

FLORIDA POWER & LIGHT COMPANY

TURKEY POINT UNITS 3 AND 4

EMERGENCY POWER SYSTEM  
ENHANCEMENT PROJECT  
TECHNICAL SPECIFICATIONS

EPS Enhancement Report  
Supplement No. 3  
Revision 0

Attachment 2

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## TURKEY POINT UNITS 3&4

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REACTIVITY CONTROL SYSTEMSCHARGING PUMPS - OPERATINGLIMITING CONDITION FOR OPERATION

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3.1.2.3 At least two charging pumps shall be OPERABLE.

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTION:

With only one charging pump OPERABLE, restore at least two charging pumps to OPERABLE status within 72 hours or be in at least HOT STANDBY and borated to a SHUTDOWN MARGIN equivalent to at least 1%  $\Delta k/k$  at 200°F within 6 hours; restore at least two charging pumps to OPERABLE status within 72 hours or be in COLD SHUTDOWN within the next 30 hours.

SURVEILLANCE REQUIREMENTS

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4.1.2.3.1 The required charging pumps shall be demonstrated OPERABLE by testing pursuant to Specification 4.0.5. The provisions of Specification 4.0.4 are not applicable for entry into MODES 3 and 4.

TABLE 3.3-3 (Continued)

ENGINEERED SAFETY FEATURE ACTUATION SYSTEM  
INSTRUMENTATION TRIP SETPOINTS

<u>FUNCTIONAL UNIT</u>	<u>TRIP SETPOINT</u>	<u>ALLOWABLE VALUE#</u>
6. Auxiliary Feedwater (Continued)		
d. Bus Stripping	See Item 7. below for all Bus Stripping Setpoints and Allowable Values.	
e. Trip of All Main Feedwater Pump Breakers.	N.A.	N.A.
7. Loss of Power		
a. 4.16 kV Busses A and B (Loss of Voltage)	N.A.	N.A.
b. 480V Load Centers (Instantaneous Relays) Degraded Voltage		
<u>Load Center</u>		
3A	418V±5V (10 sec ± 1 sec delay)	[ ]
3B	423V±5V (10 sec ± 1 sec delay)	[ ]
3C	429V±5V (10 sec ± 1 sec delay)	[ ]
3D	429V±5V (10 sec ± 1 sec delay)	[ ]
4A	407V±5V (10 sec ± 1 sec delay)	[ ]
4B	423V±5V (10 sec ± 1 sec delay)	[ ]
4C	419V±5V (10 sec ± 1 sec delay)	[ ]
4D	404V±5V (10 sec ± 1 sec delay)	[ ]
Coincident with: Safety Injection and	See Item 1. above for all Safety Injection Trip Setpoints and Allowable Values.	
Diesel Generator Breaker Open	N.A.	N.A.



TABLE 3.3-3 (Continued)

ENGINEERED SAFETY FEATURE ACTUATION SYSTEM  
INSTRUMENTATION TRIP SETPOINTS

<u>FUNCTIONAL UNIT</u>	<u>TRIP SETPOINT</u>	<u>ALLOWABLE VALUE#</u>
7. Loss of Power (Continued)		
c. 480V Load Centers (Inverse Time Relays) Degraded Voltage		
<u>Load Center</u>		
3A	416V±5V(60 sec ±30 sec delay)	[ ]
3B	426V±5V(60 sec ±30 sec delay)	[ ]
3C	436V±5V(60 sec ±30 sec delay)	[ ]
3D	437V±5V(60 sec ±30 sec delay)	[ ]
4A	424V±5V(60 sec ±30 sec delay)	[ ]
4B	422V±5V(60 sec ±30 sec delay)	[ ]
4C	433V±5V(60 sec ±30 sec delay)	[ ]
4D	432V±5V(60 sec ±30 sec delay)	[ ]
Coincident with: Diesel Generator Breaker Open	N.A.	N.A.
8. Engineering Safety Features Actuation System Interlocks		
a. Pressurizer Pressure	≤2000 psig	≤[ ] psig
b. T <sub>avg</sub> --Low	≥531°F	[ ]
9. Control Room Ventilation Isolation		
a. Automatic Actuation Logic and Actuation Relays	N.A.	N.A.
b. Safety Injection	See Item 1. above for all Safety Injection Trip Setpoints and Allowable Values.	



## INSTRUMENTATION

### FIRE DETECTION INSTRUMENTATION

#### LIMITING CONDITION FOR OPERATION

3.3.3.4 As a minimum, the fire detection instrumentation for each fire detection zone shown in Table 3.3-6 shall be OPERABLE.

APPLICABILITY: Whenever equipment protected by the fire detection instrument is required to be OPERABLE.

#### ACTION:

- a. With any, but not more than one-half the total in any fire zone, Function A fire detection instruments shown in Table 3.3-6 inoperable, restore the inoperable instrument(s) to OPERABLE status within 14 days or within the next 1 hour establish a fire watch patrol to inspect the zone(s) with the inoperable instrument(s) at least once per hour, unless the instrument(s) is located inside the containment, then inspect that containment zone at least once per 8 hours (or monitor the containment air temperature at least once per hour at the locations listed in Specification 4.6.1.5).
- b. With more than one-half of the Function A fire detection instruments in any fire zone shown in Table 3.3-6 inoperable, or with any Function B fire detection instruments shown in Table 3.3-6 inoperable, or with any two or more adjacent fire detection instruments shown in Table 3.3-11 inoperable, within 1 hour establish a fire watch patrol to inspect the zone(s) with the inoperable instrument(s) at least once per hour, unless the instrument(s) is located inside the containment, then inspect that containment zone at least once per 8 hours (or monitor the containment air temperature at least once per hour at the locations listed in Specification 4.6.1.5).
- c. With the fire watch patrol not established at the 18 foot level of the turbine area, restore the fire watch patrol within one hour, or prepare and submit a Special Report to the Commission within 30 days.
- d. The provisions of Specifications 3.0.3 are not applicable.

#### SURVEILLANCE REQUIREMENTS

4.3.3.4.1 Each of the above required fire detection instruments which are accessible during plant operation shall be demonstrated OPERABLE at least once per 6 months by performance of a TRIP ACTUATING DEVICE OPERATIONAL TEST. Fire detectors which are not accessible during plant operation shall be demonstrated OPERABLE by the performance of a TRIP ACTUATING DEVICE OPERATIONAL TEST during each COLD SHUTDOWN exceeding 24 hours unless performed in the previous 6 months.

4.3.3.4.2 The NFPA Standard 72D supervised circuits supervision associated with the detector alarms of each of the above required fire detection instruments shall be demonstrated OPERABLE at least once per 6 months.

TABLE 3.3-6

## FIRE DETECTION INSTRUMENTS FOR ESSENTIAL EQUIPMENT

<u>INSTRUMENT LOCATION</u>	<u>TOTAL NUMBER OF INSTRUMENTS</u>		
	<u>HEAT</u> (x/y)*	<u>FLAME</u> (x/y)	<u>SMOKE</u> (x/y)
<b>FIRE ZONE AREA</b>			
4 - Aux. Bldg. Corridor E. 10'			(2/0)
5 - Chem. Drain/Laundry/Shower Tank Room			(2/0)
9 - Laundry/Chemical Drain Tank Room			(1/0)
10 - Pipeway			(11/0)
11 - Unit 3 RHR Heat Exchanger Room			(5/0)
12 - RHR Pump 3A Room			(2/0)
13 - RHR Pump 3B Room			(2/0)
14 - Unit 4 RHR Heat Exchanger Room			(5/0)
15 - RHR Pump 4A Room			(2/0)
16 - RHR Pump 4B Room			(2/0)
19 - Unit 3 W Elect Penet Room			(5/0)
20 - Unit 3 S Elect Penet Room			(11/0)
21 - Instrument Shop			(2/0)
22 - Radioactive Laboratory			(2/0)
25 - Aux. Bldg. Elect. Equipmt. Room	(2/0)		(5/0)
26 - Unit 4 N Elect Penet Room			(8/0)
27 - Unit 4 W Elect Penet Room			(6/0)
30 - Unit 4 Piping and Valve Room			(4/0)
40 - Unit 3 Piping and Valve Room			(4/0)
45 - Unit 4 Charging Pump Room	(0/4)		(3/0)
47 - Unit 4 Component Cooling Water Area	(0/4)	(5/2)	
54 - Unit 3 Component Cooling Water Area	(0/4)	(4/2)	
55 - Unit 3 Charging Pump Room	(0/4)		(3/0)
58 - Aux Bldg Corridor, El. 18'			(18/0)
59 - Unit 4 Containment Electrical Penet. Area**			(10/0)
60 - Unit 3 Containment Electrical Penet. Area**			(16/0)
61 - Reactor Control Rod Eqpmt Room - Unit 4			(4/0)
62 - Computer Room			(11/0)
63 - Reactor Control Rod Eqpmt Room - Unit 3			(4/0)
67 - 4160V Switchgear 4B			(10/0)
68 - 4160V Switchgear 4A			(6/0)
70 - 4160V Switchgear 3B			(10/0)
71 - 4160V Switchgear 3A			(6/0)
72 - Diesel Generator 3B	(0/3)	(1/0)	(1/0)
73 - Diesel Generator 3A	(0/3)	(1/0)	(1/0)
74 - Day Tank Room 3B	(1/1)		
75 - Day Tank Room 3A	(1/1)		
76 - Unit 4 Turbine Lube Oil Reservoir	(1/0)		
79A- North-South Breezeway	(0/6)		(4/0)
81 - Unit 4 Main Transformer	(1/0)		
82 - Unit 4 Aux Transformer Area	(1/0)		
84 - Unit 3 and 4 Aux Feedwater Pump Area (DC Enclosure Bldg.)			(3/0)

TABLE 3.3-6 (Continued)  
FIRE DETECTION INSTRUMENTS  
FOR ESSENTIAL EQUIPMENT

<u>INSTRUMENT LOCATION</u>	<u>TOTAL NUMBER OF INSTRUMENTS</u>		
	<u>HEAT</u> <u>(x/y)*</u>	<u>FLAME</u> <u>(x/y)</u>	<u>SMOKE</u> <u>(x/y)</u>
FIRE ZONE AREA			
87 - Unit 3 Aux Transformer Area	(1/0)		
93 - 480V Load Center 4A and 4B			(1/0)
94 - 480V Load Center 4C and 4D			(2/0)
95 - 480V Load Center 3A and 3B			(1/0)
96 - 480V Load Center 3C and 3D			(2/0)
97 - Mechanical Equipment Room			(1/0)
98 - Cable Spreading Room			(16/15)
101- RPI Inverter and MG Sets			(1/0)
102- Battery Rack 4B	(1/0)		
103- Battery Rack 3A	(1/0)		
104- RPI Inverter and MG Sets			(2/0)
106- Control Room	(1/0)		(17/0)
108A- Train A Inverters			(3/4)
108B- Train B Inverters			(4/4)
109- Battery Rack 4A	(1/0)		
110- Battery Rack 3B	(1/0)		
113- Unit 4 Feedwater Platform		(2/0)	
116- Unit 3 Feedwater Platform		(2/0)	
119- Unit 4 Intake Cooling Water Pump Area		(4/0)	
120- Unit 3 Intake Cooling Water Pump Area		(4/0)	
132- Control Room Electrical Chase			(1/0)
133- Diesel Generator 4B	(5/5)	(3/0)	(5/0)
134- 4160V Switchgear 3D Room			(2/0)
135- Diesel Generator 4B			
Control Panel Room			(2/0)
136- Diesel Generator 4B			
Fuel Transfer Pump			(2/0)
138- Diesel Generator 4A	(5/5)	(3/0)	(5/0)
139- 4160V Switchgear 4D Room			(2/0)
140- Diesel Generator 4A			
Control Panel Room			(2/0)
141- Diesel Generator 4A			
Fuel Transfer Pump			(2/0)
N/A - 18' level of the Turbine Area	(N/A)#	(N/A)#	(N/A)#

TABLE NOTATIONS

- \* (x/y): x is number of Function A (early warning fire detection and notification only) instruments.  
y is number of Function B (actuation of Fire Suppression Systems and early warning fire detection and notification) instruments.
- \*\* The fire detection instruments located within the containment are not required to be operable during the performance of Type A Containment Leakage Rate Test.
- # A fire watch patrol shall be established to inspect the 18 foot level of the Turbine Area once each hour.

## EMERGENCY CORE COOLING SYSTEMS

### 3/4.5.2 ECCS SUBSYSTEMS - $T_{avg}$ GREATER THAN OR EQUAL TO 350°F

#### LIMITING CONDITION FOR OPERATION

3.5.2 The following Emergency Core Cooling System (ECCS) equipment and flow paths shall be OPERABLE:

- Four OPERABLE Safety Injection (SI) pumps, each capable of being powered from its associated OPERABLE diesel generator, with discharge aligned to the RCS cold legs,\*
- Two OPERABLE RHR heat exchangers,
- Two OPERABLE RHR pumps with discharge aligned to the RCS cold legs,
- An OPERABLE flow path capable of taking suction from the refueling water storage tank as defined in Specification 3.5.4, and
- Two OPERABLE flow paths capable of taking suction from the containment sump.

APPLICABILITY: MODES 1, 2, and 3\*\*.

#### ACTION:

- With any one of the required ECCS components or flow paths inoperable, except for inoperable Safety Injection Pump(s), restore the inoperable component or flow path to OPERABLE status within 72 hours or be in at least HOT STANDBY within the next 6 hours and in HOT SHUTDOWN within the following 6 hours.
- In the event the ECCS is actuated and injects water in the Reactor Coolant System, a Special Report shall be prepared and submitted to the Commission pursuant to Specification 6.9.2 within 90 days describing the circumstances of the actuation and the total accumulated actuation cycles to date since January 1, 1990.
- With one of the four required Safety Injection pumps inoperable and the opposite unit in MODE 1, 2, or 3, restore the pump to OPERABLE within 30 days or be in at least HOT STANDBY within the next 12 hours and in HOT SHUTDOWN within the following 6 hours.

~~ACTION applies to both units simultaneously.~~ \*\*\*

(two associated with the unit and one from the opposite unit)

\*Only three OPERABLE Safety Injection (SI) pumps, each capable of being powered from its associated OPERABLE diesel generator, with discharge aligned to the RCS cold leg are required if the opposite unit is in MODE 4, 5, or 6.

\*\*The provisions of Specifications 3.0.4 and 4.0.4 are not applicable for entry into MODE 3 for the Safety Injection flow paths isolated pursuant to Specification 3.4.9.3 provided that the Safety Injection flow paths are restored to OPERABLE status prior to  $T_{avg}$  exceeding 380°F. Safety Injection flow paths may be isolated when  $T_{avg}$  is less than 380°F.

\*\*\*The provisions of Specifications 3.0.4 and 4.0.4 are not applicable.

TURKEY POINT - UNITS 3 & 4

3/4 5-3

AMENDMENT NOS. AND

Insert 1

JUN 15 1990



INSERT 1:

#Inoperability of the required EDG's does not constitute inoperability of the associated Safety Injection pumps.

Attachment to page 3/4 5-3





EMERGENCY CORE COOLING SYSTEMS3/4.5.2 ECCS SUBSYSTEMS -  $T_{avg}$  GREATER THAN OR EQUAL TO 350°FLIMITING CONDITION FOR OPERATION

- d. With two of the four required Safety Injection pumps inoperable and the opposite unit in MODE 1, 2, or 3, restore one of the two inoperable pumps to OPERABLE status within 72 hours or be in at least HOT STANDBY within the next 12 hours and in HOT SHUTDOWN within the following 6 hours. This ACTION applies to both units simultaneously.
- e. With one of the three required Safety Injection pumps inoperable and the opposite unit in MODE 4, 5, or 6, restore the pump to OPERABLE status within 72 hours or be in at least HOT STANDBY within the next 6 hours and in HOT SHUTDOWN within the following 6 hours.
- f. With a required safety injection pump OPERABLE but not capable of being powered from its associated OPERABLE diesel generator, restore the capability within 72 hours or be in at least HOT STANDBY within the next 6 hours and in HOT SHUTDOWN within the following 6 hours.

## EMERGENCY CORE COOLING SYSTEMS

### SURVEILLANCE REQUIREMENTS

4.5.2. Each ECCS component and flow path shall be demonstrated OPERABLE:

- a. At least once per 12 hours by verifying by control room indication that the following valves are in the indicated positions with power to the valve operators removed:

<u>Valve Number</u>	<u>Valve Function</u>	<u>Valve Position</u>
864A and B	Supply from RWST to ECCS	Open
862A and B	RWST Supply to RHR pumps	Open
863A and B	RHR Recirculation	Closed
866A and B	H.H.S.I. to Hot Legs	Closed
HCV-758*	RHR HX Outlet	Open

To permit temporary operation of these valves for surveillance or maintenance purposes, power may be restored to these valves for a period not to exceed 24 hours.

- b. At least once per 31 days by:

- 1) Verifying that the ECCS piping is full of water by venting the ECCS pump casings and accessible discharge piping,
- 2) Verifying that each valve (manual, power-operated, or automatic) in the flow path that is not locked, sealed, or otherwise secured in position, is in its correct position, and
- 3) Verifying that each RHR Pump develops the indicated differential pressure applicable to the operating conditions in accordance with Figure 3.5-1 when tested pursuant to Specification 4.0.5.

- c. At least once per 92 days by:

- 1) Verifying that each SI pump develops the indicated differential pressure applicable to the operating conditions when tested pursuant to Specification 4.0.5.

SI pump  $\geq 1126$  psid at a metered flowrate  $\geq 300$  gpm (normal alignment or Unit 4 SI pumps aligned to Unit 3 RWST), or  
 $\geq 1156$  psid at a metered flowrate  $\geq 280$  gpm  
 (Unit 3 SI pumps aligned to Unit 4 RWST).

\*Air Supply to HCV-758 shall be verified shut off and sealed closed once per 31 days.

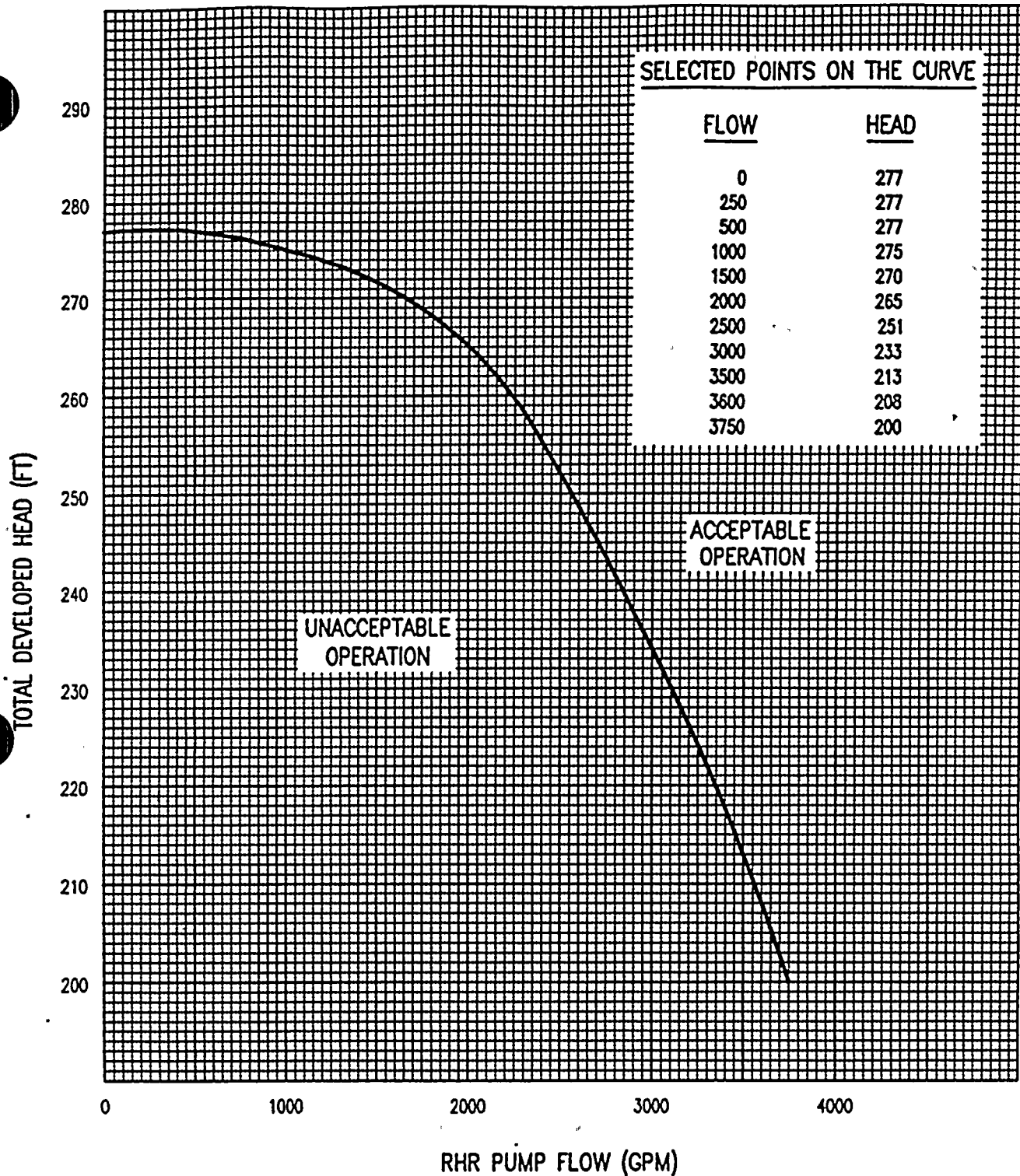


Figure 3.5-1  
RHR Pump Curve

**EMERGENCY CORE COOLING SYSTEMS****SURVEILLANCE REQUIREMENTS**

- d. By a visual inspection which verifies that no loose debris (rags, trash, clothing, etc.) is present in the containment which could be transported to the containment sump and cause restriction of the pump suction during LOCA conditions. This visual inspection shall be performed:
  - 1) For all accessible areas of the containment prior to establishing CONTAINMENT INTEGRITY, and
  - 2) Of the areas affected within containment at the completion of each containment entry when CONTAINMENT INTEGRITY is established.
- e. At least once per 18 months by:
  - 1) Verifying automatic isolation and interlock action of the RHR system from the Reactor Coolant System by ensuring that with a simulated or actual Reactor Coolant System pressure signal greater than or equal to 525 psig the interlocks cause the valves to automatically close and prevent the valves from being opened, and
  - 2) Verifying correct interlock action to ensure that the RWST is isolated from the RHR System during RHR System operation and to ensure that the RHR System cannot be pressurized from the Reactor Coolant System unless the above RWST Isolation Valves are closed.
  - 3) A visual inspection of the containment sump and verifying that the suction inlets are not restricted by debris and that the sump components (trash racks, screens, etc.) show no evidence of structural distress or abnormal corrosion.
- f. At least once per 18 months, during shutdown, by:
  - 1) Verifying that each automatic valve in the flow path actuates to its correct position on Safety Injection actuation test signal, and
  - 2) Verifying that each of the following pumps start automatically upon receipt of a Safety Injection actuation test signal:
    - a) Safety Injection pump, and
    - b) RHR pump.



EMERGENCY CORE COOLING SYSTEMSSURVEILLANCE REQUIREMENTS

- g. By verifying the correct position of each electrical and/or mechanical position stop for the following ECCS throttle valves:
- 1) Within 4 hours following completion of each valve stroking operation or maintenance on the valve when the ECCS components are required to be OPERABLE, and
  - 2) At least once per 18 months.

RHR System  
Valve Number

HCV-\*-758

MOV-\*-872

~~FCV \* 605~~ *e*

EMERGENCY CORE COOLING SYSTEMS3/4.5.3 ECCS SUBSYSTEMS -  $T_{avg}$  LESS THAN 350°FLIMITING CONDITION FOR OPERATION

---

3.5.3 As a minimum, the following ECCS components and flow path shall be OPERABLE:

- a. One OPERABLE RHR heat exchanger,
- b. One OPERABLE RHR pump, and
- c. An OPERABLE flow path capable of (1) taking suction from the refueling water storage tank upon being manually realigned and , (2) transferring suction to the containment sump during the recirculation phase of operation.

APPLICABILITY: MODE 4.

ACTION:

- a. With no OPERABLE ECCS flow path from the refueling water storage tank, restore at least one ECCS flow path to OPERABLE status within 1 hour or be in COLD SHUTDOWN within the next 24 hours.
- b. With either the residual heat removal heat exchanger or RHR pump inoperable, restore the components to OPERABLE status or maintain the Reactor Coolant System  $T_{avg}$  less than 350°F by use of alternate heat removal methods.
- c. In the event the ECCS is actuated and injects water into the Reactor Coolant System, a Special Report shall be prepared and submitted to the Commission pursuant to Specification 6.9.2 within 90 days describing the circumstances of the actuation and the total accumulated actuation cycles to date since January 1, 1990.

SURVEILLANCE REQUIREMENTS

---

4.5.3 The above ECCS components shall be demonstrated OPERABLE per the applicable requirements of Specification 4.5.2.



## EMERGENCY CORE COOLING SYSTEMS

### 3/4.5.4 REFUELING WATER STORAGE TANK

#### LIMITING CONDITION FOR OPERATION

---

3.5.4 For single Unit operation, one refueling water storage tank (RWST) shall be OPERABLE or for dual Unit operation two RWSTs shall be OPERABLE with:

- a. A minimum indicated borated water volume of 320,000 gallons per RWST,
- b. A minimum boron concentration of 1950 ppm of boron,
- c. A minimum solution temperature of 39°F, and
- d. A maximum solution temperature of 100°F.

APPLICABILITY: MODES 1, 2, 3, and 4.

#### ACTION:

With less than the required number of RWST(s) OPERABLE, restore the tank(s) to OPERABLE status within 1 hour or be in at least HOT STANDBY within 6 hours and in COLD SHUTDOWN within the following 30 hours.

#### SURVEILLANCE REQUIREMENTS

---

4.5.4 The required RWST(s) shall be demonstrated OPERABLE:

- a. At least once per 7 days by:
  - 1) Verifying the indicated borated water volume in the tank, and
  - 2) Verifying the boron concentration of the water.
- b. By verifying the RWST temperature is within limits whenever the outside air temperature is less than 39°F or greater than 100°F at the following frequencies:
  - 1) Within one hour upon the outside temperature exceeding its limit for consecutive 23 hours, and
  - 2) At least once per 24 hours while the outside temperature exceeds its limit.

PLANT SYSTEMSSPRAY AND/OR SPRINKLER SYSTEMSLIMITING CONDITION FOR OPERATION

3.7.8.2 The following Spray and/or Sprinkler Systems shall be OPERABLE:

- a. Fire Zones 47 and 54 - Component Cooling Water Areas
- b. Fire Zones 45 and 55 - Charging Pump Rooms
- c. Fire Zones 79A - North - South Breezeway (Unit 3 and Unit 4)
- d. Fire Zones 72, 73, 74 and 75 - Emergency Diesel Generator and Day Tank Rooms (Unit 3)
- e. Fire Zones 133, 136, 138 and 141 - Emergency Diesel Generator and Fuel Transfer Pump Rooms (Unit 4)

APPLICABILITY: Whenever equipment protected by the Spray/Sprinkler System is required to be OPERABLE.

ACTION:

- a. With one or more of the above required Spray and/or Sprinkler Systems inoperable, within 1 hour establish a continuous fire watch with backup fire suppression equipment. This ACTION ~~may~~ <sup>will</sup> apply to both units simultaneously for 3.7.8.2.c.
- b. The provisions of Specification 3.0.3 are not applicable.

SURVEILLANCE REQUIREMENTS

4.7.8.2 Each of the above required Spray and/or Sprinkler Systems shall be demonstrated OPERABLE:

- a. At least once per 31 days by verifying that each valve (manual, power-operated, or automatic) in the flow path is in its correct position,
- b. At least once per 12 months by cycling each testable valve in the flow path through at least one complete cycle of full travel,
- c. At least once per 18 months:
  - 1) By performing a system functional test which includes simulated automatic actuation of the system, and:
    - a) Verifying that the automatic valves in the flow path actuate to their correct positions on a test signal, and
    - b) Cycling each valve in the flow path that is not testable during plant operation through at least one complete cycle of full travel.



TABLE 3.7-5  
FIRE HYDRANTS

<u>IDENTIFICATION</u>	<u>FIRE ZONE</u>	<u>LOCATION</u>	<u>NUMBER OF HYDRANTS</u>
HY-01	124	NE Corner of Unit 3 near Vehicle Gate into RCA	1
HY-07	86	Unit 3 Transformer Area	1
HY-08	81	Unit 4 Transformer Area	1
HY-09	76	Unit 4 Turbine-Generator Area	1
HY-10	77	Unit 4 Condensate Storage Tank Area	1
HY-11	125	SW Corner of Unit 4 near equipment hatch	1
HY-12	NA	Unit 4 New Fuel Storage Area	1
HY-13	123	Refueling Water Storage Area	1
HY-17	NA	Nuclear Dry Storage Area	1
HY-16	NA	Steam Generator Storage Area	1
HY-18	NA	Unit 3 Containment Access Ramp Area	1
HY-26	86	Unit 3 Diesel Generator Building Area	1
TOTAL			$\frac{1}{12}$

**3/4.8 ELECTRICAL POWER SYSTEMS****3/4.8.1 A.C. SOURCES****OPERATING****LIMITING CONDITION FOR OPERATION**

---

3.8.1.1 As a minimum, the following A.C. electrical power sources shall be OPERABLE:

- a. Two startup transformers and their associated circuits, and
- b. Three separate and independent diesel generators\* including,
  - 1) For Unit 3, two (3A and 3B); for Unit 4, one (3A or 3B) each with:
    - a) A separate skid-mounted fuel tank and a separate day fuel tank with an OPERABLE solenoid valve to permit gravity flow from the day tank to the skid mounted tank, and with the two tanks together containing a minimum of 2000 gallons of fuel oil.
    - b) A common Fuel Storage System containing a minimum volume of 38,000 gallons of fuel,
    - c) A separate fuel transfer pump,
    - d) Lubricating oil storage containing a minimum volume of 120 gallons of lubricating oil,
    - e) Capability to transfer lubricating oil from storage to the diesel generator unit, and
    - f) Energized MCC bus (MCC 3A vital section for EDG 3A, MCC 3K for EDG 3B).
  - 2) For Unit 3, one (4A or 4B); for Unit 4, two (4A and 4B) each with:
    - a) A separate day fuel tank containing a minimum volume of 230 gallons of fuel,
    - b) A separate Fuel Storage System containing a minimum volume of 34,700 gallons of fuel,
    - c) A separate fuel transfer pump, and
    - d) Energized MCC bus (MCC 4J for EDG 4A, MCC 4K for EDG 4B).

---

\*Whenever one or more of the four EDG's is out-of-service, ensure compliance with the EDG requirements specified in Specifications 3.5.2 and 3.8.2.1.

ELECTRICAL POWER SYSTEMS

, unless the diesel generator is already operating

LIMITING CONDITION FOR OPERATION (Continued)

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTION:

- a. With one of two startup transformers or an associated circuit inoperable, demonstrate the OPERABILITY of the other startup transformer and its associated circuits by performing Surveillance Requirement 4.8.1.1.1.a within 1 hour and at least once per 8 hours thereafter. Notify the NRC within 24 hours of declaring the transformer inoperable. If any of the required diesel generators have not been successfully tested within the past 24 hours, demonstrate their OPERABILITY by performing Surveillance Requirement 4.8.1.1.2.a.4 for each such diesel generator, separately, within 24 hours. If the inoperable startup transformer is the associated startup transformer and became inoperable while the unit is in MODE 1, reduce THERMAL POWER to  $< 30\%$  RATED THERMAL POWER within 24 hours, or restore the inoperable startup transformer and associated circuits to OPERABLE status within the next 48 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours. If THERMAL POWER is reduced to  $< 30\%$  RATED THERMAL POWER within 24 hours or if the inoperable startup transformer is associated with the opposite unit restore the startup transformer and its associated circuits to OPERABLE status within 30 days of the loss of OPERABILITY, or be in at least HOT STANDBY within the next 12 hours and in COLD SHUTDOWN within the following 30 hours. If the inoperable startup transformer is the associated startup transformer and became inoperable while the unit was in MODE 2, 3, or 4 restore the startup transformer and its associated circuits to OPERABLE status within 24 hours or be in at least HOT STANDBY within 6 hours and in COLD SHUTDOWN within the following 30 hours. This ACTION applies to both units simultaneously.
- b. With one of the required diesel generators inoperable, demonstrate the OPERABILITY of the above required startup transformers and their associated circuits by performing Surveillance Requirement 4.8.1.1.1.a within 1 hour and at least once per 8 hours thereafter. If the diesel generator became inoperable due to any cause other than preplanned preventative maintenance or testing, demonstrate the OPERABILITY of the remaining required diesel generators by performing Surveillance Requirement 4.8.1.1.2.a.4 within 24 hours\*. Restore the inoperable diesel generator to OPERABLE status within 72 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.
- c. With one startup transformer and one of the required diesel generators inoperable, demonstrate the OPERABILITY of the remaining A.C. sources by performing Surveillance Requirement 4.8.1.1.1.a on the remaining

\*Unless the diesel generator inoperability was due to preplanned preventative maintenance, or testing, this test is required to be completed regardless of when the inoperable diesel generator is restored to OPERABILITY.



ELECTRICAL POWER SYSTEMS

, unless the diesel generators  
are already operating

LIMITING CONDITION FOR OPERATION (Continued)ACTION (Continued)

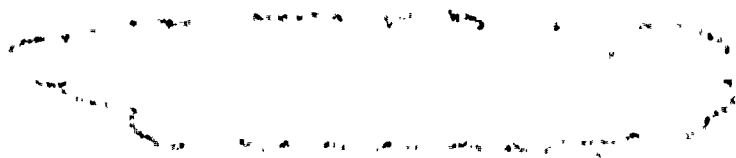
startup transformer and associated circuits within one hour and at least once per 8 hours thereafter; and if the diesel generator became inoperable due to any cause other than preplanned preventative maintenance or testing, demonstrate the OPERABILITY of the remaining required diesel generators by performing Surveillance Requirement 4.8.1.1.2.a.4 within 8 hours\*; restore one of the inoperable sources to OPERABLE status in accordance with Action Statements a and b, as appropriate. Notify the NRC within 4 hours of declaring both a start-up transformer and diesel generator inoperable. Restore the other A.C. power source (startup transformer or diesel generator) to OPERABLE status in accordance with the provisions of Section 3.8.1.1 Action Statement a or b, as appropriate, with the time requirement of that Action Statement based on the time of initial loss of the remaining inoperable A.C. power source.

- d. With one diesel generator inoperable, in addition to ACTION b. or c. above, verify that:
  1. All required systems, subsystems, trains, components, and devices (except safety injection pumps) that depend on the remaining required OPERABLE diesel generators as a source of emergency power are also OPERABLE.  
If this condition is not satisfied within 2 hours, be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.
  2. At least two Safety Injection pumps are OPERABLE and capable of being powered from their associated OPERABLE diesel generators.  
If this condition is not satisfied within 2 hours, be in at least HOT STANDBY within the next 12 hours and in HOT SHUTDOWN within the following 6 hours. This ACTION applies to both units simultaneously.
- e. With two of the above required startup transformers or their associated circuits inoperable notify the NRC within 4 hours and demonstrate the OPERABILITY of the required diesel generators separately by performing the requirements of Specification 4.8.1.1.2a.4 within 8 hours, unless the diesel generators are already operating, and at least once per 24 hours thereafter; restore at least one of the inoperable startup transformers to OPERABLE status within 24 hours or be in at least HOT STANDBY within the next 6 hours\*\* and in COLD

\*Unless the diesel generator inoperability was due to preplanned preventative maintenance, or testing, this test is required to be completed regardless of when the inoperable diesel generator is restored to OPERABILITY.

\*\*If the opposite unit is shutdown first, this time can be extended to 42 hours.





ELECTRICAL POWER SYSTEMSLIMITING CONDITION FOR OPERATION (Continued)ACTION (Continued)

SHUTDOWN within the following 30 hours. This ACTION applies to both units simultaneously. With only one startup transformer and associated circuits restored, perform Surveillance Requirement 4.8.1.1.1.a on the OPERABLE Startup transformer at least once per 8 hours, and restore the other startup transformer and its associated circuits to OPERABLE status or shutdown in accordance with the provisions of Action Statement 3.8.1.1a with time requirements of that Action Statement based on the time of initial loss of a startup transformer. This ACTION applies to both units simultaneously.

- f. With two of the above required diesel generators inoperable, demonstrate the OPERABILITY of two startup transformers and their associated circuits by performing the requirements of Specification 4.8.1.1.1a. within 1 hour and at least once per 8 hours thereafter; restore at least one of the inoperable diesel generators to OPERABLE status within 2 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours. Restore all required diesel generators to OPERABLE status within 72 hours from time of initial loss or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

SURVEILLANCE REQUIREMENTS

4.8.1.1.1 Each of the above required startup transformers and their associated circuits shall be:

- a. Determined OPERABLE at least once per 7 days by verifying correct breaker alignments, indicated power availability, and
- b. Demonstrated OPERABLE at least once per 18 months while shutting down, by transferring manually unit power supply from the auxiliary transformer to the startup transformer.

4.8.1.1.2 Each diesel generator shall be demonstrated OPERABLE\*:

- a. In accordance with the frequency specified in Table 4.8-1 with diesel generator surveillances performed nonconcurrently by:
  - 1) Verifying the fuel volume in the day and skid-mounted fuel tanks (Unit 4 - day tank only),
  - 2) Verifying the fuel volume in the fuel storage tank,
  - 3) Verifying the lubricating oil inventory in storage,

\*All diesel generator starts for the purpose of these surveillances may be proceeded by a prelube period as recommended by the manufacturer.

## ELECTRICAL POWER SYSTEMS

### SURVEILLANCE REQUIREMENTS (Continued)

- 4) Verifying the diesel starts and accelerates to reach a generator voltage and frequency of  $4160 \pm 420$  volts and  $60 \pm 1.2$  Hz. Once per 184 days, these conditions shall be reached within 15 seconds after the start signal from normal conditions. For all other starts, warmup procedures, such as idling and gradual acceleration as recommended by the manufacturer may be used. The diesel generator shall be started for this test by using one of the following signals:
  - a) Manual, or
  - b) Simulated loss-of-offsite power by itself, or
  - c) Simulated loss-of-offsite power in conjunction with an ESF Actuation test signal, or
  - d) An ESF Actuation test signal by itself.
- 5) Verifying the generator is synchronized, loaded\* to 2300 - 2500 kW (Unit 3), 2650-2850 kW (Unit 4)\*\*, operates at this loaded condition for at least 60 minutes and for Unit 3 until automatic transfer of fuel from the day tank to the skid mounted tank is demonstrated, and the cooling system is demonstrated OPERABLE.
- 6) Verifying the diesel generator is aligned to provide standby power to the associated emergency busses.
- b. Demonstrating at least once per 92 days that a fuel transfer pump starts automatically and transfers fuel from the storage system to the day tank,
- c. At least once per 31 days and after each operation of the diesel where the period of operation was greater than or equal to 1 hour by checking for and removing accumulated water from the day and skid-mounted fuel tanks (Unit 4 - day tank only);
- d. At least once per 31 days by checking for and removing accumulated water from the fuel oil storage tanks;
- e. By obtaining a composite sample of new fuel oil in accordance with ASTM-D4057 prior to addition to storage tanks and:
  - 1) By verifying in accordance with the tests specified in ASTM-D975-81 prior to addition to the storage tanks that the sample has:
    - a) An API Gravity of within 0.3 degrees at 60°F, or a specific gravity of within 0.0016 at 60/60°F, when compared to the supplier's certificate, or an absolute


\*May include gradual loading as recommended by the manufacturer so that the mechanical stress and wear on the diesel engine is minimized.

\*\*Momentary transients outside these load bands do not invalidate this test.



## ELECTRICAL POWER SYSTEMS

### SURVEILLANCE REQUIREMENTS (Continued)

- specific gravity at 60/60°F of greater than or equal to 0.83 but less than or equal to 0.89, or an API gravity of greater than or equal to 27 degrees but less than or equal to 39 degrees, when tested in accordance with ASTM-D1298-80;
- b) A kinematic viscosity at 40°C of greater than or equal to 1.9 centistokes, but less than or equal to 4.1 centistokes (alternatively, Saybolt viscosity, SUS at 100°F of greater than or equal to 32.6, but less than or equal to 40.1), if gravity was not determined by comparison with the supplier's certification;
  - c) A flash point equal to or greater than 125°F; and
  - d) A clear and bright appearance with proper color when tested in accordance with ASTM-D4176-82.
- 2) By verifying within 30 days of obtaining the sample that the other properties specified in Table 1 of ASTM-D975-81 are met when tested in accordance with ASTM-D975-81 except that the analysis for sulfur may be performed in accordance with ASTM-D1552-79 or ASTM-D2622-82.
- f. At least once every 31 days by obtaining a sample of fuel oil from the storage tank in accordance with ASTM-D2276-78, and verifying that total particulate contamination is less than 10 mg/liter when checked in accordance with ASTM-D2276-78, Method A;
- g. At least once per 18 months, during shutdown (applicable to only the two diesel generator associated with the unit):
- 1)  Subjecting the diesel to an inspection in accordance with procedures prepared in conjunction with its manufacturer's recommendations for this class of standby service;
  - 2)\* Verifying the generator capability to reject a load of greater than or equal to 380 kW while maintaining voltage at 4160 ±420 volts and frequency at 60 ±1.2 Hz;
  - 3)\* Verifying the generator capability to reject a load of greater than or equal to 2500 kW (Unit 3), 2874 kW (Unit 4) without tripping. The generator voltage shall return to less than or equal to 4784 volts within 2 seconds following the load rejection;
  - 4) Simulating a loss-of-offsite power by itself, and:
    - a) Verifying deenergization of the emergency busses and load shedding from the emergency busses, and
    - b) Verifying the diesel starts on the auto-start signal, energizes the emergency busses with any permanently

\*For the purpose of this test, warmup procedures, such as idling, gradual acceleration, and gradual loading as recommended by the manufacturer may be used.



## ELECTRICAL POWER SYSTEMS

### SURVEILLANCE REQUIREMENTS (Continued)

- connected loads within 15 seconds, energizes the auto-connected shutdown loads through the load sequencer and operates for greater than or equal to 5 minutes while its generator is loaded with the auto-connected shutdown loads. After automatic load sequencing, the steady-state voltage and frequency of the emergency busses shall be maintained at  $4160 \pm 420$  volts and  $60 \pm 1.2$  Hz during this test.
- 5) Verifying that on an ESF Actuation test signal, without loss-of-offsite power, the diesel generator starts on the auto-start signal and operates on standby for greater than or equal to 5 minutes. The generator voltage and frequency shall be  $4160 \pm 420$  volts and  $60 \pm 1.2$  Hz within 15 seconds after the auto-start signal; the steady-state generator voltage and frequency shall be maintained within these limits during this test;
  - 6) Simulating a loss-of-offsite power in conjunction with an ESF Actuation test signal, and:
    - a) Verifying deenergization of the emergency busses and load shedding from the emergency busses;
    - b) Verifying the diesel starts on the auto-start signal, energizes the emergency busses with any permanently connected loads within 15 seconds, energizes the auto-connected emergency (accident) loads through the load sequencer and operates for greater than or equal to 5 minutes while its generator is loaded with the emergency loads. After automatic load sequencing, the steady-state voltage and frequency of the emergency busses shall be maintained at  $4160 \pm 420$  volts and  $60 \pm 1.2$  Hz during this test; and
    - c) Verifying that diesel generator trips that are made operable during the test mode of diesel operation are inoperable.
  - 7)\* Verifying the diesel generator operates for at least 24 hours. During the first 2 hours of this test, the diesel generator shall be loaded to 2550-2750 kW (Unit 3), 2950-3150 kW (Unit 4)\*\* and during the remaining 22 hours of this test, the diesel generator shall be loaded to 2300-2500 kW (Unit 3), 2650-2850 kW (Unit 4)\*\*. The generator voltage and frequency shall be  $4160 \pm 420$  volts and  $60 \pm 1.2$  Hz within 15 seconds after the start signal; the steady-state generator voltage and frequency

\*For the purpose of this test, warmup procedures, such as idling, gradual acceleration, and gradual loading as recommended by the manufacturer may be used.

\*\*Momentary transients outside these load bands do not invalidate this test.

## ELECTRICAL POWER SYSTEMS

### SURVEILLANCE REQUIREMENTS (Continued)

shall be maintained within these limits during this test. Within 5 minutes after completing this 24-hour test, perform Specification 4.8.1.1.2.g.4)b);\*\*

- 8) Verifying that the auto-connected loads to each diesel generator do not exceed 2500 kW (Unit 3), 2874 kW (Unit 4);
- 9) Verifying the diesel generator's capability to:
  - a) Synchronize with the offsite power source while the generator is loaded with its emergency loads upon a simulated restoration of offsite power,
  - b) Transfer its loads to the offsite power source, and
  - c) Be restored to its standby status.
- 10) Verifying that the diesel generator operating in a test mode, connected to its bus, a simulated Safety Injection signal overrides the test mode by: (1) returning the diesel generator to standby operation, and (2) automatically energizing the emergency loads with offsite power;
- 11) Verifying that the fuel transfer pump transfers fuel from the fuel storage tank (Unit 3), fuel storage tanks (Unit 4) to the day tanks of each diesel associated with the unit via the installed cross-connection lines;
- 12) Verifying that the automatic load sequence timer is OPERABLE with the interval between each load block within  $\pm 10\%$  of its design interval;
- 13) Verifying that the diesel generator lockout relay prevents the diesel generator from starting;
- h. At least once per 10 years or after any modifications which could affect diesel generator interdependence by starting all required diesel generators simultaneously and verifying that all required diesel generators provide  $60 \pm 1.2$  Hz frequency and  $4160 \pm 420$  volts in less than or equal to 15 seconds; and
- i. At least once per 10 years by:
  - 1) Draining each fuel oil storage tank, removing the accumulated sediment and cleaning the tank.
  - 2) For Unit 4 only, performing a pressure test of those portions of the diesel fuel oil system designed to Section III, subsection ND of the ASME Code in accordance with Section XI of the ASME Boiler and Pressure Vessel Code and applicable Addenda.

\*\*If Specification 4.8.1.1.2.g.4)b) is not satisfactorily completed, it is not necessary to repeat the 24-hour test. Instead, the diesel generator may be operated at 2500 kW Unit 3, 2874 kW (Unit 4) for 1 hour or until operating temperature has stabilized and then within 5 minutes repeat Specification 4.8.1.1.2.g.4)b).



**ELECTRICAL POWER SYSTEMS****SURVEILLANCE REQUIREMENTS (Continued)**

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4.8.1.1.3 Reports - All diesel generator failures, valid or nonvalid, shall be reported to the Commission in a Special Report pursuant to Specification 6.9.2 within 30 days. Reports of diesel generator failures shall include the information recommended in Regulatory Position C.3.b of Regulatory Guide 1.108, Revision 1, August 1977. If the number of failures in the last 100 valid tests is greater than or equal to 7, the report shall be supplemented to include the additional information recommended in Regulatory Position C.3.b of Regulatory Guide 1.108, Revision 1, August 1977.

TABLE 4.8-1

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>
$\leq 1$ $\geq 2^{**}$	$\leq 4$ $\geq 5$	Once per 31 days Once per 7 days

\*Criteria for determining number of failures and number of valid tests shall be in accordance with Regulatory Position C.2.e of Regulatory Guide 1.108, but determined on a per diesel generator basis.

For the purpose 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 criterion 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 4.8.1.1.2.a.4 and 4.8.1.1.2.a.5; and four tests in accordance with the 184-day testing requirement of Surveillance Requirements 4.8.1.1.2.a.4 and 4.8.1.1.2.a.5. If this criterion is not satisfied during the first series of tests, any alternate criterion to be used to transvalue the failure count to zero requires NRC approval.

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

ELECTRICAL POWER SYSTEMSA.C. SOURCESSHUTDOWNLIMITING CONDITION FOR OPERATION

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3.8.1.2 As a minimum, the following A.C. electrical power sources shall be OPERABLE:

- a. One startup transformer and associated circuits, or an alternate circuit, between the offsite transmission network and the 4160 volt bus, A or B, and

- b. One diesel generator with:

- 1) For Unit 3 (3A or 3B)

A skid-mounted fuel tank and a day fuel tank, with an OPERABLE solenoid valve to permit gravity flow from the day tank to the skid mounted tank, with the two tanks together containing a minimum of 2000 gallons of fuel oil

For Unit 4 (4A or 4B)

A day fuel tank containing a minimum volume of 230 gallons of fuel

- 2) A fuel storage system containing a minimum volume of fuel of 38,000 gallons (Unit 3), 34,700 gallons (Unit 4)
- 3) An associated fuel transfer pump
- 4) For Unit 3 only, lubricating oil storage containing a minimum volume of 120 gallons of lubricating oil
- 5) For Unit 3 only capability to transfer lubricating oil from storage to the diesel generator unit and
- 6) Energized MCC bus (as identified by Specification 3.8.1.1.b.).

APPLICABILITY: MODES 5\* and 6\*.

ACTION:

With less than the above minimum required A.C. electrical power sources OPERABLE, immediately suspend all operations involving CORE ALTERATIONS, positive reactivity changes, movement of irradiated fuel, or crane operation with loads over the fuel storage pool, and within 8 hours, depressurize and vent the Reactor Coolant System through a greater than or equal to 2.2 square inch vent. In addition, when in MODE 5 with the reactor coolant loops not filled, or in MODE 6 with the water level less than 23 feet above the reactor vessel flange, immediately initiate corrective action to restore the required sources to OPERABLE status as soon as possible and increase RCS inventory as soon as possible.

\*CAUTION - If the opposite unit is in MODES 1, 2, 3 or 4 see Specification 3.8.1.1

ELECTRICAL POWER SYSTEMSSURVEILLANCE REQUIREMENTS

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4.8.1.2 The above required A.C. electrical power sources shall be demonstrated OPERABLE by the performance of each of the requirements of Specifications 4.8.1.1.1.a, 4.8.1.1.2 (except for Specification 4.8.1.1.2a.5)), and 4.8.1.1.3.

## 3/4.8.2 D.C. SOURCES

### OPERATING

### LIMITING CONDITION FOR OPERATION

3.8.2.1 The following D.C. electrical sources shall be OPERABLE:\*\*

- a. 125-volt D.C. Battery Bank 3A or D-52 and associated full capacity charger(s)
  - 1) 3A1 powered by motor control center (MCC) 3C with EDG 3A OPERABLE, or
  - 2) 3A2 powered by MCC 4D with EDG 4A and 4B OPERABLE, or
  - 3) 3A1 powered by MCC 3C with EDG 3A OPERABLE and 3A2 powered by MCC 4D with EDG 4A and 4B OPERABLE,
- b. 125-volt D.C. Battery Bank 3B or D-52 and associated full capacity charger(s)
  - 1) 3B1 powered by MCC 3B with EDG 3B OPERABLE, or
  - 2) 3B2 powered by MCC 4D with EDG 4A and 4B OPERABLE, or
  - 3) 3B1 powered by MCC 3B with EDG 3B OPERABLE and 3B2 powered by MCC 4D with EDG 4A and 4B OPERABLE,
- c. 125-volt D.C. Battery Bank 4A or D-52 and associated full capacity charger(s)
  - 1) 4A1 powered by MCC 4C with EDG 4A OPERABLE, or
  - 2) 4A2 powered by MCC 3D with EDG 3A and 3B OPERABLE, or
  - 3) 4A1 powered by MCC 4C with EDG 4A OPERABLE and 4A2 powered by MCC 3D with EDG 3A and 3B OPERABLE,
- d. 125-volt D.C. Battery Bank 4B or D-52 and associated full capacity charger(s)
  - 1) 4B1 powered by MCC 4B with EDG 4B OPERABLE, or
  - 2) 4B2 powered by MCC 3D with EDG 3A and 3B OPERABLE, or
  - 3) 4B1 powered by MCC 4B with EDG 4B OPERABLE and 4B2 powered by MCC 3D with EDG 3A and 3B OPERABLE.

spare  
battery  
bank

APPLICABILITY: MODES 1, 2, 3, and 4.

### ACTION:

- b X. With one of the required battery banks inoperable, or with none of the full-capacity chargers associated with a battery bank OPERABLE, restore all battery banks to OPERABLE status and at least one charger associated with each battery bank to OPERABLE status within two hours\*\* or be in at least HOT STANDBY within the next 12 hours and in COLD SHUTDOWN within the following 30 hours. This ACTION applies to both units simultaneously.

Swap  
a. and b.  
actions

\*All battery chargers required to satisfy the LCO shall be powered from separate MCCs.

\*\*Can be extended to 24 hours if the opposite unit is in MODE 5 or 6 and each of the remaining required battery chargers is capable of being powered from its associated diesel generator(s).

TURKEY POINT - UNITS 3 & 4

3/4 8-13

AMENDMENT NOS. AND

Insert 2

JUN 15 1990



**INSERT 2:**

**#Inoperability of the required EDG's specified in the LCO requirements below does not constitute inoperability of the associated battery chargers or battery banks.**





## D.C. SOURCES

### LIMITING CONDITION FOR OPERATION

#### ACTION: (Continued)

- a X. With one <sup>or more</sup> of the required battery chargers <sup>OPERABLE but</sup> not capable of being powered from its associated OPERABLE diesel generator(s), restore the capability within 72 hours or be in at least HOT STANDBY within the next 12 hours and in COLD SHUTDOWN within the following 30 hours. This ACTION applies to both units simultaneously.

### SURVEILLANCE REQUIREMENTS (Continued)

4.8.2.1 Each 125-volt battery bank and its associated full capacity charger(s) shall be demonstrated OPERABLE:

- a. At least once per 7 days by verifying that:
  - 1) The parameters in Table 4.8-2 meet the Category A limits, and
  - 2) The total battery terminal voltage is greater than or equal to 129 volts on float charge and the battery charger(s) output voltage is  $\geq 129$  volts, and if two battery chargers are connected to the battery bank, the battery charger currents do not differ from each other by more than 10% of the battery charger rating.
- b. At least once per 92 days and within 7 days after a battery discharge with battery terminal voltage below 105 volts (108.6 volts for spare battery D-52), or battery overcharge with battery terminal voltage above 143 volts, by verifying that:
  - 1) The parameters in Table 4.8-2 meet the Category B limits,
  - 2) There is no visible corrosion at either terminals or connectors, or the connection resistance is less than  $150 \times 10^{-6}$  ohm, and
  - 3) The average electrolyte temperature of every sixth cell is above 60°F.
- c. At least once per 18 months by verifying that:
  - 1) The cells, cell plates, and battery racks show no visual indication of physical damage or abnormal deterioration,
  - 2) The cell-to-cell and terminal connections are clean, tight, and coated with anticorrosion material,
  - 3) The resistance of each cell-to-cell and terminal connection is less than or equal to  $150 \times 10^{-6}$  ohm, and
  - 4) Each 400 amp battery charger (associated with Battery Banks 3A and 4B) will supply at least 400 amperes at  $\geq 129$  volts for at least 8 hours, and each 300 amp battery charger (associated with Battery Banks 3B and 4A) will supply at least 300 amperes at  $\geq 129$  volts for at least 8 hours.

D.C. SOURCESSURVEILLANCE REQUIREMENTS (Continued)

- d. At least once per 18 months, during shutdown\*\*, by verifying that the battery capacity is adequate to supply and maintain in OPERABLE status all of the actual or simulated emergency loads for the design duty cycle when the battery is subjected to a battery service test.
- e. At least once per 18 months, during shutdown\*\*, by giving performance discharge tests of battery capacity to any battery that shows signs of degradation or has reached 85% of the service life expected for the application. Degradation is indicated when the battery capacity drops more than 10% of rated capacity from its average on previous performance tests, or is below 90% of the manufacturer's rating.
- f. At least once per 60 months, during shutdown\*\*, by verifying that the battery capacity is at least 80% of the manufacturer's rating when subjected to a performance discharge test. Once per 60-month interval this performance discharge test may be performed in lieu of the battery service test required by Specification 4.8.2.1.d.

bank  
\*\*Except that the spare battery D-52, and any other battery out of service when D-52 is in service may be tested with simulated loads during operation.

spare battery bank



TABLE 4.8-2

BATTERY SURVEILLANCE REQUIREMENTS

PARAMETER	CATEGORY A <sup>(1)</sup>	CATEGORY B <sup>(2)</sup>	
	LIMITS FOR EACH DESIGNATED PILOT CELL	LIMITS FOR EACH CONNECTED CELL	ALLOWABLE <sup>(3)</sup> VALUE FOR EACH CONNECTED CELL
Electrolyte Level	>Minimum level indication mark, and < ¼" above maximum level indication mark	>Minimum level indication mark, and < ¼" above maximum level indication mark	Above top of plates, and not overflowing
Float Voltage	≥ 2.13 volts	≥ 2.13 volts <sup>(6)</sup>	≥ 2.07 volts
Specific Gravity <sup>(4)</sup>	≥ 1.200 <sup>(5)</sup>	≥ 1.195	Not more than 0.020 below the average of all connected cells
		Average of all connected cells	Average of all connected cells
		≥ 1.205	≥ 1.195 <sup>(5)</sup>

TABLE NOTATIONS

- (1) For any Category A parameter(s) outside the limit(s) shown, the battery may be considered OPERABLE provided that within 24 hours all the Category B measurements are taken and found to be within their allowable values, and provided all Category A and B parameter(s) are restored to within limits within the next 6 days.
- (2) For any Category B parameter(s) outside the limit(s) shown, the battery may be considered OPERABLE provided that the Category B parameters are within their allowable values and provided the Category B parameter(s) are restored to within limits within 7 days.
- (3) Any Category B parameter not within its allowable value indicates an inoperable battery.
- (4) Corrected for electrolyte temperature and level.
- (5) Or battery charging current is less than 2 amps when on charge.
- (6) Corrected for average electrolyte temperature.



D.C. SOURCESSHUTDOWNLIMITING CONDITION FOR OPERATION

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3.8.2.2 As a minimum, three 125 volt battery banks, each with at least one associated full capacity charger capable of being powered by an OPERABLE diesel generator, shall be OPERABLE.

APPLICABILITY: MODES 5\* and 6\*.

ACTION:

With one or more of the required 125 volt battery banks or required associated full-capacity chargers inoperable or not capable of being powered from an OPERABLE diesel generator, immediately suspend all operations involving CORE ALTERATIONS, positive reactivity changes, or movement of irradiated fuel; initiate corrective action to restore the required battery banks and associated full-capacity chargers to OPERABLE status as soon as possible, and within 8 hours, depressurize and vent the Reactor Coolant System through at least a 2.2 square inch vent.

SURVEILLANCE REQUIREMENTS

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4.8.2.2 The above required 125 volt battery banks and associated full-capacity chargers shall be demonstrated OPERABLE in accordance with Specification 4.8.2.1.

\*CAUTION - If the opposite unit is in MODES 1, 2, 3 or 4, see the corresponding Limiting Condition for Operation 3.8.2.1.



## 3/4.8.3 ONSITE POWER DISTRIBUTION

### OPERATING

#### LIMITING CONDITION FOR OPERATION

3.8.3.1 The following electrical busses\* shall be energized in the specified manner with the tie breakers open between redundant busses within the unit\*\* and between the busses of Units 3 and 4.

- a. One train of A.C. Busses consisting of:
  - 1) 4160-Volt Bus A,
  - 2) 480-Volt Load Center Busses A, C and H\*\*\*, and
  - 3) 480-Volt Motor Control Center Busses A (Unit 4 only), C and D\*\*\*,
- b. One train of A.C. Busses consisting of:
  - 1) 4160-Volt Bus B
  - 2) 480-Volt Load Center Busses B, D and H\*\*\*, and
  - 3) 480-Volt Motor Control Center Busses B and D\*\*\*
- c. One opposite unit train of AC busses consisting of either:
  - 1) 4160-Volt Bus A, 480-Volt Load Center Busses A, C and H\*\*\*, and 480-Volt Motor Control Center Busses A (Unit 4 only), C and D\*\*\*, or
  - 2) 4160-Volt Bus B, 480-Volt Load Center Busses B, D and H\*\*\*, and 480-Volt Motor Control Center Busses B and D\*\*\*.
- d. 120 Volt AC Vital Panel 3P06 and 3P21 energized from its associated inverter connected to D.C. Bus 3B.\*\*\*\*
- e. 120 Volt AC Vital Panel 4P06 and 4P21 energized from its associated inverter connected to D.C. Bus 3B.\*\*\*\*
- f. 120 Volt AC Vital Panel 3P07 and 3P22 energized from its associated inverter connected to D.C. Bus 3A.\*\*\*\*
- g. 120 Volt AC Vital Panel 4P07 and 4P22 energized from its associated inverter connected to D.C. Bus 3A.\*\*\*\*
- h. 120 Volt AC Vital Panel 3P08 and 3P23 energized from its associated inverter connected to D.C. Bus 4B.\*\*\*\*
- i. 120 Volt AC Vital Panel 4P08 and 4P23 energized from its associated inverter connected to D.C. Bus 4B.\*\*\*\*

\*For Motor Control Center busses, vital sections only.

\*\*With the opposite unit in MODE 5 or 6, its 480-Volt Load Center can be cross-tied under conditions specified in Specification 3.8.3.2.a.

\*\*\*Electrical bus can be energized from either train of its unit and swing function to opposite train must be OPERABLE for the Unit(s) in Modes 1, 2, 3, and 4.

\*\*\*\*A back-up inverter may be used to replace the normal inverter provided the normal inverter in the opposite unit is not replaced at the same time.

on the same DC bus for





## ONSITE POWER DISTRIBUTION

### LIMITING CONDITION FOR OPERATION (Continued)

- j. 120 Volt AC Vital Panel 3P09 and 3P24 energized from its associated inverter connected to D.C. Bus 4A.\*\*\*\*
- k. 120 Volt AC Vital Panel 4P09 and 4P24 energized from its associated inverter connected to D.C. Bus 4A.\*\*\*\*
- l. 125 Volt D.C. Bus 3D01 energized from an associated battery charger and from Battery Bank 3A or D-52,
- m. 125 Volt D.C. Bus 3D23 energized from an associated battery charger and from Battery Bank 3B or D-52,
- n. 125 Volt D.C. Bus 4D01 energized from an associated battery charger and from Battery Bank 4B or D-52, and
- o. 125 Volt D.C. Bus 4D23 energized from an associated battery charger and from Battery Bank 4A or D-52

Spare  
battery  
bank

APPLICABILITY: MODES 1, 2, 3, and 4.

### ACTION:

- a. With one of the required trains (3.8.3.1a., b., and c) of A.C. emergency busses not fully energized (except for the required LC's and MCC's associated with the opposite unit), reenergize the train within 8 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.
- b. With any of the required LC's and/or MCC's associated with the opposite unit inoperable, restore the inoperable LC or MCC to OPERABLE status in accordance with Table 3.8-1 or Table 3.8-2 as applicable or place the unit in at least HOT STANDBY within 6 hours and in COLD SHUTDOWN within the following 30 hours.
- c. With one A.C. vital panel either not energized from its associated inverter, or with the inverter not connected to its associated D.C. bus: (1) Reenergize the A.C. vital panel within 2 hours or be in at least HOT STANDBY within the next 12 hours and in COLD SHUTDOWN within the following 30 hours; and (2) reenergize the A.C. vital panel from an inverter connected to its associated D.C. bus

\*\*\*\*A back-up inverter may be used to replace the normal inverter, provided the normal inverter in the opposite unit is not replaced at the same time.

on the same DC bus for



ONSITE POWER DISTRIBUTIONLIMITING CONDITION FOR OPERATION (Continued)

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ACTION: (Continued)

within 24 hours or be in at least HOT STANDBY within the next 12 hours and in COLD SHUTDOWN within the following 30 hours.  
This ACTION applies to both units simultaneously.

- d. With one D.C. bus not energized from its associated battery bank or associated charger, reenergize the D.C. bus from its associated battery bank within 2 hours\* or be in at least HOT STANDBY within the next 12 hours and in COLD SHUTDOWN within the following 30 hours.  
This ACTION applies to both units simultaneously.

SURVEILLANCE REQUIREMENTS

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4.8.3.1 The specified busses shall be determined energized and aligned in the required manner at least once per 7 days by verifying correct breaker alignment and indicated voltage on the busses.

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\*Can be extended to 24 hours if the opposite unit is in MODE 5 or 6 and each of the remaining required battery chargers is capable of being powered from its associated diesel generator(s).

TABLE 3.8-1

APPLICABLE TO UNIT 3 BASED ON UNIT 4 LOAD  
CENTERS AND MOTOR CONTROL CENTERS INOPERABLE

ALLOWABLE OUTAGE TIMES

Unit 4

Load Centers and Motor  
Control Centers  
Inoperable (Any MODE)

Allowable Outage Times  
Unit 3 - MODES 1, 2, 3 or 4

	With AC Trains 3A, 3B, 4A, & 4B OPERABLE	With AC Trains 3A, 3B, & 4A OPERABLE	With AC Trains 3A, 3B, & 4B OPERABLE
LC 4A	N/A	72	N/A
MCC 4A	N/A	N/A	N/A
LC 4C and/or MCC 4C	2*	2*	N/A
LC 4H and/or MCC 4D	2**	2**	2**
LC 4B and/or MCC 4B	2*	N/A	2*
LC 4D	N/A	N/A	72

is not applicable (N/A).

\*If the battery charger powered from the out-of-service LC and/or MCC is not required by LCO 3.8.2.1, the out-of-service time ~~is N/A~~.

\*\*If neither of the battery chargers powered from the out-of-service LC and/or MCC is required by LCO 3.8.2.1, the out-of-service time is 72 hours.

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TABLE 3.8-2

APPLICABLE TO UNIT 4 BASED ON UNIT 3 LOAD  
CENTERS AND MOTOR CONTROL CENTERS INOPERABLE

ALLOWABLE OUTAGE TIMES

Unit 3 Load Centers and Motor Control Centers Inoperable (Any MODE)	Allowable Outage Times Unit 4 - MODES 1, 2, 3 or 4.		
	With AC Trains 4A, 4B, 3A, & 3B OPERABLE	With AC Trains 4A, 4B, & 3A OPERABLE	With AC Trains 4A, 4B, & 3B OPERABLE
LC 3A	N/A	72	N/A
LC 3C and/or MCC 3C	2*	2*	N/A
LC 3H and/or MCC 3D	2**	2**	2**
LC 3B and/or MCC 3B	2*	N/A	2*
LC 3D	N/A	N/A	72

is not applicable (N/A).

\*If the battery charger powered from the out-of-service LC and/or MCC is not required by LCO 3.8.2.1, the out-of-service time ~~is 72 hours~~ ~~if N/A~~

\*\*If neither of the battery chargers powered from the out-of-service LC and/or MCC is required by LCO 3.8.2.1, the out-of-service time is 72 hours.

100



ONSITE POWER DISTRIBUTIONSHUTDOWNLIMITING CONDITION FOR OPERATION

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3.8.3.2 As a minimum, the following electrical busses shall be energized in the specified manner:

- a. One train of A.C. emergency busses associated with the unit (3.8.3.1a. or b.) consisting of one 4160-volt and three 480-volt A.C. emergency busses load centers\* and three (four for Unit 4 Train A) vital sections of motor control center busses,
- b. Two 120-volt A.C. vital busses for the unit energized from their associated inverters\*\* connected to their respective D.C. busses, and
- c. Three 125-volt D.C. busses energized from their associated battery banks.

APPLICABILITY MODES 5\*\*\* and 6\*\*\*.

ACTION:

With any of the above required electrical busses not energized in the required manner, immediately suspend all operations involving CORE ALTERATIONS, positive reactivity changes, or movement of irradiated fuel, initiate corrective action to energize the required electrical busses in the specified manner as soon as possible, and within 8 hours, depressurize and vent the RCS through at least a 2.2 square inch vent.

SURVEILLANCE REQUIREMENTS

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4.8.3.2 The specified busses shall be determined energized in the required manner at least once per 7 days by verifying correct breaker alignment and indicated voltage on the busses.

\*With the opposite unit in MODE 1, 2, 3, or 4, the 480-volt load centers can only be cross-tied upon issuance of an engineering evaluation to prevent exceeding required electrical components maximum design ratings and to ensure availability of the minimum required equipment.

\*\*A backup inverter may be used to replace the normal inverter provided the normal inverter in the opposite unit is not replaced at the same time.

\*\*\*CAUTION - If the opposite unit is in MODES 1, 2, 3, or 4, see the corresponding Limiting Condition for Operation 3.8.3.1.

REACTIVITY CONTROL SYSTEMSBASESBORATION SYSTEMS (Continued)

The boration flow path specification allows the RWST and the boric acid storage tank to be the boron sources. Due to the lower boron concentration in the RWST, borating the RCS from this source is less effective than borating from the boric acid tank and additional time may be required to achieve the desired SHUTDOWN MARGIN required by ACTION statement restrictions.

The ACTION statement restrictions for the boration flow paths allow continued operation in mode 1 for a limited time period with either boration source flow path or the normal flow path to the RCS (via the regenerative heat exchanger) inoperable. In this case, the plant capability to borate and charge into the RCS is limited and the potential operational impact of this limitation on mode 1 operation must be addressed. With both the flow path from the boric acid tanks and the regenerative heat exchanger flow path inoperable, immediate initiation of action to go to COLD SHUTDOWN is required but no time is specified for the mode reduction due to the reduced plant capability with these flow paths inoperable.

Two charging pumps are required to be OPERABLE to ensure single functional capability in the event an assumed failure renders one of the pumps or power supplies inoperable. Each bus supplying a pump can be fed from either a Emergency Diesel Generator or the offsite grid through a startup transformer.

The boration capability of either flow path is sufficient to provide the required SHUTDOWN MARGIN in accordance with Figure 3.1-1 from expected operating conditions after xenon decay and cooldown to 200°F. The maximum expected boration capability requirement occurs at BOL from full power equilibrium xenon conditions and requires 3080 gallons of 20,000 PPM borated water from the boric acid storage tanks or 320,000 gallons of 1950 PPM borated water from the refueling water storage tank (RWST).

With the RCS temperature below 200°F, one boron injection source flow path is acceptable without single failure consideration on the basis of the stable reactivity condition of the reactor and the additional restrictions prohibiting CORE ALTERATIONS and positive reactivity changes in the event the single boron injection system source flow path becomes inoperable.

The boron capability required below 200°F is sufficient to provide a SHUTDOWN MARGIN of 1%  $\Delta k/k$  after xenon decay and cooldown from 200°F to 140°F. This condition requires either 500 gallons of 20,000 ppm borated water from the boric acid storage tanks or 20,000 gallons of 1950 ppm borated water from the RWST.



**3/4.8 ELECTRICAL POWER SYSTEMS****BASES****3/4.8.1, 3/4.8.2, and 3/4.8.3 A.C. SOURCES, D.C. SOURCES, and ONSITE POWER DISTRIBUTION**

The OPERABILITY of the A.C. and D.C power sources and associated distribution systems during operation ensures that sufficient power will be available to supply the safety-related equipment required for: (1) the safe shutdown of the facility, and (2) the mitigation and control of accident conditions within the facility.

The loss of an associated diesel generator for system(s), subsystem(s), train(s), component(s) or device(s) does not result in the system(s), subsystem(s), train(s), component(s) or device(s) being considered inoperable for the purpose of satisfying the requirements of its applicable Limiting Condition for Operation for the affected unit provided: (1) its corresponding normal power source is OPERABLE; and (2) its redundant system(s), subsystem(s), train(s), component(s), and device(s) that depend on the remaining OPERABLE diesel generators as a source emergency power to meet all applicable LCO's are OPERABLE. This allows operation to be governed by the time limits of the ACTION statement associated with the inoperable diesel generator, not the individual ACTION statements for each system, subsystem, train, component or device. However, Due to the existence of shared systems, there are certain conditions that require special provisions. These provisions are stipulated in the appropriate LCO's as needed.

The ACTION requirements specified for the levels of degradation of the power sources provide restrictions upon continued facility operation commensurate with the level of degradation. The OPERABILITY of the power sources is consistent with the initial condition assumptions of the safety analysis and is based upon maintaining adequate onsite A.C. and D.C. power sources and associated distribution systems OPERABLE during accident conditions coincident with an assumed loss-of-offsite power and single failure of one onsite A.C. source. Two physically independent A.C. circuits exist between the offsite transmission network and the onsite Class 1E Distribution System by utilizing the following: (1) a total of eight transmission lines which lead to five separate transmission substations tie the Turkey Point Switchyard to the offsite power grid; (2) two dual-winding startup transformers each provide 100% of the A and B train 4160 volt power from the switchyard to its associated unit. In addition, each startup

Insert 3



INSERT 3:

More specifically, LCO's 3.5.2 and 3.8.2.1 require that associated EDG's be OPERABLE in addition to requiring that Safety Injection pumps, battery chargers, and battery banks, respectively also be OPERABLE. This EDG requirement was placed in these particular LCO's due to the shared nature of these systems to ensure adequate EDG availability for the required components. A situation could arise where a unit in MODES 1, 2, 3, or 4 could be in full compliance with LCO 3.8.1.1, yet be using shared equipment that could be impacted by taking an EDG out-of-service on the opposite unit. In this situation, diesel generator ACTION 3.8.1.1.d, which verifies redundant train OPERABILITY, may not be applicable to one of the units. Thus, specific requirements for EDG OPERABILITY have been added to the appropriate LCO's of the shared systems (3.5.2 and 3.8.2.1). It is important to note that in these particular LCO's the inoperability of the required EDG does not constitute inoperability of the other components required to be OPERABLE in the LCO. Specific ACTION statements are included in 3.5.2 and 3.8.2.1 for those situations where the required components are OPERABLE (by the definition of OPERABILITY) but not capable of being powered by an OPERABLE EDG.



ELECTRICAL POWER SYSTEMSBASES (Continued)

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transformer has the capability to supply backup power of approximately 2500 kW to the opposite unit's A-train 4160 volt bus. Two emergency diesel generators (EDG) provide onsite emergency A.C. power for each unit. EDG's 3A and 3B provide Unit 3 A-train, and B-train emergency power, respectively. EDG's 4A and 4B provide Unit 4 A-train and B-train emergency power, respectively.

Due to the shared nature of numerous electrical components between Turkey Point Units 3&4, the inoperability of a component on an associated unit will often affect the operation of the opposite unit. These shared electrical components consist primarily of both startup transformers, three out of four 4160 volt busses, and associated 480 volt motor control centers, all four 125 volt D.C. busses, all eight 120 volt vital A.C. panels and eight out of twelve vital A.C. inverters, four out of eight battery chargers, and all four battery banks. Depending on the component(s) which is (are) determined inoperable, the resulting ACTION can range from the eventual shutdown of the opposite unit long after the associated unit has been shutdown (30 days) to an immediate shutdown of both units. Therefore, ACTION times allow for an orderly sequential shutdown of both units when the inoperability of a component(s) affects both units with equal severity. When a single unit is affected, the time to be in HOT STANDBY is 6 hours. When an ACTION statement requires a dual unit shutdown, the time to be in HOT STANDBY is 12 hours. This is to allow the orderly shutdown of one unit at a time and not jeopardize the stability of the electrical grid by imposing a dual unit shutdown.

As each startup transformer only provides the limited equivalent power of approximately one EDG to the opposite Units A-train 4160 volt bus, the allowable out-of-service time of 30 days has been applied before the opposite unit is required to be shutdown. Within 24 hours, a unit with an inoperable startup transformer must reduce THERMAL POWER to less than or equal to 30% RATED THERMAL POWER. The 30% RATED THERMAL POWER limit was chosen because at this power level the decay heat and fission product production has been reduced and the operators are still able to maintain automatic control of the feedwater trains and other unit equipment. At lower power levels the operators must use manual control with the feedwater bypass lines. By not requiring a complete unit shutdown, the plant avoids a condition requiring natural circulation and avoids intentionally relying on engineered safety features for non-accident conditions.



## ELECTRICAL POWER SYSTEMS

### BASES (Continued)

With one startup transformer and one of the three required EDG's inoperable, the unit with the inoperable transformer must reduce THERMAL POWER to less than or equal to 30% RATED THERMAL POWER within 24 hours, based on the loss of its associated startup transformer, whereas operation of the unit with the OPERABLE transformer is controlled by the limits for inoperability of the EDG. The notification of a loss of startup transformer(s) to the NRC is not a 10 CFR 50.72/50.73 requirement and as such will be made for information purposes only to the NRC Operations Center via commercial lines.

With an EDG out of service, an ACTION statement and a Surveillance Requirement are provided to demonstrate the required startup transformers and their associated circuits are OPERABLE. When one diesel generator is inoperable, there is also an additional ACTION requirement to verify that required system(s), subsystem(s), train(s), component(s), and device(s) that depend on the remaining required OPERABLE diesel generators as a source of emergency power to meet all applicable LCO's, are OPERABLE. This requirement is intended to provide assurance that a loss-of-offsite power event will not result in a complete loss of safety function of critical systems during the period one of the diesel generators is inoperable. This requirement allows continued operation to be governed by the time limits of the ACTION statement associated with the inoperable diesel generator. The loss of a diesel generator does not result in the associated system(s), subsystem(s), train(s), component(s), or device(s) being considered inoperable provided: (1) its corresponding normal power source is OPERABLE; and (2) its redundant system(s), subsystem(s), train(s), component(s), and device(s) that depend on the remaining required OPERABLE diesel generators as a source of emergency power to meet all applicable LCO's, are OPERABLE.

A footnote is added to ensure the remaining required EDG's are tested for OPERABILITY if one of the required EDG's becomes inoperable due to reasons other than preplanned preventative maintenance. This statement will ensure that tests are performed to verify common mode failures do not exist.

When in Modes 1, 2, 3 or 4, a unit depends on one EDG and its associated train of busses from the opposite unit in order to satisfy the single active failure criterion for safety injection (SI) pumps and other shared equipment required during a loss-of-coolant accident with a loss-of-offsite power. Therefore, one EDG from the opposite unit is required to be OPERABLE along with the two EDG's associated with the applicable unit.

ELECTRICAL POWER SYSTEMSBASES (Continued)

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With both startup transformers inoperable, the unit(s) are required to be shutdown consecutively, after 24 hours. A consecutive shutdown is used because a unit without its associated transformer must perform a natural circulation cooldown. By placing one unit in COLD SHUTDOWN before starting shutdown of the second unit, a dual unit natural circulation cooldown is avoided.

The term verify means to administratively check by examining logs or other information to determine if required components are out-of-service for maintenance or other reasons. It does not mean to perform the surveillance requirements needed to demonstrate the OPERABILITY of the component.

The EDG Surveillance testing requires that each EDG be started from normal conditions only once per 184 days with no additional warmup procedures. Normal conditions in this instance are defined as the pre-start temperature and lube oil conditions each EDG normally experiences with the continuous use of prelube systems and immersion heaters.

The fuel supply specified for the Unit 3 EDG's is based on the original criteria and design bases used to license the plant. The specified fuel supply will ensure sufficient fuel for either EDG associated with Unit 3 for at least a week. The fuel supply specified for the Unit 4 EDG's is based on the criteria provided in ANSI N195-1976 as endorsed by Regulatory Guide 1.137. The specified fuel supply will ensure sufficient fuel for each EDG associated with Unit 4 for at least a week.



ELECTRICAL POWER SYSTEMSBASES (Continued)

The Surveillance Requirements for demonstrating the OPERABILITY of the diesel generators are in accordance with the recommendations of Regulatory Guides 1.9, "Selection of Diesel Generator Set Capacity for Standby Power Supplies," March 10, 1971; 1.108, "Periodic Testing of Diesel Generator Units Used as Onsite Electric Power Systems at Nuclear Power Plants," Revision 1, August 1977; and 1.137, "Fuel-oil Systems for Standby Diesel Generators," Revision 1, October 1979.

The OPERABILITY of the minimum specified A.C. and D.C. power sources and associated distribution systems during shutdown and refueling ensures that (1) the facility can be maintained in the shutdown or refueling condition for extended time periods, and (2) sufficient instrumentation and control capability is available for monitoring and maintaining the unit status. During a unit shutdown, the one required circuit between the offsite transmission network and the onsite Class 1E Distribution System can consist of at least the associated unit startup transformer feeding one 4160 volt Bus A or B, or the opposite unit's startup transformer feeding the associated unit's 4160 volt Bus A, or the associated unit's 4160 volt Bus A or B backfed through its auxiliary transformers with the main generator isolated.

As inoperability of numerous electrical components often affect the operation of the opposite unit, the applicability for the shutdown LIMITING CONDITION FOR OPERATION (LCO) for A.C. Sources, D.C. Sources and Onsite Power Distribution all contain statements to ensure the LCO's of the opposite unit are considered.

The allowable out-of-service time for the D.C. busses is 24 hours with one unit shutdown in order to allow for required battery maintenance without requiring both units to be shutdown. Provisions to substitute the spare battery for any one of the four station batteries have been included to allow for battery maintenance without requiring both units to be shutdown. The requirement to have only one OPERABLE battery charger associated with a required battery bank permits maintenance to be conducted on the redundant battery charger.

The minimum number of battery chargers required to be OPERABLE is based on the following criteria:

- 1) A minimum of one battery charger per bus with each power<sup>ed</sup> from a separate 480 volt MCC is required to satisfy the single failure criteria when assuming the failure of a MCC. This restriction prohibits the use of two chargers powered from the same bus for meeting the minimum requirements.

ELECTRICAL POWER SYSTEMSBASES (Continued)

- 2) To satisfy the single failure criteria, when assuming a loss-of-offsite power with the loss of an EDG, an additional restriction is stipulated which requires each battery charger to have its associated diesel generator(s) OPERABLE. This requires both EDG's associated with a swing bus battery charger to be OPERABLE.

Provisions for requiring the OPERABILITY of the EDG associated with the battery charger is explicitly specified in the LCO. This is because conditions exist where the affected unit would not enter the applicable ACTION statement in the LCO without this provision. For example, with Unit 3 in, MODE 1 and Unit 4 in MODE 5, the operability of both EDG 4A and 4B is not required. One could postulate conditions where battery chargers 4A1, 3A2, 3B2, or 4B1 could be used to satisfy the LCO without having an associated OPERABLE EDG, unless specific provisions were made to preclude these conditions.

An out-of-service limit of 72 hours is applied when the required EDG is not OPERABLE. With less than the required battery chargers OPERABLE, an allowable out-of-service time of 2 hours is applied, which can be extended to 24 hours if the opposite unit is in MODES 5 or 6 and each of the remaining required battery chargers is capable of being powered from its associated diesel generator(s).

Verifying average electrolyte temperature above the minimum for which the battery was sized, total battery terminal voltage on float charge, connection resistance values, and the performance of battery service and discharge tests ensure the effectiveness of the charging system, the ability to handle high discharge rates, and verifies the battery capability to supply its required load.

Table 4.8-2 specifies the normal limits for each designated pilot cell and each connected cell for electrolyte level, float voltage, and specific gravity. The limits for the designated pilot cell's float voltage and specific gravity, greater than 2.13 volts and not more than 0.015 below the manufacturer's full charge specific gravity or a battery charger current that had stabilized at a low value, is characteristic of a charged cell with adequate capacity. The normal limits for each connected cell for float voltage and specific gravity, greater than 2.13 volts and not more than 0.020 below the manufacturer's full charge specific gravity with an average specific gravity of all connected cells not more than 0.010 below the manufacturer's full charge specific gravity, ensures the OPERABILITY and capability of the battery.



ELECTRICAL POWER SYSTEMSBASES (Continued)

Operation with a battery cell's parameter outside the normal limit but within the allowable value specified in Table 4.8-2 is permitted for up to 7 days. During this period: (1) the allowable values for electrolyte level ensures no physical damage to the plates with an adequate electron transfer capability; (2) the allowable value for the average specific gravity of all the cells, not more than 0.020 below the manufacturer's recommended full charge specific gravity, ensures that the decrease in rating will be less than the safety margin provided in sizing; (3) the allowable value for an individual cell's specific gravity ensures that an individual cell's specific gravity will not be more than 0.040 below the manufacturer's full charge specific gravity and that the overall capability of the battery will be maintained within an acceptable limit; and (4) the allowable value for an individual cell's float voltage, greater than or equal to 2.07 volts, ensures the battery's capability to perform its design function.

The ACTION requirements specified for the inoperability of certain Motor Control Centers (MCC's), Load Centers (LC's) and the 4160-Volt Busses provide restrictions upon continued facility operation commensurate with the level of degradation on each unit and the amount of time one could reasonably diagnose and correct a minor problem. The level of degradation is based upon the types of equipment powered and the out-of-service limit imposed on that equipment by the associated ACTION statement. If this degradation affects the associated unit only, then no restriction is placed on the opposite unit and an out-of-service limit of 8 hours (except for MCC's 3A, 3K, 4J and 4K) is applied to the associated unit. Since MCC's 3A, 3K, 4J and 4K are used to power EDG auxiliaries, an out-of-service limit of 72 hours is applied as required by 3.8.1.1. If the degradation impacts both units (i.e., required shared systems or cross-unit loads), then an out-of-service limit of 8 hours is applied to the associated unit and an out-of-service limit based on the most restrictive ACTION requirement for the applicable shared or cross-unit load is applied to the opposite unit.

For example, if being used to satisfy 3.8.2.1, the Battery Chargers 3A2, 3B2, 4A2, and 4B2 are cross-unit loads and have out-of-service limits of 2 hours. This is the most restrictive limit of the applicable equipment powered from MCC 3D and 4D. Therefore, an out-of-service limit of 2 hours is applied if the battery charger is required to be OPERABLE.

ELECTRICAL POWER SYSTEMSBASES (Continued)

The ACTION requirements specified when an A.C. vital panel is not energized from an inverter connected to its associated D.C. bus provides for two phases of restoration. Expedient restoration of an A.C. panel is required due to the degradation of the Reactor Protection System and vital instrumentation. The first phase requires reenergization of the A.C. vital panel within two hours. During this phase the panel may be powered by a Class 1E constant voltage transformer (CVT) fed from a vital MCC. However, the condition is permissible for only 24 hours as the second phase of the ACTION requires reenergization of the A.C. vital panel from an inverter connected to its associated D.C. bus within 24 hours. Failure to satisfy these ACTIONS, results in a dual unit shutdown.

With one unit shut down one 4160-volt Bus on the associated unit can be deenergized for ~~period~~ refueling outage maintenance. The associated 480-Volt Load Centers can then be cross-tied upon issuance of an engineering evaluation.

periodic





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