Flowing	_____	
b. Left Bank Sight Glass	Flowing	_____	

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CHECKLIST 1

TRAIN A DIESEL GENERATOR STANDBY MODE STATUS CHECK

UPSTAIRS

	<u>STATUS</u>	<u>INITIALS</u>	<u>IV</u>
1. Intake Air Filter			
a. Screens	Unobstructed	_____	
b. Oil Level Sight Glass	Half Full	_____	
2. Exhaust Silencer	No Combustibles in Room	_____	

ELECTRICAL CONTROL PANEL QEAB - MAIN CONTROL ROOM

1. DSL GEN 1A UNIT/PARALLEL Switch 1-HS-4414B	NORMAL AFTER UNIT	_____	_____
2. SYNC MODE SELECTOR Switch 1-TS-DG1A	AUTO	_____	_____
3. DG1A OUTPUT BRKR 1-HS-1AA0219	AUTO	_____	_____
4. DFO DAY TANK LEVEL 1-LI-9018	52-100Z	_____	_____

CHECKLIST 1

	<u>STATUS</u>	<u>INITIALS</u>	<u>IV</u>
<u>4160V AC SWGR 1AA02 - CONTROL BLDG LVL A</u>			
1.    1AA02-19    10A FUSE REMOTE BKR CKT(AY)	INSTALLED	_____	_____
2.                10A FUSE REMOTE BKR CKT(AZ)	INSTALLED	_____	_____
3.                15A BKR BREAKER CONTROL	CLOSED	_____	_____
4.                EMERGENCY DG1A INC BRKR	RACKED IN	_____	_____
5.                CHARGING MOTOR POWER SWITCH ON AND CLOSING SPRINGS CHARGED	ON/CHARGED	_____	_____
6.    DIESEL GENERATOR BRKR CONT SELECT SWITCH 1-HS-1AA0219B	CONT RM	_____	_____

Comments \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Completed By: \_\_\_\_\_

\_\_\_\_\_ Date

\_\_\_\_\_ Time

Reviewed By: \_\_\_\_\_

\_\_\_\_\_ Date

\_\_\_\_\_ Time

CHECKLIST 2

TRAIN B DIESEL GENERATOR STANDBY MODE STATUS CHECK

<u>ENGINE CONTROL PANEL - PDG4</u>	<u>STATUS</u>	<u>INITIALS</u>
1. All annunciator windows	No unexpected alarms	_____
2. Starting Air Pressure:		
a. Left Bank 1-PI-9057	220-255 psig	_____
b. Right Bank 1-PI-9053	220-255 psig	_____
3. Control Air Pressure 1-PI-19175	58-62 psig	_____
4. UNIT AVAILABLE Light	ON	_____
5. Thermocouple Selector:		
a. Lubricating Oil In	142-170°F	_____
b. Lubricating Oil Out	142-170°F	_____
c. Jacket Water In	142-170°F	_____
d. Jacket Water Out	142-170°F	_____

CHECKLIST 2

TRAIN B DIESEL GENERATOR STANDBY MODE STATUS CHECK

ENGINE CONTROL PANEL - PDG4

6. POWER AVAILABLE Lights:

a. A

ON

b. B

ON

c. C

ON

7. STOPPING LIGHT

OFF

GENERATOR CONTROL PANEL - PDG3

1. Unit/Parallel Switch 1-HS-4452A

CENTER AFTER  
UNIT

2. Local/Remote Switch 1-HS-4517

REMOTE

3. Load Relays:

a. 186A

RESET

b. 186B

RESET

c. 186C

RESET

4. Voltage Regulator

a. Automatic Voltage Regulator Light

ON

b. Manual Voltage Regulator Light

OFF



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Sheet 3 of 6

CHECKLIST 2

TRAIN B DIESEL GENERATOR STANDBY MODE STATUS CHECK

<u>MOTOR CONTROL CENTER INBO</u>	<u>STATUS</u>	<u>INITIALS</u>
1. Air After Cooler Fan No. 1	AUTO	_____
2. Air Compressor No. 1	AUTO	_____
3. Air After Cooler Fan No. 2	AUTO	_____
4. Air Compressor No. 2	AUTO	_____
5. Jacket Water Circulating Pump	AUTO	_____
6. Jacket Water Heater	AUTO	_____
7. Lube Oil Circulating Pump	AUTO	_____
8. Lube Oil Heater	AUTO	_____
9. Generator Space Heater	AUTO	_____

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CHECKLIST 2

TRAIN B DIESEL GENERATOR STANDBY MODE STATUS CHECK

<u>DIESEL GENERATOR SKID - DG1B</u>	<u>STATUS</u>	<u>INITIALS</u>	<u>IV</u>
1. Governor Settings			
Speed Droop	2.6	_____	_____
Load Limit	MAX FUEL	_____	_____
Speed	12.2	_____	_____
Oil Level	Above centerline of sight glass	_____	_____
2. Overspeed Trip Air Press (Located under right bank Turbocharger)	58-62 psig	_____	
3. Lube Oil Level - Dipstick	Max Static $\pm 1$ "	_____	
4. Run/Stop Switch 1-HS-4688	PULL-TO-RUN	_____	_____
5. Generator Bearing Oil Level	Centerline of sight glass	_____	
6. Turbocharger Bearings			
a. Right Bank Sight Glass	Flowing	_____	
b. Left Bank Sight Glass	Flowing	_____	

CHECKLIST 2

TRAIN B DIESEL GENERATOR STANDBY MODE STATUS CHECK

UPSTAIRS

1. Intake Air Filter

a. Screens

b. Oil Level Sight Glass

2. Exhaust Silencer Room

STATUS

Unobstructed

Half Full

No Combustibles  
in Room

INITIALS

IV

ELECTRICAL CONTROL PANE JEAB - MAIN CONTROL ROOM

1. DSL GEN 1B UNIT/PARALLEL Switch  
1-HS-4452B

NORMAL  
AFTER UNIT

2. SYNC MODE SELECTOR Switch 1-TS-DG1B

AUTO

3. DG1B OUTPUT RKR 1-HS-1BA0319

AUTO

4. DFO DAY TANK LEVEL 1-LI-9019

52-100%

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CHECKLIST 2

4160V AC SWGR 1BA03 - CONTROL BLDG LVL A

		<u>STATUS</u>	<u>INITIALS</u>	<u>IV</u>
1.	1BA03-19 10A FUSE REMOTE BKR CKT(AY)	INSTALLED	_____	_____
2.	10A FUSE REMOTE BKR CKT(AZ)	INSTALLED	_____	_____
3.	15A BKR BREAKER CONTROL	CLOSED	_____	_____
4.	EMERGENCY DGLB INC BRKR	RACKED IN	_____	_____
5.	CHARGING MOTOR POWER SWITCH ON AND CLOSING SPRINGS CHARGED	ON/CHARGED	_____	_____
6.	DIESEL GENERATOR BRKR CONTROL SELECT SWITCH 1-HS-1BA0319B	CONT RM	_____	_____

Comments

\_\_\_\_\_

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\_\_\_\_\_

\_\_\_\_\_

Completed By: \_\_\_\_\_ Date \_\_\_\_\_ Time \_\_\_\_\_

Reviewed By: \_\_\_\_\_ Date \_\_\_\_\_ Time \_\_\_\_\_

92 PROJECT 062303

Sheet 1 of 1

### CHECKLIST 3

#### CYLINDER MOISTURE CHECK INDEPENDENT VERIFICATION

#### NOTES

- a. This checklist is written for Train A component designations. Train B designations are shown in parenthesis.
- b. When performing this checklist, circle the number of the component (Train A or B) that was actually checked.

DIESEL GENERATOR: \_\_\_\_\_


<u>COMPONENT</u>	<u>DESCRIPTION</u>	<u>POSITION</u>	<u>INITIALS</u>
1-2403-X4-761 (1-2403-X4-724)	AIR RECEIVER #1 TO ENG BARR DEVICE	CLOSED	<u>          /          </u> IV
1-2403-U4-130 (1-2403-U4-131)	TURBO LUBE OIL ORIFICE BYPASS	CLOSED	<u>          /          </u> IV
1-HS-4516 (1-HS-4517)	LOCAL/REMOTE	REMOTE	<u>          /          </u> IV
	FUEL SHUTDOWN CYLINDER	FULLY RETRACTED	<u>          /          </u> IV
	AIR SHUTDOWN CYLINDER	FULLY RETRACTED	<u>          /          </u> IV
1-2403-X4-427 (1-2403-X4-428)	RIGHT BANK INTAKE MANIFOLD DRAIN	CLOSED	<u>          /          </u> IV
1-2403-X4-431 (1-2403-X4-432)	RIGHT BANK INTAKE MANIFOLD DRAIN	CLOSED	<u>          /          </u> IV
1-2403-X4-425 (1-2403-X4-426)	LEFT BANK INTAKE MANIFOLD DRAIN	CLOSED	<u>          /          </u> IV
1-2403-X4-429 (1-2403-X4-430)	LEFT BANK INTAKE MANIFOLD DRAIN	CLOSED	<u>          /          </u> IV

Performed By: _____	DATE	TIME	
Verified By: _____	DATE	TIME	
Reviewed By: _____	DATE	TIME	

OSOS OF USS

92 PROJECT 062304



Approval <i>J. Lash</i>	Vogtle Electric Generating Plant NUCLEAR OPERATIONS	 <b>Georgia Power</b>	Procedure No. 14980-1
Date 2-5-40	Unit <u>1</u>		Revision No. 18
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**VOID**

DIESEL GENERATOR OPERABILITY TEST

1.0 PURPOSE

1.1 This surveillance procedure is used to demonstrate the operability of the Emergency Diesel Generators. This procedure should not be used for maintenance troubleshooting or testing.

1.2 This surveillance satisfies these Technical Specification Requirements:

- 4.8.1.1.2.a
- 4.8.1.1.2.b
- 4.8.1.1.2.g

1.3 The frequency of this test is given by Technical Specification Table 4.8-1.

2.0 APPLICABILITY

2.1 This surveillance is applicable in Modes 1, 2, 3 and 4.

2.2 Portions of this surveillance are applicable in Modes 5 and 6.

3.0 PRECAUTIONS AND LIMITATIONS

3.1 The Unit Shift Supervisor (USS) shall be notified immediately if a subsystem or component malfunctions or test data indicate a potential problem during a surveillance test.

3.2 The rated capacity of a Diesel Generator is 7000 kW. Load should not be permitted to exceed this limit during testing. The Diesel Generator should not be operated at less than 30% load (2100 kW) for prolonged periods of time.

3.3 During Diesel Generator load testing, loads in excess of 7000 kW or momentary variations due to changing bus loads shall not invalidate the test.

EXHIBIT B

EXHIBIT

- 3.4 If during a Diesel Engine start, the Fail To Start alarm comes in but the engine keeps running, the support systems will operate as if the engine was shut down. To reset these systems, the START pushbutton must be pressed. This will stop the Keep Warm Pumps, turn off the Keep Warm Heaters, stop the Crankcase Fans and place the alarms in service that are bypassed when shut down.
- 3.5 Once initiated, the Diesel Generator shutdown signals remain in effect for 90 seconds. During this period, the Diesel Generator will only respond to an emergency start signal. To prevent the depletion of starting air, wait until the local red stopping light is OFF (approximately 90 seconds) after a normal stop before attempting to start the diesel.
- 3.6 All start attempts, including those from bona fide start signals, shall be logged in the USS and/or the Control Room logbook. The log entry shall include the following information:
- a. Start time,
  - b. Reason for start,
  - c. Success or failure of the start attempt.
- 3.7 The Emergency Diesel Generators shall not be used for peaking service.
- 3.8 Diesel Generator surveillance tests shall be initiated only from the Control Room.
- 3.9 During surveillance testing, only one Diesel Generator shall be paralleled at a time to the off-site power source.
- 3.10 The Diesel Generator has been aligned for standby per 13145-1, "Diesel Generators" and a current copy of 11145-1, "Diesel Generator Alignment" and 11146-1, "Diesel Generator Fuel Oil Transfer System Alignment" are on file.
- 3.11 If any unusual grid disturbances occur while the Diesel Generator is operating, start the Fault Recorder in the Control Room and notify the System Engineer for an evaluation of the problem.
- 3.12 Testing of a Diesel Generator for troubleshooting (i.e., first engine run following major maintenance, etc.) should be performed using 13145-1, "Diesel Generators". If necessary, testing for operability should follow using this procedure.

INITIALS

- 3.13 A cylinder moisture check shall not be performed if in an action statement of Technical Specification 3.8.1.1 or 3.8.1.2.

4.0 PREREQUISITES OR INITIAL CONDITIONS

- 4.1 The USS shall ensure this surveillance test does not affect other tests presently in progress or jeopardize plant operation prior to granting approval to perform this surveillance test.

USS APPROVAL

- 4.2 OBTAIN the following test equipment:

a. Two stop watches.

No. 1 serial number \_\_\_\_\_

No. 2 serial number \_\_\_\_\_

b. A clear container 1 liter size or larger.

- 4.3 NOTIFY the System Operator and the Unit 2 Control Room of the Diesel Generator Test.

- 4.4 The NSCW System is in service to provide cooling water to the Diesel Generator Jacket Water Heat Exchangers.



INITIALS

5.0

INSTRUCTIONS

TEST STARTED

DATE

TIME

MODE

Diesel Generator Being Tested

NOTE

Once begun, the appropriate portions of this procedure should be completed if possible and the system subsystem or component returned to service or committed to repair as required.

5.1

DIESEL GENERATOR STARTUPNOTE

Prior to performing the six month surveillance, the diesel should remain in standby for several hours to allow temperatures to stabilize.

5.1.1

If this test is being performed as the six-month (184 day) surveillance per Technical Specification 4.8.1.1.2.g VERIFY the Diesel Generator has been shutdown for more than 4 hours.

NOTE

While the Diesel Generator is in operation check for rubbing or excessive vibration of small diameter tubing supporting Diesel Generator operation, e.g., fuel lines, instrument tubing, or instrument air tubing.

5.1.2

STATION an operator in the Diesel Generator Building to monitor the Diesel Generator operation and maintain headset or radio communication with the Control Room throughout the duration of the test.

INITIALS**CAUTION**

The cylinder moisture check shall not be performed if this test is performed as an action item of Technical Specification 3.8.1.1 or 3.8.1.2.

- 5.1.3 If it has not been performed within the preceding 4 hours, **PERFORM** a Cylinder Moisture Check per 13145-1, "Diesel Generators".
- 5.1.4 **RECORD** the Diesel Generator pre-startup readings on Section A of 11885-D, "Diesel Generator Operating Log".
- 5.1.5 **RECORD** the Engine Hours on Data Sheet 1.
- 5.1.6 **TEST** the annunciator lights at the alarm panel at PDG2 (PDG4), and **VERIFY** that all annunciator lights are operable.
- 5.1.7 If this test is performed as the regular monthly surveillance, **ALIGN** the starting air system as follows:
- 5.1.7.1 If the month is January, April, July or October, **UNLOCK** and **CLOSE** the Air Start Receiver 1 Discharge Isolation 1-2403-U4-765(722).
- 5.1.7.2 If the month is February, May, August or November, **UNLOCK** and **CLOSE** the Air Start Receiver 2 Discharge Isolation 1-2403-U4-769(729).
- 5.1.7.3 **RECORD** the valve which was closed on Data Sheet 1. If both valves were left open, **RECORD** "Both Valves Open" on Data Sheet 1.



INITIALS

## CAUTION

The Turbo Lube Oil Orifice Bypass Valve should be opened (Step 5.1.8) 15 minutes prior to diesel start, and should be promptly closed (Step 5.1.12) after the start. Steps 5.1.8 through 5.1.12 should be performed expeditiously. Excess prelubrication may result in oil accumulation in the exhaust piping and an exhaust fire upon engine start.

- 5.1.8 OPEN the Turbo Lube Oil Orifice Bypass Valve 1-2403-U4-130(131).
- 5.1.9 PLACE the DSL GEN 1A(1B) VM SW Switch to A-B.
- 5.1.10 When starting the Diesel Generator, TIME the following:
- 5.1.10.1 The time from depressing the Diesel Generator START Pushbutton until voltage reaches 4025 to 4330 volts.
- 5.1.10.2 The time from depressing the Diesel Generator START Pushbutton until frequency reaches 58.8 to 61.2 Hz.

## NOTES

- a. While the diesel engine is starting the operator in the Diesel Room should listen for the escape of air from the Starting Air Manifold Vent to verify the manifold vent is open and unobstructed.
- b. When the Diesel Generator is started in the next step, the Generator Trouble Alarm may annunciate due to a spurious Generator Field Ground relay actuation. This is a normal startup alarm and relay.

- 5.1.11 At Panel QEAR, DEPRESS the DIESEL GENERATOR START Pushbutton.

INITIALS

- 5.1.12 CLOSE the Turbo Lube Oil Orifice Bypass Valve 1-2403-U4-130(131)
- 5.1.13 RECORD the time to voltage and frequency on Data Sheet 1.
- 5.1.14 RECORD the Diesel Generator voltage and frequency on Data Sheet 1.
- 5.1.15 If the Generator Field Ground relay flag is visible, then PERFORM the following at Generator Control Panel PDG1 (PDG3):
- a. RESET the DG1A (DG1B) Generator Field Ground relay flag by placing the Generator Field Ground Relay Test Switch to the RESET position.
  - b. DEPRESS the Relay Target Reset Pushbutton.
- 5.1.16 LOCK OPEN the Air Start Receiver Discharge Isolation which was closed in Step 5.1.7.
- 5.1.17 If the Diesel Generator is to be paralleled to the 4160V AC bus, PROCEED to Subsection 5.2.
- 5.1.18 If the Diesel Generator is to be shut down, immediately PROCEED to Subsection 5.3.

INITIALS

## 5.2 DIESEL GENERATOR LOADING

CAUTION

If the Diesel Generator is being operated in the Parallel mode, never transfer the LOCAL-REMOTE Switch 1-HS-4516 (4517) on PDG1 (3) to LOCAL as this will take governor and voltage regulator out of the droop mode.

NOTE

If this test is to perform the 6 month surveillance, then the Diesel Generator should not be allowed to idle prior to paralleling and loading.

5.2.1 If this test is not performed as the six month surveillance, then IDLE the diesel for 5-10 minutes until temperatures stabilize.

5.2.2 ENSURE the Diesel Generator 1A(1B) SYNC MODE SELECTOR Switch TS-DG1A (DG1B) is in AUTO.

CAUTION

Never place two sync-switches to the ON position at the same time. A blown PT fuse may result.

5.2.3 PLACE the breaker 1AA0219 (1BA0319) Synchronization Switch to ON.

5.2.4 Momentarily PLACE the DSL GEN 1A(1B) UNIT/PARALLEL Switch 1HS-4414B (HS-4452B) to PARALLEL and OBSERVE the red DSL GEN 1A(1B) DROOP MODE light is on.



INITIALS

5.2.5 OBSERVE 4160V Bus 1AA02 (1BA03) voltage on the QEAB RUNNING Voltmeter via BUS 1AA02 NORM INCM VM SW (BUS 1BA03 NORM INCM VM SW) and Diesel Generator 1A(1B) voltage on the QEAB INCOMING Voltmeter via DSL GEN 1A VM SW (DSL GEN 1B MV SW).

5.2.6 VERIFY that the Sync Scope Meter is rotating and that the Synchronizing Lights are bright at the 6 o'clock position and dark at the 12 o'clock position and that the SYNC PERMISSIVE red light comes on near the 12 o'clock position.

5.2.7 ADJUST generator voltage as necessary to slightly lead the bus voltage (Generator voltage less than 50V above the lowest phase of bus voltage).

5.2.8 While observing the Sync Scope, ADJUST the generator speed until the Sync Scope needle is rotating slowly in the clockwise (FAST) direction (8 to 10 seconds rotation).

5.2.9 If this surveillance is being performed as the regularly monthly test, or as an action item of Technical Specification 3.8.1.1, PERFORM Step 5.2.11 and MARK Step 5.2.12 as N/A.

5.2.10 If this surveillance is being performed as the six-month (184 day) test per Technical Specification 4.8.1.1.2.g, PERFORM Step 5.2.12 and MARK Step 5.2.11 as N/A.

5.2.11 PARALLEL the Diesel Generator to the bus.

5.2.11.1 When the Sync Scope needle reaches the 11 o'clock position, DEPRESS and HOLD the Diesel Generator 1A(1B) AUTO SYNC PERMISSIVE Pushbutton PB-DG1A (PB-DG1B).

5.2.11.2 When the DG1A (DG1B) OUTPUT BRKR 1AA0219 (1BA0319) closes, RELEASE the Auto Sync Permissive Pushbutton.

INITIALSNOTE

To perform the six-month test, the Diesel Generator load must be raised to greater than 6100 kW within 60 seconds of closing the Diesel Generator Output Breaker.

- 5.2.12 Parallel the Diesel Generator to the bus.
- 5.2.12.1 When paralleling the Diesel Generator, TIME the interval from closing the Diesel Generator Output Breaker until load exceeds 6100kW.
- 5.2.12.2 When the Sync Scope needle reaches the 11 o'clock position, DEPRESS and HOLD the Diesel Generator 1A(1B) AUTO SYNC PERMISSIVE Pushbutton PB-DG1A (PB-DG1B).
- 5.2.12.3 When the DG1A (DG1B) OUTPUT BRKR 1AA0219 (1BA0319) closes, RELEASE the Auto Sync Permissive Pushbutton.
- 5.2.12.4 RAISE generator load to 6100-7000 KW.
- 5.2.12.5 RECORD the time required to raise Diesel Generator load above 6100kW on Data Sheet 1.

NOTES

- a. When not performing the six-month test, the Generator should be step loaded in increments of approximately 1000 kW and 500 kVAR with 3 - 4 minutes between load changes.
- b. As the generator voltage is adjusted, the kVAR should be maintained positive and no more than half of the kW load.

- 5.2.13 PLACE the breaker 1AA0219 (1BA0319) Synchronization Switch to OFF.



INITIALS

- 5.2.14 ADJUST generator load to 6800-7000kW.
- 5.2.15 ADJUST generator voltage to maintain generator kVARS between 2500 and 3000 OUT.
- 5.2.16 RECORD the time at which Diesel Generator load exceeded 6800kW on Data Sheet 1.
- 5.2.17 When the Diesel Generator has been loaded for 30 minutes, INITIATE 11885-C, "Diesel Generator Operating Log."

NOTE

Subsection 5.4, Fuel Oil Transfer Pump Testing and 5.5, Air Compressor Test, may be completed during the Diesel Generator loaded run if desired.

- 5.2.18 While the diesel is loaded EXAMINE the following and NOTE any problems:
- 5.2.18.1 Generator Sliprings and Brushes,
- 5.2.18.2 Generator Bearing Oil Rings,
- 5.2.18.3 Jacket Water System,
- 5.2.18.4 Lube Oil System,
- 5.2.18.5 Fuel Oil System,
- 5.2.18.6 Diesel engine intake and exhaust piping,
- 5.2.18.7 Combustion Air Header Drains (4). One valve at each end of both manifolds.

INITIALSNOTES

- a. As generator load is adjusted, generator voltage should be adjusted concurrently to maintain kVAR load OUT (positive) and no more than one-half of the kW load.
- b. The Generator should be unloaded in increments of approximately 1000 kW and 500 kVAR with 3-4 minutes between load changes.

5.2.19 When the Diesel Generator has been loaded to greater than 6800 kW for at least 1 hour

5.2.19.1 RECORD the time load was reduced to less than 6800 kW on Data Sheet 17

5.2.19.2 REDUCE Diesel Generator load to 100-200 kW and 50-100 kVAR

5.2.19.3 TRIP the DG1A (DG1B) OUTPUT BRKR 1AA0219 (1BA0319)

5.2.19.4 IDLE the Diesel Generator unloaded for 4-5 minutes

5.2.20 SHUT DOWN the Diesel Generator per Subsection 5.3

INITIALS

## 5.3 DIESEL GENERATOR SHUTDOWN

## CAUTION

If an SI signal is received during engine coastdown, monitor lube oil pressure and trip the Diesel Generator if pressure falls below the trip setpoint of 30 psi.

5.3.1 At Panel QEAB, DEPRESS the DIESEL GENERATOR 1A(1B) STOP Pushbutton 1-HS-4571B (4572B).

5.3.2 RECORD the time the Diesel Generator was shut down on Data Sheet 1.

5.3.3 At 480V AC MCC 1NBI (1NBO), VERIFY the Generator Space Heater is energized.

5.3.4 VERIFY the Jacket Water Keep-Warm Pump starts.

5.3.5 VERIFY the Lube Oil Keep-Warm Pump starts.

5.3.6 After approximately two minutes, VERIFY the red stopping light at Panel PDG2 (PDG4) is off.



INITIALS

5.3.7

If after approximately 2 minutes, the red STOPPING light is NOT off, RESET as follows:

NOTE

Handswitch is found on the front of the engine auxiliary skid.

- a. PLACE the pushbutton 1-HS-4688 (4689), DGLA (DGLB) RUN/STOP, in the PUSH-TO-STOP position for approximately 10 seconds,
- b. PLACE the pushbutton 1-HS-4688 (4689), DGLA (DGLB) RUN/STOP, in the PULL-TO-RUN position,
- c. VERIFY the red STOPPING light is off, and the blue UNIT AVAILABLE light is ON.

5.3.8

RECORD the engine hours on Data Sheet 1.

5.3.9

ALIGN the Diesel Generator Building HVAC System for automatic operation per 13325-1, "Auxiliary Feedwater Pumphouse And Diesel Generator Building HVAC Systems"

## INITIALS

NOTE

Accumulated water must be drained from the Fuel Oil Day Tank per Technical Specification 4.8.1.1.2.b.

- 5.3.10 If this test was performed as a regular monthly surveillance test or, if the Diesel Generator was operated for a period of one hour or greater, SAMPLE the Diesel Generator Diesel Fuel Oil (DFO) Day Tank for water:
- 5.3.10.1 OBTAIN a clear container one liter size or larger.
- 5.3.10.2 DRAIN a small amount of fuel oil into the container from the Day Tank Drain 1-2403-U4-035(036).
- 5.3.10.3 EXAMINE the sample for water on the bottom of the container.
- 5.3.10.4 If water detected, REPEAT the sample until no water is found.
- 5.3.10.5 CLOSE, LOCK and CAP the Day Tank Drain Valve 1-2403-U4-035(036).
- 5.3 DIESEL GENERATOR FUEL OIL TRANSFER SYSTEM TEST

NOTE

This section of the procedure will verify the operability of the Diesel Generator Fuel Oil Transfer Pumps.

- 5.4.1 START the DFO STOR TANK PUMP-1 (-3),  
1-HS-9044(9045).
- 5.4.2 VERIFY the pump starts and transfers  
fuel oil to the DFO Day Tank.
- 5.4.3 STOP the DFO STOR TANK PUMP-1 (-3),  
1-HS-9044(9045).
- 5.4.4 START the DFO STOR TANK PUMP-2 (-4),  
1-HS-9046(9047).



INITIALS

- 5.4.5 VERIFY the pump starts and transfers fuel oil to the DFO Day Tank.
- 5.4.6 STOP the DFO STOR TANK PUMP-2 (-4), 1-HS-9046(9047).
- 5.5 DIESEL GENERATOR AIR START COMPRESSOR TEST

CAUTIONS

- a. Only one Air Compressor should be tested at a time.
- b. At least one air start receiver must be pressurized to greater than 210 psig at all times.

NOTE

These instructions are written for the Train A Air Compressors. The Train B components are indicated by parentheses.

- 5.5.1 NOTIFY the Control Room that QEAB annunciator ALB35F02 DGLA LOW PRESS STARTING AIR (ALB38F02 DGLB LOW PRESS STARTING AIR) will energize in the following step.
- 5.5.2 CRACK-OPEN the Air Start Receiver 1 Drain, 1-2403-X4-762(723), and slowly REDUCE air receiver pressure to 145-155 psig.

CAUTION

If the Air Compressor fails to start automatically do not reduce air receiver pressure below 210 psig.

- 5.5.3 VERIFY the Air Start Compressor, 1-2403-G4-001-C01 (002-C01) starts automatically when the air receiver pressure is between 215 and 235 psig.

INITIALS

5.5.4 If the Air Compressor fails to start automatically:

- a. CLOSE the Air Receiver Drain 1-2403-X4-762(723),
- b. INITIATE maintenance on the compressor to correct the problem.

5.5.5 NOTIFY the Control Room that QEAB annunciator ALB35F06 DG1A SWITCH NOT IN AUTO (ALB38F06 DG1B SWITCH NOT IN AUTO) will energize in the following step.

5.5.6 PLACE the Control Switch for the Air Compressor 1, 1-2403-C4-001-C01(002-C01) in OFF.

5.5.7 When the Air Start Receiver Pressure has been reduced to 145-155 psig, CLOSE 1-2403-X4-762(723).

5.5.8 START the Air Compressor by placing the Control Switch in AUTO.

5.5.9 RECORD the Air Compressor start time on Data Sheet 1.

5.5.10 VERIFY the Air Compressor stops automatically when air receiver pressure is between 245 and 255 psig.

5.5.11 RECORD the time the Air Compressor stops on Data Sheet 1.

5.5.12 NOTIFY the Control Room that QEAB annunciator ALB35F02 DG1A LOW PRESS STARTING AIR (ALB38F02 DG1B LOW PRESS STARTING AIR) will energize in the following step.

5.5.13 CRACK-OPEN the Air Start Receiver 2 Drain 1-2403-X4-772(728) and slowly REDUCE air receiver pressure to 45-155 psig.

INITIALS**CAUTION**

If the Air Compressor fails to start automatically do not reduce air receiver pressure below 210 psig.

- 5.5.14 VERIFY the Air Start Compressor 1-2403-G4-001-C02(002-C02) starts automatically when the air receiver pressure is between 215 and 235 psig.
- 5.5.15 If the Air Compressor fails to start automatically:
- a. CLOSE the Air Receiver Drain 1-2403-X4-772(728),
  - b. INITIATE maintenance on the compressor to correct the problem.
- 5.5.16 NOTIFY the Control Room that QEAB annunciator ALB35F06 DG1A SWITCH NOT IN AUTO (ALB38F06 DG1B SWITCH NOT IN AUTO) will energize in the following step.
- 5.5.17 PLACE the Control Switch for the Air Compressor 2, 1-2403-G4-001-C02(002-C02) in OFF.
- 5.5.18 When the Air Start Receiver Pressure has been reduced to 145-155 psig, CLOSE 1-2403-X4-772(728).
- 5.5.19 START the Air Compressor 2 by placing the Control Switch in AUTO.
- 5.5.20 RECORD the Air Compressor start time on Data Sheet 1.
- 5.5.21 VERIFY the Air Compressor stops automatically when air receiver pressure is between 245 and 255 psig.
- 5.5.22 RECORD the time the Air Compressor stops on Data Sheet 1.

INITIALS

## 5.6 SYSTEM RESTORATION

5.6.1 PERFORM Checklist 1, Diesel Generator Standby Mode Status Check, for the Diesel Generator which was tested.

5.6.2 RECORD DFO Storage Tank level 1-11-9024(9025) on Data Sheet 1.

5.6.3 RECORD DFO Day Tank level 1-11-9018(9019) on Data Sheet 1.

5.6.4 RECORD Air Start Receiver 1 pressure 1-PI-9060(9061) on Data Sheet 1.

5.6.5 RECORD Air Start Receiver 2 pressure 1-PI-9064(9065) on Data Sheet 1.

## 5.7 INDEPENDENT VERIFICATION

5.7.1 Independently VERIFY LOCKED OPEN the Air Start Receiver Discharge Isolation which was opened in Step 5.1.16.

5.7.2 Independently VERIFY CLOSED 1-2403-U4-1 (31) which was closed in Step 5.1.12.

5.7.3 Independently VERIFY LOCKED CLOSED the DFO Day Tank Drain Valve 1-2403-U4-035(036) which was closed in Step 5.3.10.5.

5.7.4 Independently VERIFY CLOSED the Air Start Receiver 1 Drain 1-2403-X4-762(723) which was closed in Step 5.5.7.

5.7.5 Independently VERIFY CLOSED the Air Start Receiver 2 Drain 1-2403-X4-772(728) which was closed in Step 5.5.18.

5.7.6 Independently VERIFY OPEN the L.O. Keep-Warm Pump 1-PI-19143(19152) Root 1-2403-X4-798(797) which was operated in Step 5.1.4.



INITIALS

5.7.7 Independently VERIFY CLOSED the  
L.O. Keep-Warm Pump 1-PI-19145(19152)  
Root 1-2403-X4-796(795) which was  
operated in Step 5.1.4.

5.7.8 Independently VERIFY OPEN the  
J.W. Keep-Warm Pump 1-PI-19124(19134)  
Root 1-2403-X4-812(811) which was  
operated in Step 5.1.4.

5.7.9 Incepently VERIFY CLOSED the  
J.W. Keep-Warm Pump 1-PI-19124(19134)  
Root 1-2403-X4-810(809) which was  
operated in Step 5.1.4.

6.0 ACCEPTANCE CRITERIA

6.1 The Diesel Generator starts and  
voltage and frequency are between  
4025 to 4330 volts and 58.8 to 61.2  
hertz within 11.4 seconds.

6.2 The Diesel Generator operates with a  
load of 6800 to 7000 kW for at least  
60 minutes. Modes 1, 2, 3, or 4 only.

6.3 If this test was performed the  
regularly scheduled 6 month  
surveillance, the Diesel Generator  
was loaded to greater than 6100 kW  
within 60 seconds.

6.4 At least one DFO Day Tank Transfer  
Pump started and transferred fuel  
to the DFO Day Tank.

6.5 The DFO Day Tank contains greater  
than 650 gallons of fuel, 52% on  
1-LI-9018 (9019).

6.6 The DFO Storage Tank contains greater  
than 68,000 gallons of fuel, 76% on  
1-LI-9024 (9023).

6.7 The pressure in at least one air  
start receiver is at least 210 psig.

6.8 If the Diesel was operated for 60  
minutes or more, the DFO Day Tank  
was sampled for water, and all water  
removed.



7.0 EVALUATION AND REVIEW

## 7.1 TEST PROCEDURE

☐ Surveillance: ☐ Monthly ☐ Semi-annual ☐ Both  
☐ Other (explain) \_\_\_\_\_

7.2 Results obtained through performance of this procedure meet Acceptance Criteria of Section 6.0

☐ Yes ☐ No

7.2.1 NOTIFY the USS of the test results. REFER to Technical Specification 3.8.1.1 or 3.8.1.2.

7.2.2 If no was checked and the failure was due to a Diesel Generator fault, EVALUATE the reason for the failure per Table 1.

7.2.3 NOTIFY the Diesel Generator System Engineer of the Diesel Generator start. Provide the following information:

- a. A copy of Completion Sheet 1,
- b. A copy of the completed 11885-C, "Diesel Generator Operating Log".

7.3 If any parameter recorded on 11885-C was out of range, INITIATE maintenance to investigate and repair as necessary.

7.4 If either Air Compressor fails to:

- a. Start automatically at the correct pressure, or
- b. Fails to raise air receiver pressure from 150 to 250 psig in  $\frac{1}{2}$  hour or less

INITIATE maintenance to repair the Air Compressor.

7.5

Comments (include any abnormal conditions and corrective actions taken):

---

---

---

## USS notified of Test Completion and Results

Initials / Date / Time

Test Completed By:

Signature / Date / Time

Supervisory Review:

Signature / Date / Time

8.0

REFERENCES

8.1

## FSAR

8.1.1

Technical Specification 3/4.8.1.1

8.1.2

Technical Specification 3/4.8.1.2

8.1.3

FSAR 8.3.1.3

8.1.4

FSAR 9.5.4.4

8.1.5

FSAR 9.5.5.3

8.1.6

FSAR 9.5.5.4

8.1.7

FSAR 9.5.6.4

8.1.8

FSAR 9.5.8.4

8.1.9

FSAR 1.9.108

Reg Guide 1.108

8.2

## PROCEDURES

8.2.1

13145-1,

"Diesel Generators"

8.2.2

00404-C,

"Surveillance Test Tracking Program"

8.2.3

11885-C,

"Diesel Generator Operating Log"

8.2.4

13325-1,

"Auxiliary Feedwater Pumphouse And Diesel Generator Building HVAC Systems"

8.2.5

54169-1,

"Diesel Generator Miscellaneous Trending And Evaluation"

- 8.3 P&ID's
- 8.3.1 1X4DB170-1 Diesel Generator - Train A
- 8.3.2 1X4DB170-2 Diesel Generator - Train B
- 8.4 ELECTRICAL DIAGRAMS
- 8.4.1 1X3D-AA-K01A Diesel Generator Relay And Metering Diagrams
- 8.4.2 1X3D-AA-D02A Swgr 1AA02
- 8.4.3 1X3D-AA-D02B Swgr 1AA02
- 8.4.4 1X3D-AA-D03A Swgr 1BA03
- 8.4.5 1X3D-AA-D03B Swgr 1BA03
- 8.5 ELEMENTARY DIAGRAMS
- 8.5.1 1X3D-BA-D02G Breaker 1AA02-19
- 8.5.2 1X3D-BA-D03D Breaker 1BA03-19
- 8.6 LOGIC DIAGRAMS
- 8.6.1 1X5DN107-1 Diesel Fuel Oil System
- 8.6.2 1X5DN107-2 Diesel Generator Engine
- 8.6.3 1X5DN107-3 Diesel Generator Excitation
- 8.6.4 1X5DN107-4 Diesel Generator Engine Auxiliaries
- 8.6.5 1X5DN107-5 Diesel Generator Engine Auxiliaries
- 8.7 TECHNICAL MANUALS
- 8.7.1 AX4AK01-509 Diesel Engine Technical Manual
- 8.7.2 AX4AK01-563 Diesel Generator Associated Publications Manual Vol 1
- 8.7.3 AX4AK01-564 Diesel Generator Associated Publications Manual Vol 2

END OF PROCEDURE TEXT

TABLE 1

## DIESEL GENERATOR VALID TEST AND FAILURE EVALUATION CRITERIA

Valid tests and failures (per Regulatory Guide 1.108, Section C.2.e and Technical Specification 4.8.1.1.3) shall be based on the following criteria:

1. All start attempts (automatic, including those from bona fide signals, or manual) that result in a failure to start, except as noted in (2) below, should be considered valid tests and failures.
2. Unsuccessful start and load attempts that can definitely be attributed to operating error; to spurious operation of a trip that is bypassed in the emergency operating mode, to malfunction of equipment that is not operative in the emergency operating mode (e.g., synchronizing circuitry) or is not part of the defined Diesel Generator unit design should not be considered valid tests or failures.
3. Successful starts, including those initiated by bona fide signals, followed by successful loading (sequential or manual) to at least 50% of continuous rating and continued operation for at least one hour should be considered valid successful tests. (Failures occurring after one hour are not considered valid failures.)
4. Successful starts that are terminated intentionally without loading, as defined in (3) above, should not be considered valid tests or failures.
5. Successful starts followed by an unsuccessful loading attempt should be considered valid tests and failures, except as noted in (2) above.
6. Tests that are terminated intentionally before completion as defined in (3) above because of an alarmed abnormal condition that would ultimately have resulted in Diesel Generator damage or failure should be considered valid tests and failures.
7. Tests performed in the process of troubleshooting should not be considered valid tests. Tests that are performed to verify correction of the problem should be considered valid tests and successes or failures, as appropriate.
8. Cranking and venting procedures that lead to the discovery of conditions (e.g., excessive water or oil in a cylinder) that would have resulted in the failure of the Diesel Generator unit during test or during response to a bona fide signal should be considered a valid test and failure.



## DATA SHEET 1

## DIESEL GENERATOR SURVEILLANCE DATA

DG under test: \_\_\_\_\_ Date: \_\_\_\_\_ Mode: \_\_\_\_\_

5.1 Diesel Generator Startup

5.1.5 Engine Hours at Startup: \_\_\_\_\_

5.1.7.3 Air Start Receiver Valve Closed: \_\_\_\_\_

5.1.13 Time to voltage: \_\_\_\_\_

Time to frequency: \_\_\_\_\_

5.1.14 Voltage: A-B \_\_\_\_\_

B-C \_\_\_\_\_

C-A \_\_\_\_\_

Frequency: \_\_\_\_\_ Hz

5.2 Diesel Generator Loading

5.2.12.5 Diesel Generator Loading Time \_\_\_\_\_ seconds  
(6 month surveillance only)

5.2.16 Time load exceeded 6800kW: \_\_\_\_\_

5.2.19.1 Time load reduced to less than 6800kW: \_\_\_\_\_

5.3 Diesel Generator Shutdown

5.3.2 Diesel Shutdown Time: \_\_\_\_\_

5.3.8 Diesel Engine Hours at Shutdown \_\_\_\_\_

5.5.9 Air Compressor 1 start time \_\_\_\_\_

5.5.11 Air Compressor 1 stop time \_\_\_\_\_

5.5.20 Air Compressor 2 start time \_\_\_\_\_

5.5.22 Air Compressor 2 stop time \_\_\_\_\_

Sheet 2 of 2

## DATA SHEET 1

## DIESEL GENERATOR SURVEILLANCE DATA

5.6 System Restoration

5.6.2 DFO Storage Tank Level: \_\_\_\_\_ 7  
1-LI-9024(9025)5.6.3 DFO Day Tank Level: \_\_\_\_\_ 1  
1-LI-9018(9019)5.6.4 Air Start Receiver 1 Pressure: \_\_\_\_\_ psig  
1-PI-9060(9061)5.6.5 Air Start Receiver 2 Pressure: \_\_\_\_\_ psig  
1-PI-9064(9065)

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Sheet 1 of 1

### COMPLETION SHEET 1

TO: DIESEL GENERATOR SYSTEM ENGINEER

FROM: UNIT SHIFT SUPERVISOR (UNIT 1)

Diesel Generator Tested: ☐ DG1A ☐ DG1B

Start Date: \_\_\_\_/\_\_\_\_/\_\_\_\_ Shutdown Date: \_\_\_\_/\_\_\_\_/\_\_\_\_

Start Time: \_\_\_\_\_ Shutdown Time: \_\_\_\_\_

Start Engine Hours: \_\_\_\_\_ Shutdown Engine Hours: \_\_\_\_\_

Start preceded by turbocharger prelubrication: ☐ Yes ☐ No

Reason for start:

☐ Surveillance Test

☐ Other: \_\_\_\_\_

---

Reason for trip or failure to start:

☐ Manual ☐ Equipment failure ☐ Trip signal ☐ Alarm Response

☐ Other: \_\_\_\_\_

---

DR# (if known) \_\_\_\_\_ WRT # (If Known) \_\_\_\_\_

List any conditions that would have resulted in Diesel Generator failure to start: \_\_\_\_\_

---

Comments: \_\_\_\_\_

---

Completed By: _____	Date _____	Time _____
Reviewed By: _____	Date _____	Time _____

Diesel Generator Start Evaluation:

☐ Successful Start ☐ Valid Test

☐ Valid Failure ☐ Non-Valid Test

☐ Non-Valid Failure

Unit Shift Supervisor  
 \_\_\_\_\_  
 Shift Clerk / Date \_\_\_\_\_

Copy sent to  
 Diesel General System Engineer

Sheet 1 of 4

## CHECKLIST 1

DIESEL GENERATOR STANDBY MODE STATUS CHECK

<u>ENGINE CONTROL PANEL - PDG2(PDG4)</u>	<u>STATUS</u>	<u>INITIALS</u>
1. All annunciator windows	No unexpected alarms.	_____
2. Control Air Pressure 1-PI-19174 (19175)	58-62 psig	_____
3. UNIT AVAILABLE Light	ON	_____
4. Thermocouple Selector:		
a. Lubricating Oil In	142-170°F	_____
b. Lubricating Oil Out	142-170°F	_____
c. Jacket Water In	142-170°F	_____
d. Jacket Water Out	142-170°F	_____
5. POWER AVAILABLE Lights:		
a. A	ON	_____
b. B	ON	_____
c. C	ON	_____
6. STOPPING light	OFF	_____



Sheet 2 of 4

## CHECKLIST 1

GENERATOR CONTROL PANEL - PDG1(PDG3)		STATUS	INITIALS	IV
1.	Unit/Parallel Switch 1-HS-4414A(4452A)	Center After Unit	_____	_____
2.	Local/Remote Switch 1-HS-4516(4517)	REMOTE	_____	_____
3.	Lockout Relays:			
a.	186A	RESET	_____	_____
b.	186B	RESET	_____	_____
c.	186C	RESET	_____	_____
4.	Voltage Regulator	AUTO	_____	_____
a.	Automatic Voltage Regulator Light	ON	_____	_____
b.	Manual Voltage Regulator Light	OFF	_____	_____
MOTOR CONTROL CENTER 1NBI(1NBO)				
1.	Air After Cooler Fan No. 1	AUTO	_____	
2.	Air Compressor No. 1	AUTO	_____	
3.	Air After Cooler Fan No. 2	AUTO	_____	
4.	Air Compressor No. 2	AUTO	_____	
5.	Jacket Water Circulating Pump	AUTO	_____	
6.	Jacket Water Heater	AUTO	_____	
7.	Lube Oil Circulating Pump	AUTO	_____	
8.	Lube Oil Heater	AUTO	_____	
9.	Generator Space Heater	AUTO	_____	

Sheet 3 of 4

## CHECKLIST 1

DIESEL GENERATOR SKIDSTATUSINITIALS

IV

## 1. Governor Settings

Speed Droop

A: 2.6

B: 2.6

Load Limit

MAX FUEL

Speed

A: 14.34

B: 12.2

Oil Level

Above  
centerline  
of  
sight glass2. Overspeed Trip Air Press  
(located under right bank turbocharger)

58-62 psig

## 3. Lube Oil Level - Dipstick

MAX STATIC  $\pm 1''$ 4. Jacket Water Keep-Warm Pressure  
1-PI-19134 (19134)

15-35 psig

5. Lube Oil Keep Warm Pressure  
1-PI-19145 (19152)

25-50 psig

## 6. Run/Stop Switch 1-HS-4688(4689)

PULL-TO-RUN

## 7. Generator Bearing Oil Level

Centerline of  
sight glass  
or above

## 8. Turbocharger Bearings

a. Right Bank Sight Glass

Flowing

b. Left Bank Sight Glass

Flowing

UPSTAIRS - DIESEL GENERATOR BLDG

## 1. Intake Air Filter

a. Screens

Unobstructed

b. Oil Level Sight Glass

Half Full

## 2. Exhaust Silencer

No Combustibles  
in Room


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CHECKLIST 1

<u>ELECTRICAL CONTROL PANEL QEAB - MAIN</u>		<u>STATUS</u>	<u>INITIALS</u>	<u>IV</u>
<u>CONTROL ROOM</u>				
1.	DSL GEN 1A(1B) UNIT/PARALLEL Switch 1-HS-4414B(4452B)	NORMAL AFTER UNIT	_____	_____
2.	SYNC MODE SELECTOR Switch 1-TS-DG1A (DG1B)	AUTO	_____	_____
3.	DG1A(DG1B) OUTPUT BRKR 1-HS-1AA0219 (1BA0319)	AUTO	_____	_____
<u>4160V AC SWGR 1AA02(1BA03) - CONTROL BLDG LVL A</u>				
1.	DIESEL GENERATOR BRKR CONT SELECT SWITCH 1-HS-1AA0219B(1BA0319B)	CONT RM	_____	_____

REVIEWED BY \_\_\_\_\_ DATE \_\_\_\_\_  
(OSOS, SS, or STA)

Approval <i>[Signature]</i>	Vogtle Electric Generating Plant NUCLEAR OPERATIONS	 Georgia Power	Procedure No. 10001-C
Date 8-2-89	Unit <u>COMMON</u>		Revision No. 10
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**VOID**

LOGKEEPING

1.0 PURPOSE

This procedure provides guidance for keeping operations narrative logs, round sheets, operating logs, recorder charts, computer printouts, and special logs.

2.0 NARRATIVE LOG ENTRIES

2.1 GENERAL

2.1.1 Logs should provide an accurate history of plant operations as a narrative sequence of events or functions performed.

2.1.2 Logs shall be kept current. Information should be promptly recorded. Entries should be clear, concise, complete and legible.

2.2 SHIFT SUPERVISOR LOG

2.2.1 The Shift Supervisor Log should have an entry prefaced by the time of occurrence, for activities on shift including:

- a. The name and position of each operator on shift,
- b. Major equipment status changes,
- c. Major system and equipment testing,
- d. Personnel injuries,
- e. Entering and exiting a technical specification action statement,
- f. Significant events, such as reactor trips or unexpected power changes,
- g. Implementing the Emergency Plan,
- h. Significant security incidents,
- i. Mode changes.

EXHIBIT C



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## 2.3 UNIT (1 OR 2) CONTROL LOG

2.3.1 Entries may be made by the Shift Supervisor, Reactor Operator, or Balance of Plant (BOP) Operator, preceded by the time of entry.

2.3.2 The Unit Control Log should have an entry for any:

- a. Mode change,
- b. Load changes,
- c. Reactivity changes (other than during startup and shut down),
- d. Equipment status changes,
- e. Performance of surveillance testing,
- f. Releases of radioactive effluents including; start and stop times,
- g. Out-of-specification chemistry results,
- h. Operation of PORVs and opening of primary system and significant secondary system safeties.

## 2.4 OPERATOR LOGS

2.4.1 Operator logs will be kept for local operating stations as determined by the Operations Superintendent. Entries should be made by the operator on duty at the local station.

2.4.2 Operator logs should have an entry, prefaced by the time of occurrence, for the following as applicable:

- a. Major equipment or systems changes in operating status,
- b. Equipment failures or problems, including follow-up corrective action,
- c. Radioactive waste discharges, start and stop,
- d. Operating station specific events.

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2.5	REQUIREMENTS COMMON TO ALL LOGS	
2.5.1	When making log entries use black indelible ink, and leave no blank lines between consecutive entries.	
2.5.2	To correct errors, draw a single line through the error, initial and date the correction. The individual who made the original entry will normally make a correction.	
2.5.3	Prepare logs in chronological order. When necessary to insert additional information after the fact, note the entry with the actual time of the event and mark it "Late Entry" or "LE".	
2.5.4	Start a new page at the beginning of each day by entering the date at the top. Remove the second copy of each page completed the previous day from the log book. Copies of all completed pages are collected by the Shift Supervisor. After local review, the page copies are forwarded to the Operations Superintendent for review and disposal.	
2.5.5	To ensure consistency, operating logs shall be formatted as follows:	
	a.	Each shift's entries start with the operating status, e.g., operating mode, tests in progress, or special condition,
	b.	Shift entries shall be per Subsection 2.2, 2.3, or 2.4 as applicable,
	c.	The last entry for each shift will be "Relieved by _____" followed by the signature of the off-going person.
2.5.6	The on-coming person shall review and initial the log to signify the review.	
2.5.7	Log books with the originals of all used pages are kept in the Control Room or at their operating station until all pages in the book are used. The latest completed log book may remain in the Control Room or at their operating station after completion, until the current log is completed.	
2.5.8	Completed log books which are no longer required in the Control Room or on operating stations shall be forwarded to the Operations Superintendent for review. After the Operations Superintendent has completed his review the completed log book shall be forwarded to Document Control for filing.	

### 3.0 ROUNDS SHEETS

#### 3.1 GENERAL

##### NOTE

Properly maintained round sheets provide a record of equipment status and housekeeping conditions that is an effective tool for evaluating equipment performance.

3.1.1 Operators should know the equipment parameters to be monitored and the significance of each parameter.

3.1.2 Operators should have a good understanding of values recorded on their round sheets and operating logs, whether recorded by them or by a previous operator. This is particularly true of out-of-specification readings. They should also be alert for trends or a lack of expected trends. If readings do not respond appropriately to a change in plant conditions determine cause and notify the Control Room.

#### 3.2 REQUIREMENTS FOR ROUNDS SHEETS AND ROUNDS

3.2.1 Rounds should be performed as soon as possible, after the start of a new shift.

3.2.2 Make neat entries with black indelible ink. To correct errors, draw a single line through the error, initial and date the correction, and enter the correct data.

3.2.3 Circle abnormal or unusual readings in red ink. Investigate the cause for the abnormal or unusual reading and record the results on the narrative section of the round sheet. Report circled readings to the Control Room upon discovery. A resolution for the abnormal or unusual reading should be included in the comment section.



- 3.2.4 Entries into rounds sheets blanks shall be as follows:
- a. If a reading cannot be taken due to equipment not running enter OFF,
  - b. If a reading cannot be taken due to equipment tagged out enter TAGGED,
  - c. Normal readings and inspections performed on equipment and areas enter either time, numerical values, or the operator's initial,
  - d. If a reading cannot be taken due to a broken instrument, enter "OOS" (out of service). In addition to this the operator should comment on this condition and also ensure a Maintenance Work Order (MWO) has been written.

- 3.2.5 If a round cannot be taken, enter the reason (for instance PLANT STARTUP or PLANT SHUTDOWN) in the comment section of each affected page.

### 3.3 GENERAL INSPECTION

Refer to Table 1 for inspection criteria when performing rounds. These are the minimum criteria to which an operator must inspect his assigned area. If abnormalities are detected, circle the entry in red and record/report per Sub-subsection 3.2.3.

### 4.0 ELECTRICAL LOGS

#### 4.1 GENERAL

- 4.1.1 Electrical Log Data Sheets are those log sheets required for recording data to account for the unit's generation and station service.

- 4.1.2 The Electrical Log Book is a hardbound book, maintained by the BOP operator to ensure a readily available record of monthly generation and the end of the month meter readings.



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4.2

DATA KEEPING TECHNIQUE

4.2.1

All entries on the Electrical Log Data Sheets shall be in pencil.

4.2.2

Once per hour, on-the-hour, the BOP operator shall complete the applicable entries on the Electrical Log Data Sheet.

4.2.3

Once per hour the BOP operator shall report the net generation to the system operator. The BOP operator shall also report the applicable subtotals and totals to the system operator on the specified times.

4.2.4

Once per day, at midnight, the BOP operator shall calculate the daily totals and update the applicable totals as necessary. The BOP operator shall ensure that all applicable data is transposed onto a new data sheet for the new day.

4.2.5

Once per week, on Saturday, the BOP operator shall obtain copies of the previous week's electrical log sheets and transmit them to:

Integrated System Marketing

333 Piedmont

20th Floor

4.2.6

At the end of the month at 2400 of the last day, the BOP operator shall take the end of the month readings from the station service and gross generation meters. The BOP operator shall then calculate the monthly totals for gross generation, station service, and net generation. These totals alone with the gross generation and station service meter readings shall be reported to the system operator.

4.2.7

After the end of the month readings are reported, the BOP operator shall update the Electrical Log Book as follows:

a. Gross generation meter reading,

b. Gross generation for current month,

c. Station service meter reading,

d. Station service for current month,

e. Net generation for the month.

4.3

ELECTRICAL LOG DATA SHEETS

See Figure 4 for typical.

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## 5.0 SAFETY RELATED LOCKED VALVE MANIPULATION LOG (SRLVML)

### 5.1 GENERAL

An entry into the SRLVML will be made any time that a key to a safety related locked valve is checked out of the Key Cabinet.

### 5.2 COMPLETION INSTRUCTIONS

5.2.1 An individual required to manipulate a safety related locked valve will initiate an entry into the SRLVML, 11888-C. The initial entry should consist of the following:

- a. Valve number,
- b. Reason for manipulation,
- c. Required position per P&ID and applicable system lineup.

5.2.2 The individual will obtain the signature of the USS authorizing the manipulation.

5.2.3 The individual will check out the key to the valve, perform the manipulation, and sign the key back into the Key Cabinet.

5.2.4 The individual will then complete the "as found" and "as left" position on the SRLVML.

5.2.5 A second individual will then independently verify the position of the valve as "as left", and sign the IV position in the SRLVML.

5.2.6 If the "as left" position is the same as the "required position", then the section for restoration will be N/A'd.

5.2.7 An individual required to restore a safety related locked valve to its required position will obtain the USS signature indicating authorization.

5.2.8 The individual will then check out the key to the valve, restore the valve to its required position, sign the restoration section of the SRLVML, and return the key to the Key Cabinet.

5.2.9 A second individual will then independently verify the position of the valve as being the "required position" and sign off the "Restoration to Required Position" IV in the SRLVML.

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## 6.0 EQUIPMENT RUNTIME LOGS

### 6.1 GENERAL

Equipment runtime will be maintained on a shiftly basis to monitor useage for equalization purposes and for identifying needed changes to the preventative maintenance program.

### 6.2 COMPLETION INSTRUCTIONS

6.2.1 Each shift the Control Room operators will complete the log indicating which equipment has operated on their shift by recording the time of operation.

6.2.2 The smallest increment of time will be 1/4 hour.

6.2.3 Each night shift the operator will total the daily run times and the year-to-date times as indicated on the log sheets.

6.2.4 The year-to-date time will then be recorded on the next day's runtime log.

## 7.0 CHART ENTRIES

### 7.1 GENERAL

7.1.1 The operator on duty is responsible for all charts in his area. This includes assuring that each recorder chart is marked daily with the time and date. Also, each chart should be checked for proper operation. If required, repair or initiate an MWO for repair.

7.1.2 When replacing or adjusting a chart, or changing chart speed, mark the chart with the date, time and initial. When a chart is completed it should be marked with the stamp shown in Figure 1 (or equivalent) and forwarded to Document Control for filing.

7.1.3 When a section of a chart is removed, it should be marked with the stamp shown in Figure 2 (or equivalent).

7.1.4 When a chart with an incorrect scale must be used on a recorder, mark it as such and note the recorder range on the chart at the times it is installed and removed. Use the stamp in Figure 3 (or equivalent).

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9.0 SPECIAL LOGS

9.1 GENERAL

From time to time special logs may be required to trend plant parameters or equipment performance. Normally a special log is requested by a department other than the operating group.

9.2 RULES FOR SPECIAL LOGS

9.2.1 Special logs should contain the following, as applicable:

- a. The responsible department and the responsible person requesting the log,
- b. The reason for the log,
- c. The effective start date and the effective end date of the log,
- d. Applicable actions if any parameter is exceeded,
- e. The responsible person/department requesting the special logs shall provide the log to operations, with an adequate number of copies.

9.2.2 Special logs must be approved by the OSOS prior to implementation.

9.2.3 Special logs should be taken as close to the specified time as possible.

END OF PROCEDURE TEXT



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TABLE 1

1.0 GENERAL INSPECTIONS

1.1 Each operator should perform thorough, general inspection of assigned areas and equipment.

Check the general area for:

- a. Satisfactory area cleanliness,
- b. Pipe hangers intact,
- c. Equipment/component labels installed and readable, and no unauthorized labels used,
- d. Insulation installed and undamaged,
- e. Noise and vibration levels normal,
- f. Equipment access satisfactory and unhampered by scaffolding or other material,
- g. Minimum oil and water leakage,
- h. Fire doors closed or automatic hold-open and release mechanisms are free of obstructions, fire barriers intact, and no fire hazards present,
- i. Fire extinguishers in place and hose stations properly equipped,
- j. Radiation/contamination areas clearly identified,
- k. Floor drains open and accessible, where applicable,
- l. Hold tags attached and in good condition,
- m. Doors and gates closed/locked as required,
- n. Sump liquid levels in normal range,
- o. Louvered/screened openings clear of debris,
- p. Area temperature indicates proper operation of HVAC,
- q. Equipment locked with break away locks closed/locked as required,
- r. Temporary modifications clearly marked,

TABLE 1 (CONT'D)

- s. Operator aids properly approved,
- t. Lighting working properly,
- u. Items such as tool boxes and welding bottles that could impact or otherwise affect the seismic capability of safety related equipment in an earthquake are properly stored or restrained.

## 1.2

Check electrical equipment and panels for:

- a. Protective cabinet doors and electrical enclosure covers are installed with all fasteners engaged. (Engage loose fasteners),
- b. Indicating lights energized as required. (Replace defective bulbs),
- c. Charging Springs charged on breakers with visible external indication,
- d. Relay targets indicating normal:
  - (1) Relay targets and flags discovered should be logged and Control Room notified,
  - (2) When authorized, reset discovered targets and flags.
- e. Transformer liquid levels, temperatures, and pressures normal,
- f. No water leakage in immediate vicinity of energized equipment,
- g. Filters are clean.

## 1.3

Check local control panels for:

- a. Alarms not in alarmed condition,
- b. Recorders operating properly,
- c. Record time, date, and initials on all recorder charts,
- d. Indicators within normal bands,
- e. Test all annunciators.

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TABLE 1 (CONT'D)

- 1.4 Check fire alarm panels for:
  - a. Power supplies energized,
  - b. Trouble lights indicate no abnormalities.
- 1.5 Check heat tracing panels for:
  - a. Power supplies energized,
  - b. No alarms.
- 1.6 Check batteries for:
  - a. Proper cell level,
  - b. No cracking, leaking, or corrosion of cells.
- 1.7 General equipment checks include:

CAUTION

When checking equipment for temperature with the hand use the back of the hand and not the palm. If an electrical shock occurs or the surface is extremely hot, the muscular response of the hand causes it to close and grasp.

- a. Motor housing temperature, vibration, and noise normal,
- b. Bearing temperature, vibration, and noise normal,
- c. Bearing lubrication:
  - (1) Oil level and/or flow normal,
  - (2) Oil sling is picking up oil.
- d. Oil temperature-adequate cooling water flow and proper temperatures for the oil cooler,
- e. Adequate gland sealing water,
- f. Suction, discharge, and recirculation flow path available,



TABLE 1 (CONT'D)

- g. Suction and discharge pressure normal,
- h. Fluid leakage normal (oil, water, air, steam, chemicals),
- i. Ventilation intakes clear of dust and debris,
- j. Coupling guards in place,
- k. Ground straps connected,
- l. Standby equipment properly aligned and lubricated (cooling water, oilers, bubblers, etc),
- m. Surge/storage tanks at proper level.

1.8

Check for evidence of water hammer.



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TABLE 1 (CONT'D)

- g. Suction and discharge pressure normal,
- h. Fluid leakage normal (oil, water, air, steam, chemicals),
- i. Ventilation intakes clear of dust and debris,
- j. Coupling guards in place,
- k. Ground straps connected,
- l. Standby equipment properly aligned and lubricated (cooling water, oilers, bubblers, etc),
- m. Surge/storage tanks at proper level.

1.8 Check for evidence of water hammer.

TABLE 1 (CONT'D)

- g. Suction and discharge pressure normal,
- h. Fluid leakage normal (oil, water, air, steam, chemicals),
- i. Ventilation intakes clear of dust and debris,
- j. Coupling guards in place,
- k. Ground straps connected,
- l. Standby equipment properly aligned and lubricated (cooling water, oilers, bubblers, etc),
- m. Surge/storage tanks at proper level.

1.8

Check for evidence of water hammer.

Tag No	_____	Scale	_____
Description	_____		
Date	_____	Time	_____
Operator	_____		

Figure 1

DATE	_____
Section of chart removed	
by	_____
for review by	
	_____

Figure 2

INCORRECT CHART SCALE	
Recorder Range is	_____
INIT.	_____ DATE _____

Figure 3

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ELECTRICAL LOG SHEET - UNIT 1

PLANT ALVIN W. WOOLLE

DAY \_\_\_\_\_ DATE \_\_\_\_\_ 19\_\_

TIME	Generator Meter Reading	Gross Generation MWH	Total Gross Generation	STATION SERVICE		Total Station Service	Net Generation MWH	Total Net Generation	Load MW	A.C. Volts KV	Avg A.C. Amps	React MWARS	PF	Angle	Receptacle KV 1-2	115 KV LINES			
				Station Service Meter Reading	Station Service MWH											AUTO KV# ROW NO. 1	WARS	MW	AMPS
0600																			
0700																			
0800																			
0900																			
1000																			
1100																			
1200																			
Subtotal																			
1300																			
1400																			
1500																			
1600																			
1700																			
Subtotal																			
1800																			
1900																			
2000																			
2100																			
2200																			
2300																			
TOTAL																			

COMMENTS		GENERATION HISTORY					
		GENERATOR METER READINGS		MWH		YEAR	
		Present	Previous	TOTAL	NET	YEAR	YEAR
Gross Generation							
TOTAL STATION SERVICE							
TOTAL NET GENERATION							
MAXIMUM NET DEMAND							
Time	MWH	Date	MWH	Date	MWH	Previous	Present
PREVIOUS							
TOTAL							

115 KV LINES				115 KV LINES					
TIME	WARS	MW	AMPS	KV 1-2	TIME	WARS	MW	AMPS	KV 1-2
0600					0600				
0700					0700				
0800					0800				
0900					0900				
1000					1000				
1100					1100				
1200					1200				
1300					1300				
1400					1400				
1500					1500				
1600					1600				
1700					1700				
1800					1800				
1900					1900				
2000					2000				
2100					2100				
2200					2200				
2300					2300				

CUMULATIVE				CUMULATIVE					
TIME	WARS	MW	AMPS	KV 1-2	TIME	WARS	MW	AMPS	KV 1-2
0600					0600				
0700					0700				
0800					0800				
0900					0900				
1000					1000				
1100					1100				
1200					1200				
1300					1300				
1400					1400				
1500					1500				
1600					1600				
1700					1700				
1800					1800				
1900					1900				
2000					2000				
2100					2100				
2200					2200				
2300					2300				


  

WILSON				
TIME	WARS	MW	AMPS	KV 1-2
0600				
0700				
0800				
0900				
1000				
1100				
1200				
1300				
1400				
1500				
1600				
1700				
1800				
1900				
2000				
2100				
2200				
2300				



Figure 4 - Electrical Log Sheet - Unit 1



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VOID

## DIESEL START LOG

### 1.0 PURPOSE

1.1 The purpose of this procedure is to provide the tracking mechanism required to evaluate the reliability of the "Diesel Generator Unit". This procedure also will provide the feedback required to adjust testing intervals and the reporting mechanism to the required regulatory agencies which may be required when failures occur.

1.2 This procedure satisfies the following Technical Specifications:

Table 4.8-1

Section 4.8.1.1.3

### 2.0 PREREQUISITES OR INITIAL CONDITIONS

2.1 A diesel start was initiated by either automatic signal, including those from bona fide signals, or manual signals.

2.2 Tests will be performed using procedure 14980-1, 14985-1, 13145-1, 14980-2, 14985-2, or 13145-2 and results shall be recorded. The results of the test shall be transmitted to the ESS for independent review and update of the Diesel Generator Log.

### 3.0 DEFINITIONS

#### 3.1 "FAILURE"

The diesel does not start, accelerate and assume the design rated load within and for the time prescribed during an emergency or a valid test.

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### 3.2 "DIESEL GENERATOR UNIT"

Consists of the following components: The engine, generator, combustion air system, cooling water system up to the supply, fuel supply system, lubricating oil system, starting energy sources, autostart controls, manual controls and the diesel generator breaker.

### 3.3 "VALID TESTS AND FAILURES"

- a. All start attempts (automatic, including those from bona fide signals, or manual) that result in a failure to start, except as noted in (2) below, should be considered valid tests and failures.
- b. Unsuccessful start and load attempts that can definitely be attributed to operating error, to spurious operation of a trip that is bypassed in the emergency operating mode, to malfunction of equipment that is not operative in the emergency operating mode (e.g., synchronizing circuitry) or is not part of the defined diesel generator unit design should not be considered valid tests or failures.
- c. Successful starts, including those initiated by bona fide signals, followed by successful loading (sequential or manual) to at least 50% of continuous rating and continued operation for at least one hour should be considered valid successful tests.
- d. Successful starts that are terminated intentionally without loading, as defined in (3) above, should not be considered valid tests or failures.
- e. Successful starts followed by an unsuccessful loading attempt should be considered valid tests and failures, except as noted in (2) above.
- f. Tests that are terminated intentionally before completion as defined in (3) above because of an alarmed abnormal condition that would ultimately have resulted in diesel generator damage or failure should be considered valid tests and failures.

- g. Tests performed in the process of trouble shooting should not be considered valid tests. Tests that are performed to verify correction of the problem should be considered valid tests and successes or failures, as appropriate.
- h. Cranking and venting procedures that lead to the discovery of conditions (e.g., excessive water or oil in a cylinder) that would have resulted in the failure of the diesel generator unit during test or during response to a bona fide signal should be considered a valid test and failure.

3.4 "UNAVAILABLE"

A "Diesel Generator Unit" shall be considered inoperable from the time of failure until it satisfies the requirements of Procedure 14980-1.

3.5 "TEST FREQUENCY"

The required test period is determined by comparing information given on Data Sheet 1 to Table 4.8-1 of the Tech Specs.

4.0 INSTRUCTIONS FOR DIESEL GENERATOR START LOG  
(DATA SHEET 1)

NOTE

A separate Start Log shall be maintained for each Diesel Generator.

- 4.1 Record on the Diesel Generator Start Information sheet provided by the Operations Department and the Diesel Generator Start Log the next sequential start number from the engine log.
- 4.2 Record date of start.
- 4.3 Review information provided from Operations and compare against definition of valid tests and failures given in section 3.3 of this procedure to determine whether the start constitutes a valid or invalid test and a success or failure. If determination is different than that given then differences must be resolved with the individual signing the Data Sheet.

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4.4 Record number of valid failures in last 20 valid tests for determination of test frequency per Figure 1 of this procedure and Table 4.8-1 of Tech Specs.

4.5 Record number of valid failures in last 100 valid tests for determination of that frequency per Figure 1 of this procedure and table 4.8-1 of Tech Spec, and Reporting Requirements per section 4.8.1.1.3 of the Tech Specs.

4.6 Record current test frequency by comparing number of valid failures per 20 and 100 valid tests, as given in previous columns to limits given in Figure 1. If test frequency must be changed, notify NSAC by completing Data Sheet 4 and transmitting to NSAC Manager.

4.7 Determine total time the Diesel Generator was run following a particular sequential start and record on Diesel Generator Start Log.

4.8 Calculate the total Diesel Generator run time for the past 30 days.

4.9 Record total time the Diesel Generator was unavailable.

4.10 Record name and date of person entering data.

4.11 Data Sheet 1, 2 and 3 should be transmitted to Document Control as deemed necessary by the Responsible Engineer.

5.0 INSTRUCTIONS FOR DIESEL GENERATORS CUMULATIVE OPERATING DATA (DATA SHEET 2)

NOTE

Cumulative operating data of both Diesel Generators is to be reviewed and compiled periodically (every eighteen months) and documented on Data Sheet 2 by the responsible Engineer.

5.1 Record the calendar period for which the review covers.

5.2 Record the Sequential Start Numbers for the calendar period covered.



- 5.3 Review all Diesel Generator Start Information Sheets for the calendar period covered to determine the total number of starts, number of auto starts from either BUS UV or LOCA and number of manual starts.
- 5.4 From Diesel Generator Start Information Sheets and Data Sheet 1 of this procedure determine the total number of Valid Tests, total number of failures (Valid and Invalid) and total number of valid failures for the calendar period covered.
- 5.5 From Diesel Generator Start Information Sheets, determine the number of failures attributed to operator error, other human error and equipment failures. Also record number of failures which occurred during surveillance testing, maintenance testing, during actual demand (LOCA or BUS UV) or other runs for the calendar period covered.
- 5.6 From Procedure 11885-1 or 11885-2 determine for the time period covered the total Engine Run Time at no load, 0 to 25% load, 25 to 50% load, 50 to 75% load, 75 to 100% load and 100% load.
- 5.7 From Data Sheet 3 of procedure 14980-1 or 14980-2 Data Sheet 1 of this procedure and other sources (e.g. Operator's Log), record all time the Diesel Generator was unavailable.
- 5.8 Record current Total Run Time from the Engine Hourmeter at the Local Engine Control Panel.
- 5.9 From Diesel Generator Start Information Sheets for the calendar period covered, determine if there were any repeat failure mechanisms, repeat human errors or common mode failures. If there were any, give details in comments section. Attach additional pages, if necessary.
- 5.10 Person performing review is to enter his name and the date.
- 6.0 INSTRUCTIONS FOR DIESEL GENERATOR FAILURE DOCUMENTATION SHEET

## NOTE

All Diesel Generator Unit failures, valid or invalid are to be documented on Data Sheet 3. This documentation may be used to supplement reporting requirements.

- 6.1 Identify the Diesel Generator unit involved.
- 6.2 Record the Sequential Start Number on which the failure occurred.
- 6.3 From determination made on Diesel Generator Start Information Sheet, indicate if the start was a valid test.
- 6.4 Identify failure as the failure in the last 100 valid tests from Data Sheet 1.
- 6.5 Describe the cause of the failure.
- 6.6 Describe corrective measures taken.
- 6.7 Indicate length of time the Diesel Generator Unit was unavailable.
- 6.8 Indicate the current Test Surveillance Interval from Data Sheet 1.
- 6.9 Verify that the test interval is in conformance with Table 4.8-1 of the Tech Spec.
- 6.10 If additional failures were experienced during troubleshooting of the subject failure, complete Data Sheet 3 for each of the troubleshooting failures.

NOTE

The information required by the following steps is required only when the number of failures in the last 100 valid tests is seven or more.

- 6.11 Describe corrective measures taken or planned to increase reliability of the Diesel Generators.
- 6.12 Provide an assessment of the existing reliability of electric power to ESF equipment.
- 6.13 Provide basis for continued plant operation, if that is planned.
- 6.14 Attach a copy of Data Sheet 3 of Procedure 14980-1 or 2 and Data Sheet 1 of this procedure that document all starts that occurred within the time period over which the last 100 Valid Tests were performed and verifies that surveillance testing during the period was in conformance with Table 4.8-1 of the Tech Spec.

6.15 The person completing Data Sheet 3 is to enter his name and the date.

7.0 REPORTING:

7.1 FAILURES

7.1.1 All diesel generator failures, valid or nonvalid, shall be reported to the NRC in a Special Report submitted to the Regional Administrator of Region 2 within thirty days. Reports of diesel generator failures shall include the information contained on Data Sheet 3.

7.1.2 Transmit information in 5.1.1 to Nuclear Safety & compliance.

7.2 ENVIRONMENTAL REPORTS

7.2.1 If the diesel generator is operated more than 120 hours per year, Nuclear Safety & Compliance shall be notified.

8.0 REFERENCES:

8.1 TECHNICAL SPECIFICATION

8.1.1 Technical Specification Section 4.8.1.1.3

8.1.2 Technical Specification Table 4.8-1

8.2 PROCEDURES

8.2.1 00404-C, "Surveillance Test Program"

8.2.2 00150-C, "Deficiency Control"

8.2.3 14980, "Diesel Generator Operability Test"

8.2.4 14985, "Diesel Generator Interdependence Test"

8.2.5 13145 "Diesel Generators"

8.2.6 11885-C, "Diesel Generator Operating Log"

8.3 OTHER

8.3.1 Reg. Guide 1.108

8.3.2 Letter from W. R. Woodall Dated February 2, 1987

8.3.3 Letter to T.E. Byerley dated December 22, 1981

END OF PROCEDURE TEXT

FIGURE 1

## DIESEL GENERATOR TEST SCHEDULE

<u>Number of Failures in Last 20 Valid Tests*</u>	<u>Number of Failures in last 100 Valid Tests*</u>	<u>Test Frequency</u>
1	4	Once Per 31 Days
2**	5	Once Per 7 Days

\* See definition of VALID TESTS & FAILURES.

For the purposes of determining the required test frequency, the previous test failure count may be reduced to zero if a complete diesel overhaul to like-new condition is completed, provided that the overhaul, including appropriate post-maintenance operation and testing, is specifically approved by the manufacturer and if acceptable reliability has been demonstrated. The reliability criteria shall be the successful completion of 14 consecutive tests in a single series. Ten of these tests shall be in accordance with the routine Surveillance requirements specified in procedure 14980-1 and four tests in accordance with the 6 month (184-day) testing requirement specified in procedure 14980-1. If this criteria is not satisfied during the first series of tests, any alternative criterion to be used to transvalue the failure count to zero requires NRC approval.

\*\* The associated test frequency shall be maintained until seven (7) consecutive failure free demands have been performed and the number of failures in the last 20 valid demands has been reduced to one (1).



DIESEL GENERATOR START LOG - TRAIN UNIT

PAGE

[illegible]

- 1) S - Successful  
2) F - Failure  
3) VF - Valid Failures  
4) VT - Valid Tests

## DATA SHEET 2

PAGE \_\_\_\_ OF \_\_\_\_

DC TRAIN \_\_\_\_

UNIT \_\_\_\_

DIESEL GENERATORS CUMULATIVE OPERATING DATA

STEP	OPERATING DATA	TRAIN A	TRAIN B
	Period Covered: From (Date)		
5.1	To (Date)		
	Starts Covered: From (Sequential Start No.)		
5.2	To (Sequential Start No.)		
	Total Starts		
	Total Auto Starts (LOCA)		
5.3	Total Auto Starts (BUV)		
	Total M <sub>g</sub> Starts		
	Total Valid Tests		
5.4	Total Failures (Valid and Invalid)		
	Total Valid Failures		
	Failures Attributed to Operator Error		
	Failures attributed to other Human Error		
5.5	Equipment Failures		
	Failures occurring during Surveillance Testing		
	Failures occurring during Maintenance Testing		
	Failures occurring during Actual Demand		
	Failures occurring during all other runs		
	Total Run Time at No Load		
	Total Run Time at 0 25% load		
5.6	Total Run Time at 25 50% load		
	Total Run Time at 50 75% load		
	Total Run Time at 75 100% load		
	Total Run Time at 100% load		
5.7	Total Time Engine Unavailable		

## DATA SHEET 2 (CONT'D)

PAGE \_\_\_\_\_ OF \_\_\_\_\_

DC TRAIN

UNIT \_\_\_\_\_

### DIESEL GENERATORS CUMULATIVE OPERATING DATA

STEP	OPERATING DATA	TRAIN A	TRAIN B
------	----------------	---------	---------

5.8 Current Engine Hourmeter reading  
Repeat Failure Mechanism (Yes, No)

5.9 Repeat Human Errors (Yes, No)  
Common Mode Failures (Yes, No)

Comments:

5.10 Completed By (Name/Date) \_\_\_\_\_ /

DATA SHEET 3

PAGE \_\_\_\_ OF \_\_\_\_

DIESEL GENERATOR FAILURE DOCUMENTATION SHEETComplete For All Diesel Generator Failures

- 6.1 Diesel Generator: \_\_\_\_\_
- 6.2 Sequential Start Number: \_\_\_\_\_
- 6.3 Valid Test (Yes, No): \_\_\_\_\_
- 6.4 Failure in last 100 Valid Tests: \_\_\_\_\_
- 6.5 Cause of Failure: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
- 6.6 Corrective Measure Taken: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
- 6.7 Length of Time Diesel Generator Unavailable: \_\_\_\_\_
- 6.8 Current Surveillance Test Interval: \_\_\_\_\_
- 6.9 Test Interval in Conformance with Table 4.8-1 of Tech Specs.? \_\_\_\_\_
- 6.10 Data Sheet 3 completed for each failure during troubleshooting? \_\_\_\_\_

If Failure is 7 in last 100 Valid Test

- 6.11 Corrective measures, taken or planned, to increase reliability of the Diesel Generator: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_



DATA SHEET 3 (CONT'D)

PAGE \_\_\_\_ OF \_\_\_\_

DIESEL GENERATOR FAILURE DOCUMENTATION SHEET

If Failure is 7 in last 100 Valid Test

6.12 Assessment of existing reliability of Electrical Power to ESF  
equipment: \_\_\_\_\_

6.13 Basis for continued Plant Operation, if planned: \_\_\_\_\_

6.14 Data Sheets attached documenting last 100/Valid Tests? \_\_\_\_\_

6.15 Data Sheet Completed By (Name/Date) \_\_\_\_\_ /

DATA SHEET 4

TO: NSAC MANAGER

FROM: ENGINEERING SUPPORT SUPERINTENDENT

SUBJECT: DIESEL GENERATOR TEST FREQUENCY

DIESEL GENERATOR

DIESEL GENERATOR TEST FREQUENCY SHOULD BE CHANGED TO :

31 DAYS

7 DAYS

REASON FOR TEST FREQUENCY CHANGE: