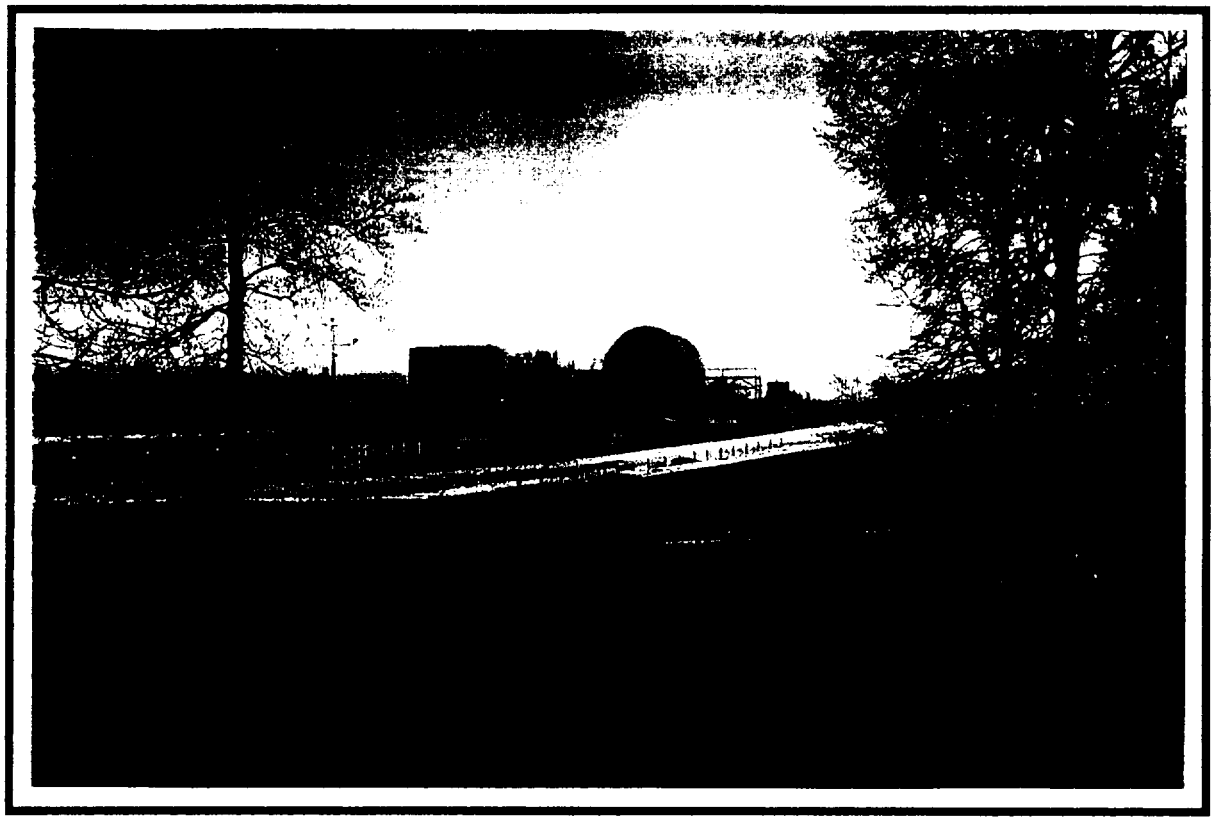
NORTH ANNA POWER STATION

Section 3.8
Electrical Power Systems – Book 1



VOLUME 17
Improved Technical Specifications

Dominion

NORTH ANNA POWER STATION

IMPROVED TECHNICAL SPECIFICATION CONVERSION

SECTION 3.8 - ELECTRICAL POWER SYSTEMS

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IMPROVED TECHNICAL SPECIFICATIONS

3.8 ELECTRICAL POWER SYSTEMS

3.8.1 AC Sources—Operating

LCO 3.8.1 The following AC electrical sources shall be OPERABLE:

a. Two qualified circuits between the offsite transmission network and the onsite Class 1E AC Electrical Power Distribution System;

b. Two emergency diesel generators (EDGs) capable of supplying the onsite Class 1E power distribution subsystem(s);

c. One qualified circuit between the offsite transmission network and the onsite Class 1E AC Electrical Power Distribution System and one EDG capable of supplying the onsite Class 1E AC power distribution subsystem on the other unit for each required shared component; and

d. Required sequencing timing relays.

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

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One LCO 3.8.1.a offsite circuit inoperable.	A.1 Perform SR 3.8.1.1 for required OPERABLE offsite circuit(s).	1 hour AND Once per 8 hours thereafter
	AND	(continued)

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. (continued)	A.2	Declare required feature(s) with no offsite power available inoperable when its redundant required feature(s) is inoperable.	24 hours from discovery of no offsite power to one train concurrent with inoperability of redundant required feature(s)
	AND		
	A.3	Restore offsite circuit to OPERABLE status.	72 hours AND 17 days from discovery of failure to meet LCO
B. One LCO 3.8.1.b EDG inoperable.	B.1	Perform SR 3.8.1.1 for the required offsite circuits.	1 hour AND Once per 8 hours thereafter
	AND		
	B.2	Declare required feature(s) supported by the inoperable EDG inoperable when its required redundant feature(s) is inoperable.	4 hours from discovery of Condition B concurrent with inoperability of redundant required feature(s)
	AND		

(continued)

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. (continued)	B.3.1 Determine OPERABLE LCO 3.8.1.b EDG is not inoperable due to common cause failure. OR B.3.2 Perform SR 3.8.1.2 for OPERABLE LCO 3.8.1.b EDG. AND B.4 Restore EDG to OPERABLE status.	24 hours 24 hours 14 days AND 17 days from discovery of failure to meet LCO
C. --------NOTE---------- Only applicable if either Alternate AC (AAC) diesel generator (DG) or EDG(s) on other unit is inoperable. ---------- One LCO 3.8.1.b EDG inoperable.	C.1 Restore inoperable AAC DG to OPERABLE status. AND C.2 Restore inoperable EDG(s) on other unit to OPERABLE status.	72 hours 72 hours

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
D. --------NOTE---------- Separate Condition entry is allowed for each offsite circuit. ----------	D.1	Perform SR 3.8.1.1 for required OPERABLE offsite circuit(s).	1 hour AND Once per 8 hours thereafter
One or more required LCO 3.8.1.c offsite circuit(s) inoperable.	AND		
	D.2	Declare required feature(s) with no offsite power available inoperable when its redundant required feature(s) is inoperable.	24 hours from discovery of no offsite power to a train concurrent with inoperability of redundant required feature(s)
	AND		
	D.3	Declare associated shared component inoperable.	72 hours

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
E. One required LCO 3.8.1.c EDG inoperable.	E.1 Perform SR 3.8.1.1 for required offsite circuit(s).	1 hour AND Once per 8 hours thereafter
	AND	
	E.2 Declare required feature(s) supported by the inoperable EDG inoperable when its redundant required feature(s) is inoperable.	4 hours from discovery of Condition E concurrent with inoperability of redundant required feature(s)
	AND	
	E.3 Declare associated shared component inoperable.	14 days
F. --------NOTE---------- Only applicable if AAC DG or LCO 3.8.1.b EDG(s) is inoperable. ----------	F.1.1 Restore inoperable AAC DG to OPERABLE status.	72 hours
	AND	
One required LCO 3.8.1.c EDG inoperable.	F.1.2 Restore inoperable LCO 3.8.1.b EDG (s) to OPERABLE status.	72 hours
	OR	
	F.2 Declare associated shared component inoperable.	72 hours

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
G. Two LCO 3.8.1.a offsite circuits inoperable.	G.1 Declare required feature(s) inoperable when its redundant required feature(s) is inoperable.	12 hours from discovery of Condition G concurrent with inoperability of redundant required features
	AND	
	G.2 Restore one offsite circuit to OPERABLE status.	24 hours
H. One LCO 3.8.1.a offsite circuit inoperable. AND One LCO 3.8.1.b EDG inoperable.	----------NOTE---------- Enter applicable Conditions and Required Actions of LCO 3.8.9, "Distribution Systems—Operating," when Condition H is entered with no AC power source to any train. ----------	
	H.1 Restore offsite circuit to OPERABLE status.	12 hours
	OR	
	H.2 Restore EDG to OPERABLE status.	12 hours
I. Two LCO 3.8.1.b EDGs inoperable.	I.1 Restore one EDG to OPERABLE status.	2 hours
J. Two required LCO 3.8.1.c EDGs inoperable.	J.1 Declare associated shared components inoperable.	Immediately

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
K. --------NOTE---------- Separate Condition entry is allowed for each sequencing timing relay. ---------- One or more required sequencing timing relay(s) inoperable.	K.1 Enter appropriate Conditions and Required Actions for any component made inoperable by inoperable sequencing timing relay(s).	Immediately
	AND	
	K.2.1 Place the component(s) with the inoperable sequencing timing relay in a condition where it can not be automatically loaded to associated emergency electrical bus.	Immediately
	OR	
	K.2.2 Declare the associated EDG inoperable.	Immediately
L. Required Action and associated Completion Time of Condition A, B, C, G, H, or I not met.	L.1 Be in MODE 3.	6 hours
	AND	
	L.2 Be in MODE 5.	36 hours
M. Three or more of LCO 3.8.1.a and LCO 3.8.1.b AC sources inoperable.	M.1 Enter LCO 3.0.3.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.8.1.1	Verify correct breaker alignment and indicated power availability for each required offsite circuit.	7 days
SR 3.8.1.2	----------NOTES---------- 1. All EDG starts may be preceded by an engine prelube period and followed by a warmup period prior to loading. 2. A modified EDG start involving idling and gradual acceleration to synchronous speed may be used for this SR as recommended by the manufacturer. When modified start procedures are not used, the time, voltage, and frequency tolerances of SR 3.8.1.7 must be met. ---------- Verify each required EDG starts from standby conditions and achieves steady state voltage ≥ 3740 V and ≤4580 V, and frequency ≥ 59.5 Hz and ≤60.5 Hz.	31 days
SR 3.8.1.3	----------NOTES---------- 1. EDG loadings may include gradual loading as recommended by the manufacturer. 2. Momentary transients outside the load range do not invalidate this test. 3. This Surveillance shall be conducted on only one EDG at a time. 4. This SR shall be preceded by and immediately follow without shutdown a successful performance of SR 3.8.1.2 or SR 3.8.1.7. ---------- Verify each required EDG is synchronized and loaded and operates for ≥ 60 minutes at a load ≥ 2500 kW and ≤2600 kW.	31 days

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.8.1.4	Verify each required day tank contains ≥ 450 gal of fuel oil.	31 days
SR 3.8.1.5	Check for and remove accumulated water from each required day tank.	92 days
SR 3.8.1.6	Verify each required fuel oil transfer pump operates to transfer fuel oil from the storage tank to the day tank.	92 days
SR 3.8.1.7	----------NOTE---------- All EDG starts may be preceded by an engine prelube period. ---------- Verify each required EDG starts from standby condition and achieves in a. In ≤10 seconds, voltage ≥ 3960 V and frequency ≥ 59.5 Hz; and b. Steady state voltage ≥ 3740 V and ≤4580 V, and frequency ≥ 59.5 Hz and ≤60.5 Hz.	184 days
SR 3.8.1.8	----------NOTE---------- This Surveillance is only applicable to Unit 1. ---------- Verify manual transfer of AC power sources from the normal offsite circuit to the alternate required offsite circuit.	18 months

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.8.1.9	----------NOTE---------- If performed with EDG synchronized with offsite power, it shall be performed at a power factor ≤0.9. However, if grid conditions do not permit, the power factor limit is not required to be met. Under this condition, the power factor shall be maintained as close to the limit as practicable. ---------- Verify each required EDG rejects a load greater than or equal to its associated single largest post-accident load, and: a. Following load rejection, the frequency is ≤66 Hz; b. Within 3 seconds following load rejection, the voltage is ≥ 3740 V and ≤4580 V; and c. Within 3 seconds following load rejection, the frequency is ≥ 59.5 Hz and ≤60.5 Hz.	18 months

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.8.1.10	----------NOTES---------- 1. All EDG starts may be preceded by an engine prelube period. 2. This Surveillance shall not normally be performed in MODE 1, 2, 3, or 4. However, portions of the Surveillance may be performed to reestablish OPERABILITY provided an assessment determines the safety of the unit is maintained or enhanced. ----------	
	Verify on an actual or simulated loss of offsite power signal: a. De-energization of emergency buses; b. Load shedding from emergency buses; c. Each required EDG auto-starts from standby condition and: 1. energizes permanently connected loads in ≤10 seconds, 2. energizes auto-connected shutdown loads through sequencing timing relays, 3. maintains steady state voltage ≥ 3740 V and ≤4580 V, 4. maintains steady state frequency ≥ 59.5 Hz and ≤60.5 Hz, and 5. supplies permanently connected and auto-connected shutdown loads for ≥ 5 minutes.	18 months

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.8.1.11	----------NOTES---------- 1. All EDG starts may be preceded by prelube period. 2. This Surveillance shall not normally be performed in MODE 1 or 2. However, portions of the Surveillance may be performed to reestablish OPERABILITY provided an assessment determines the safety of the unit is maintained or enhanced. ---------- Verify on an actual or simulated Engineered Safety Feature (ESF) actuation signal each LCO 3.8.1.b EDG auto-starts from standby condition and: a. In ≤10 seconds after auto-start and during tests, achieves voltage ≥ 3960 V and frequency ≥ 59.5 Hz; b. Achieves steady state voltage ≥ 3740 V and ≤4580 V and frequency ≥ 59.5 Hz and ≤60.5 Hz; c. Operates for ≥ 5 minutes; d. Permanently connected loads remain energized from the offsite power system; and e. Emergency loads are energized or auto-connected through the sequencing timing relays from the offsite power system.	18 months
SR 3.8.1.12	Verify each required EDG's automatic trips are bypassed on actual or simulated automatic start signals except: a. Engine overspeed; and b. Generator differential current.	18 months

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.8.1.13	----------NOTES---------- 1. Momentary transients outside the load and power factor ranges do not invalidate this test. 2. If performed with EDG synchronized with offsite power, it shall be performed at a power factor ≤0.9. However, if grid conditions do not permit, the power factor limit is not required to be met. Under this condition the power factor shall be maintained as close to the limit as practicable. ---------- Verify each required EDG operates for ≥ 24 hours: a. For ≥ 2 hours loaded ≥ 2900 kW and ≤3000 kW; and b. For the remaining hours of the test loaded ≥ 2500 kW and ≤2600 kW.	18 months

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.8.1.14	----------NOTES---------- 1. This Surveillance shall be performed within 5 minutes of shutting down the EDG after the EDG has operated ≥ 2 hours loaded ≥ 2500 kW and ≤2600 kW or after operating temperatures have stabilized. Momentary transients outside of load range do not invalidate this test. 2. All EDG starts may be preceded by an engine prelube period. ---------- Verify each required EDG starts and achieves a. In ≤10 seconds, voltage ≥ 3960 V and frequency ≥ 59.5 Hz; and b. Steady state voltage ≥ 3740 V, and ≤4580 V and frequency ≥ 59.5 Hz and ≤60.5 Hz.	18 months
SR 3.8.1.15	----------NOTE---------- This Surveillance shall not normally be performed in MODE 1, 2, 3, or 4. However, this Surveillance may be performed to reestablish OPERABILITY provided an assessment determines the safety of the unit is maintained or enhanced. ---------- Verify each required EDG: a. Synchronizes with offsite power source while loaded with emergency loads upon a simulated restoration of offsite power; b. Transfers loads to offsite power source; and c. Returns to ready-to-load operation.	18 months

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.8.1.16	----------NOTE---------- This Surveillance shall not normally be performed in MODE 1, 2, 3, or 4. However, this Surveillance may be performed to reestablish OPERABILITY provided an assessment determines the safety of the unit is maintained or enhanced. ---------- Verify each required sequencing timing relay is within the design tolerance.	18 months

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.8.1.17	----------NOTES---------- 1. All EDG starts may be preceded by an engine prelube period. 2. This Surveillance shall not normally be performed in MODE 1, 2, 3, or 4. However, portions of the Surveillance may be performed to reestablish OPERABILITY provided an assessment determines the safety of the unit is maintained or enhanced. ----------	
	Verify on an actual or simulated loss of offsite power signal in conjunction with an actual or simulated ESF actuation signal: a. De-energization of emergency buses; b. Load shedding from emergency buses; and c. Each LCO 3.8.1.b EDG auto-starts from standby condition and: 1. energizes permanently connected loads in ≤10 seconds, 2. energizes auto-connected emergency loads through load sequencing timing relays, 3. achieves steady state voltage ≥ 3740 V and ≤4580 V, 4. achieves steady state frequency ≥ 59.5 Hz and ≤60.5 Hz, and 5. supplies permanently connected and auto-connected emergency loads for ≥ 5 minutes.	18 months

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.8.1.18	----------NOTE---------- All EDG starts may be preceded by an engine prelube period. ---------- Verify when started simultaneously from standby condition, each LCO 3.8.1.b EDG achieves: a. in ≤10 seconds, voltage ≥ 3960 V and frequency ≥ 59.5 Hz; and b. steady state voltage ≥ 3740 V and ≤4580 V, and frequency ≥ 59.5 Hz and ≤60.5 Hz.	10 years

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3.8 ELECTRICAL POWER SYSTEMS

3.8.2 AC Sources–Shutdown

LCO 3.8.2 The following AC electrical power sources shall be OPERABLE:

a. One qualified circuit between the offsite transmission network and the onsite Class 1E AC electrical power distribution subsystem(s) required by LCO 3.8.10, "Distribution Systems–Shutdown"; and

b. One emergency diesel generators (EDG) capable of supplying one train of the onsite Class 1E AC electrical power distribution subsystem(s) required by LCO 3.8.10.

APPLICABILITY: MODES 5 and 6,
During movement of recently irradiated fuel assemblies.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One required offsite circuit inoperable.	----------NOTE---------- Enter applicable Conditions and Required Actions of LCO 3.8.10, with required trains de-energized as a result of Condition A. ----------	
	A.1 Declare affected required feature(s) with no offsite power available inoperable.	Immediately
	<u>OR</u>	
	A.2.1 Suspend CORE ALTERATIONS.	Immediately
	<u>AND</u>	
	A.2.2 Suspend movement of recently irradiated fuel assemblies.	Immediately
	<u>AND</u>	

(continued)

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. (continued)	A.2.3 Suspend operations involving positive reactivity additions that could result in loss of required SDM or boron concentration.	Immediately
	AND	
	A.2.4 Initiate action to restore required offsite power circuit to OPERABLE status.	Immediately
B. One required EDG inoperable.	B.1 Suspend CORE ALTERATIONS.	Immediately
	AND	
	B.2 Suspend movement of recently irradiated fuel assemblies.	Immediately
	AND	
	B.3 Suspend operations involving positive reactivity additions that could result in loss of required SDM or boron concentration.	Immediately
	AND	
	B.4 Initiate action to restore required EDG to OPERABLE status.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.8.2.1	----------NOTE---------- The following SRs are not required to be performed: SR 3.8.1.3, SR 3.8.1.9, SR 3.8.1.13, SR 3.8.1.14, and SR 3.8.1.15. ---------- For AC sources required to be OPERABLE, the following SRs are applicable: SR 3.8.1.1 SR 3.8.1.5 SR 3.8.1.13 SR 3.8.1.2 SR 3.8.1.6 SR 3.8.1.14 SR 3.8.1.3 SR 3.8.1.7 SR 3.8.1.15 SR 3.8.1.4 SR 3.8.1.9	In accordance with applicable SRs

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3.8 ELECTRICAL POWER SYSTEMS

3.8.3 Diesel Fuel Oil and Starting Air

LCO 3.8.3 The stored diesel fuel oil and starting air subsystem shall be within limits for each required emergency diesel generator (EDG).

APPLICABILITY: When associated EDG is required to be OPERABLE.

ACTIONS

- NOTE -
Separate Condition entry is allowed for each EDG.
- -

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. One fuel oil storage tank not within limits for performance of tank repair or inspection.	A.1	Verify replacement fuel oil is available.	Prior to removing tank from service
	AND		
	A.2	Verify remaining fuel oil storage tank contains ≥ 45,000 gal.	Once per 12 hours
	AND		
	A.3	Verify above ground fuel oil tank contains ≥ 100,000 gal.	Once per 12 hours
	AND		
	A.4	Restore fuel oil storage tank to within limits.	7 days
B. Required Action and associated Completion Time for Condition A not met.	B.1	Be in MODE 3.	6 hours
	AND		
	B.2	Be in MODE 5.	36 hours

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. One or more EDGs with fuel level < 45,000 gal and > 38,600 gal in either storage tank for reasons other than Condition A.	C.1 Restore fuel oil level to within limits.	48 hours
D. One or more EDGs with stored fuel oil total particulates not within limit.	D.1 Restore fuel oil total particulates within limit.	7 days
E. One or more EDGs with new fuel oil properties not within limits.	E.1 Restore stored fuel oil properties to within limits.	30 days
F. One or more EDGs with the required starting air receiver pressure < 175 psig and ≥ 150 psig.	F.1 Restore starting air receiver pressure to ≥ 175 psig.	48 hours
G. Required Action and associated Completion Time for Conditions C, D, E, or F, not met. OR One or more EDGs diesel fuel oil or starting air subsystem not within limits for reasons other than Condition C, D, E, or F.	G.1 Declare associated EDG inoperable.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.8.3.1	Verify each fuel oil storage tank contains ≥ 45,000 gal of fuel.	31 days
SR 3.8.3.2	Verify fuel oil properties of new and stored fuel oil are tested in accordance with, and maintained within the limits of, the Diesel Fuel Oil Testing Program.	In accordance with the Diesel Fuel Oil Testing Program
SR 3.8.3.3	Verify each EDG air start receiver pressure is ≥ 175 psig.	31 days
SR 3.8.3.4	Check for and remove accumulated water from each stored fuel oil storage tank.	92 days

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3.8 ELECTRICAL POWER SYSTEMS

3.8.4 DC Sources–Operating

LCO 3.8.4 The following DC electrical power sources shall be OPERABLE:

a. The Train H and Train J DC electrical power subsystems;

b. The Emergency Diesel Generator (EDG) DC systems for each required EDG; and

c. One DC electrical power subsystem on the other unit for each required shared component.

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

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One LCO 3.8.4.a DC electrical power subsystem inoperable.	A.1 Restore DC electrical power subsystem to OPERABLE status.	2 hours
B. Required Action and Associated Completion Time for Condition A not met.	B.1 Be in MODE 3. AND B.2 Be in MODE 5.	6 hours 36 hours
C. --------NOTE---------- Separate Condition entry is allowed for each EDG DC system. ---------- One or more required EDG DC system(s) inoperable.	C.1 Enter applicable Conditions and Required Actions for associated EDG(s) made inoperable.	Immediately

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
D. --------NOTE---------- Separate Condition entry is allowed for each DC subsystem. ---------- One or more required LCO 3.8.4.c DC electrical power subsystem(s) inoperable.	D.1 Declare associated shared component(s) inoperable.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.8.4.1	Verify for each required Station and EDG battery, terminal voltage is ≥ 129 V on float charge.	7 days
SR 3.8.4.2	Verify for each required Station and EDG battery, there is no visible corrosion at battery terminals and connectors. OR Verify battery connection resistance is ≤1.5E-4 ohm for inter-cell connections, ≤1.5E-4 ohm for inter-rack connections, ≤1.5E-4 ohm for inter-tier connections, and ≤1.5E-4 ohm for terminal connections.	92 days
SR 3.8.4.3	Verify for each required Station and EDG battery, cells, cell plates, and racks show no visual indication of physical damage or abnormal deterioration that could degrade battery performance.	18 months

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.8.4.4	For each required Station and EDG battery, remove visible terminal corrosion, verify battery cell to cell and terminal connections are clean and tight, and are coated with anti-corrosion material.	18 months
SR 3.8.4.5	Verify for each required Station and EDG battery, connection resistance is ≤1.5E-4 ohm for inter-cell connections, ≤1.5E-4 ohm for inter-rack connections, ≤1.5E-4 ohm for inter-tier connections, and ≤1.5E-4 ohm for terminal connections.	18 months
SR 3.8.4.6	Verify each required Station battery charger supplies ≥ 270 amps at ≥ 125 V for ≥ 4 hours.	18 months
SR 3.8.4.7	Verify each required EDG battery charger supplies ≥ 10 amps at ≥ 125 V for ≥ 4 hours.	18 months

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.8.4.8	----------NOTES---------- 1. The modified performance discharge test in SR 3.8.4.9 may be performed in lieu of the service test in SR 3.8.4.8. 2. The performance discharge test in SR 3.8.4.9 may be performed in lieu of the service test in SR 3.8.4.8 once every 60 months. 3. This Surveillance shall not normally be performed in MODE 1, 2, 3, or 4. However, portions of the Surveillance may be performed to reestablish OPERABILITY provided an assessment determines the safety of the plant is maintained or enhanced. ----------	
	Verify for each required Station battery, capacity is adequate to supply, and maintain in OPERABLE status, the required emergency loads for the design duty cycle when subjected to a battery service test.	18 months
SR 3.8.4.9	----------NOTE---------- This Surveillance shall not normally be performed in MODE 1, 2, 3, or 4 for Station batteries. However, portions of the Surveillance may be performed to reestablish OPERABILITY provided an assessment determines the safety of the plant is maintained or enhanced. ----------	
	Verify for each required Station and EDG battery, capacity is ≥ 80% of the manufacturer's rating when subjected to a performance discharge test or a modified performance discharge test.	60 months <u>AND</u> 18 months when battery shows degradation or has reached 85% of expected life

3.8 ELECTRICAL POWER SYSTEMS

3.8.5 DC Sources–Shutdown

LCO 3.8.5 DC electrical power subsystem(s) shall be OPERABLE to support the DC electrical power distribution subsystem(s) required by LCO 3.8.10, "Distribution Systems–Shutdown," and EDG DC system shall be OPERABLE for the EDG required by LCO 3.8.2, "AC Sources–Shutdown."

APPLICABILITY: MODES 5 and 6,
During movement of recently irradiated fuel assemblies.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more required DC electrical power subsystems inoperable.	A.1.1 Declare affected required feature(s) inoperable.	Immediately
	OR	
	A.2.1 Suspend CORE ALTERATIONS.	Immediately
	AND	
	A.2.2 Suspend movement of recently irradiated fuel assemblies.	Immediately
	AND	
	A.2.3 Suspend operations involving positive reactivity additions that could result in a loss of required SDM or boron concentration.	Immediately
	AND	

(continued)

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. (continued)	A.2.4 Initiate action to restore required DC electrical power subsystems to OPERABLE status.	Immediately
B. Required EDG DC system inoperable.	B.1 Enter applicable Conditions and Required Actions for associated EDG made inoperable.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.8.5.1	----------NOTE---------- The following SRs are not required to be performed: SR 3.8.4.4, SR 3.8.4.7, SR 3.8.4.8, and SR 3.8.4.9. ---------- For DC sources required to be OPERABLE, the following SRs are applicable: SR 3.8.4.1 SR 3.8.4.4 SR 3.8.4.7 SR 3.8.4.2 SR 3.8.4.5 SR 3.8.4.8 SR 3.8.4.3 SR 3.8.4.6 SR 3.8.4.9	In accordance with applicable SRs

3.8 ELECTRICAL POWER SYSTEMS

3.8.6 Battery Cell Parameters

LCO 3.8.6 Battery cell parameters for the following batteries shall be within limits:

a. The Train H and Train J DC electrical power subsystems;

b. The Emergency Diesel Generator (EDG) DC systems for each required EDG; and

c. One DC electrical power subsystem on the other unit for each required shared component.

APPLICABILITY: When associated DC electrical power subsystem(s) or EDG DC system(s) are required to be OPERABLE.

ACTIONS

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Separate Condition entry is allowed for each battery.
- -

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more Station or EDG batteries with one or more battery cell parameters not within Table 3.8.6-1 Category A or B limits.	A.1 Verify pilot cell electrolyte level and float voltage meet Table 3.8.6-1 Category C limits.	1 hour
	AND	
	A.2 Verify battery cell parameters meet Table 3.8.6-1 Category C limits.	24 hours AND Once per 7 days thereafter
	AND	(continued)

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. (continued)	A.3 Restore battery cell parameters to Table 3.8.6-1 Category A and B limits.	31 days
B. Required Action and associated Completion Time of Condition A not met. OR One or more Station batteries with average electrolyte temperature of the representative cells < 60°F. OR One or more Station or EDG batteries with one or more battery cell parameters not within Table 3.8.6-1 Category C values.	B.1 Declare associated battery inoperable.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.8.6.1	Verify for each required Station and EDG battery cell parameters meet Table 3.8.6-1 Category A limits.	7 days

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.8.6.2	Verify for each required Station and EDG battery cell parameters meet Table 3.8.6-1 Category B limits.	92 days AND Once within 24 hours after a battery discharge < 110 V AND Once within 24 hours after a battery overcharge > 150 V
SR 3.8.6.3	Verify average electrolyte temperature of representative cells for each required Station battery is ≥ 60°F.	92 days

Table 3.8.6-1 (page 1 of 1)
Battery Cell Parameters Requirements

PARAMETER	CATEGORY A: LIMITS FOR EACH DESIGNATED PILOT CELL	CATEGORY B: LIMITS FOR EACH CONNECTED CELL	CATEGORY C: ALLOWABLE LIMITS FOR EACH CONNECTED CELL
Electrolyte Level	> Minimum level indication mark, and ≤¼ inch above maximum level indication mark(a)	> Minimum level indication mark, and ≤¼ inch above maximum level indication mark(a)	Above top of plates, and not overflowing
Float Voltage	≥ 2.13 V	≥ 2.13 V	> 2.07 V
Specific Gravity(b)(c)	≥ 1.200	≥ 1.195 AND Average of all connected cells > 1.205	Not more than 0.020 below average of all connected cells AND Average of all connected cells ≥ 1.195

(a) It is acceptable for the electrolyte level to temporarily increase above the specified maximum during equalizing charges provided it is not overflowing.

(b) Corrected for electrolyte temperature and level. Level correction is not required for Station batteries when battery charging is < 2 amps when on float charge.

(c) Station batteries only: A battery charging current of < 2 amps when on float charge is acceptable for meeting specific gravity limits following a battery recharge, for a maximum of 7 days. When charging current is used to satisfy specific gravity requirements, specific gravity of each connected cell shall be measured prior to expiration of the 7 day allowance.

3.8 ELECTRICAL POWER SYSTEMS

3.8.7 Inverters–Operating

LCO 3.8.7 The Train H and Train J inverters shall be OPERABLE.

- - - - - - - - - - - - - - NOTE - - - - - - - - - - - - - -

One inverter may be disconnected from its associated DC bus for ≤24 hours to perform an equalizing charge on its associated battery, provided:

a. The associated AC vital bus is energized from its constant voltage source transformer; and

b. All other AC vital buses are energized from their associated OPERABLE inverters.

- -

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

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One inverter inoperable.	A.1 ---------NOTE-------- Enter applicable Conditions and Required Actions of LCO 3.8.9, "Distribution Systems–Operating" with any vital bus de-energized. ---------- Restore inverter to OPERABLE status.	24 hours
B. Required Action and associated Completion Time not met.	B.1 Be in MODE 3.	6 hours
	<u>AND</u>	
	B.2 Be in MODE 5.	36 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.8.7.1	Verify correct inverter voltage and alignment to required AC vital buses.	7 days

3.8 ELECTRICAL POWER SYSTEMS

3.8.8 Inverters–Shutdown

LCO 3.8.8 Inverter(s) shall be OPERABLE to support the onsite Class 1E AC vital bus electrical power distribution subsystem(s) required by LCO 3.8.10, "Distribution Systems–Shutdown."

APPLICABILITY: MODES 5 and 6,
During movement of recently irradiated fuel assemblies.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more required inverters inoperable.	A.1 Declare affected required feature(s) inoperable.	Immediately
	OR	
	A.2.1 Suspend CORE ALTERATIONS.	Immediately
	AND	
	A.2.2 Suspend movement of recently irradiated fuel assemblies.	Immediately
	AND	
	A.2.3 Suspend operations involving positive reactivity additions that could result in loss of required SDM or boron concentration.	Immediately
	AND	
	A.2.4 Initiate action to restore required inverters to OPERABLE status.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.8.8.1	Verify correct inverter voltage and alignments to required AC vital buses.	7 days

3.8 ELECTRICAL POWER SYSTEMS

3.8.9 Distribution Systems—Operating

LCO 3.8.9 The following distribution subsystems shall be OPERABLE:

a. The Train H and Train J AC, DC, and AC vital buses; and

b. One AC and DC bus on the other unit for each required shared component.

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

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more LCO 3.8.9.a AC electrical power distribution subsystem(s) inoperable.	A.1 ---------NOTE-------- Enter applicable Conditions and Required Actions of LCO 3.8.4, "DC Sources—Operating," for DC train(s) made inoperable by inoperable distribution subsystem(s). ----------	
	Restore AC electrical power distribution subsystem(s) to OPERABLE status.	8 hours <u>AND</u> 16 hours from discovery of failure to meet LCO

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. One or more LCO 3.8.9.a AC vital bus(es) inoperable.	B.1 Restore AC vital bus subsystem(s) to OPERABLE status.	2 hours AND 16 hours from discovery of failure to meet LCO
C. One or more LCO 3.8.9.a DC electrical power distribution subsystem(s) inoperable.	C.1 Restore DC electrical power distribution subsystem(s) to OPERABLE status.	2 hours AND 16 hours from discovery of failure to meet LCO
D. --------NOTE---------- Separate Condition entry is allowed for each AC subsystem. ---------- One or more required LCO 3.8.9.b AC electrical power distribution subsystem(s) inoperable.	D.1 Declare associated shared component(s) inoperable.	Immediately
E. --------NOTE---------- Separate Condition entry is allowed for each DC subsystem. ---------- One or more required LCO 3.8.9.b DC electrical power distribution subsystem(s) inoperable.	E.1 Declare associated shared component(s) inoperable.	Immediately

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
F. Required Action and associated Completion Time for Condition A, B, or C not met.	F.1 Be in MODE 3. AND F.2 Be in MODE 5.	6 hours 36 hours
G. Two or more LCO 3.8.9.a electrical power distribution subsystems inoperable that result in a loss of safety function.	G.1 Enter LCO 3.0.3.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.8.9.1	Verify correct breaker alignments and voltage to required AC, DC, and AC vital bus electrical power distribution subsystems.	7 days

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3.8 ELECTRICAL POWER SYSTEM

3.8.10 Distribution Systems–Shutdown

LCO 3.8.10 The necessary portion of AC, DC, and AC vital bus electrical power distribution subsystems shall be OPERABLE to support equipment required to be OPERABLE.

APPLICABILITY: MODES 5 and 6,
During movement of recently irradiated fuel assemblies.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more required AC, DC, or AC vital bus electrical power distribution subsystems inoperable.	A.1 Declare associated supported required feature(s) inoperable.	Immediately
	OR	
	A.2.1 Suspend CORE ALTERATIONS.	Immediately
	AND	
	A.2.2 Suspend movement of recently irradiated fuel assemblies.	Immediately
	AND	
	A.2.3 Suspend operations involving positive reactivity additions that could result in loss of required SDM or boron concentration.	Immediately
	AND	
		(continued)

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. (continued)	A.2.4 Initiate actions to restore required AC, DC, and AC vital bus electrical power distribution subsystems to OPERABLE status.	Immediately
	AND	
	A.2.5 Declare associated required residual heat removal subsystem(s) inoperable and not in operation.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.8.10.1	Verify correct breaker alignments and voltage to required AC, DC, and AC vital bus electrical power distribution subsystems.	7 days

SECTION 3.8 - ELECTRICAL POWER SYSTEMS

IMPROVED TECHNICAL SPECIFICATIONS BASES

B 3.8 ELECTRICAL POWER SYSTEMS

B 3.8.1 AC Sources–Operating

BASES

BACKGROUND

The unit Class 1E AC Electrical Power Distribution System AC sources consist of the offsite power sources (preferred power sources, normal and alternate(s)), and the onsite standby power sources (Train A(H) and Train B(J) emergency diesel generators (EDGs)). As required by GDC 17 (Ref. 1), the design of the AC electrical power system provides independence and redundancy to ensure an available source of power to the Engineered Safety Feature (ESF) systems.

Additionally, the unit's electrical sources must include electrical sources from the other unit that are required to support the Service Water (SW), Main Control Room (MCR)/Emergency Switchgear Room (ESGR) Emergency Ventilation System (EVS), or Auxiliary Building central exhaust system safety functions. This requirement could include both of the other unit's offsite circuits and EDGs for this unit.

The onsite Class 1E AC Distribution System is divided into redundant load groups (trains) so that the loss of any one group does not prevent the minimum safety functions from being performed. Each train has connections to one preferred offsite power source and a single EDG.

Offsite power is supplied to the switchyard from the transmission network by several different transmission lines. From the switchyard, two electrically and physically separated circuits provide AC power, through reserve station service transformers (RSSTs), to the 4.16 kV ESF buses. A detailed description of the offsite power network and the circuits to the Class 1E ESF buses is found in the UFSAR, Chapter 8 (Ref. 2).

An offsite circuit consists of all breakers, transformers, switches, interrupting devices, cabling, and controls required to transmit power from the offsite transmission network to the onsite Class 1E ESF bus(es).

Certain required unit loads are energized in a predetermined sequence in order to prevent overloading the transformer supplying offsite power to the onsite Class 1E Distribution System. After the initiating signal is received, permanently

(continued)

BASES

BACKGROUND (continued)

connected loads and all automatically connected loads, via the load sequencing timing relays, needed to recover the unit or maintain it in a safe condition are energized.

The onsite standby power source for each 4.16 kV ESF bus is a dedicated EDG. EDGs H and J are dedicated to ESF buses H and J, respectively. An EDG starts automatically on a safety injection (SI) signal (i.e., low pressurizer pressure or high containment pressure signals) or on an ESF bus degraded voltage or undervoltage signal (refer to LCO 3.3.5, "Loss of Power (LOP) Emergency Diesel Generator (EDG) Start Instrumentation"). After the EDG has started, it will automatically tie to its respective bus after offsite power is tripped as a consequence of ESF bus undervoltage or degraded voltage, independent of or coincident with an SI signal. The EDGs will also start and operate in the standby mode without tying to the ESF bus on an SI signal or a momentary undervoltage condition. Following the trip of offsite power, an undervoltage signal strips nonpermanent loads from the ESF bus. When the EDG is tied to the ESF bus, loads are then sequentially connected to their respective ESF bus by the sequencing timing relays. The specific ESF equipment's sequencing timer controls the permissive and starting signals to motor breakers to prevent overloading the EDG by automatic load application.

In the event of a loss of preferred power, the ESF electrical loads are automatically connected to the EDGs in sufficient time to provide for safe reactor shutdown and to mitigate the consequences of a Design Basis Accident (DBA) such as a loss of coolant accident (LOCA).

Certain required unit loads are returned to service in a predetermined sequence in order to prevent overloading the EDG in the process. After the initiating signal is received, all loads needed to recover the unit or maintain it in a safe condition are returned to service.

Ratings for Train H and Train J EDGs satisfy the requirements of Safety Guide 9 (Ref. 3). The continuous service rating of each EDG is 2750 kW with 3000 kW allowable for up to 2000 hours per year. The ESF loads that are powered from the 4.16 kV ESF buses are listed in Reference 2.

BASES

APPLICABLE SAFETY ANALYSES

The initial conditions of DBA and transient analyses in the UFSAR, Chapter 6 (Ref. 4) and Chapter 15 (Ref. 5), assume ESF systems are OPERABLE. The AC electrical power sources are designed to provide sufficient capacity, capability, redundancy, and reliability to ensure the availability of necessary power to ESF systems so that the fuel, Reactor Coolant System (RCS), and containment design limits are not exceeded. These limits are discussed in more detail in the Bases for Section 3.2, Power Distribution Limits; Section 3.4, Reactor Coolant System (RCS); and Section 3.6, Containment Systems.

The OPERABILITY of the AC electrical power sources is consistent with the initial assumptions of the accident analyses and is based upon meeting the design basis of the unit. This results in maintaining at least one train of the onsite or offsite AC sources OPERABLE during accident conditions in the event of:

a. An assumed loss of all offsite power or all onsite AC power; and

b. A worst case single failure.

The AC sources satisfy Criterion 3 of 10 CFR 50.36(c)(2)(ii).

LCO

Two qualified circuits between the offsite transmission network and the onsite Class 1E Electrical Power System and separate and independent EDGs for each train ensure availability of the required power to shut down the reactor and maintain it in a safe shutdown condition after an anticipated operational occurrence (AOO) or a postulated DBA.

Qualified offsite circuits are those that are described in the UFSAR and are part of the licensing basis for the unit.

In addition, the automatic load sequencing timing relays must be OPERABLE.

Each offsite circuit must be capable of maintaining rated frequency and voltage, and accepting required loads during an accident, while connected to the ESF buses.

(continued)

BASES

LCO (continued)

Offsite circuits consist of the 34.5 kV buses supplying the Reserve Station Service Transformer(s) (RSST) which feed the transfer buses. The D, E, and F transfer buses supply the onsite electrical power to the four emergency buses for the two units. Unit 1 emergency bus H is fed through the F transfer bus from the C RSST that is supplied from 34.5 kV bus #3. Unit 1 emergency bus J is fed through the D transfer bus from the A RSST that is fed from 34.5 kV bus #4. Unit 1 station service bus 1B can be an alternate feed for Unit 1 H emergency bus, while Unit 1 J bus may be fed from Unit 2 station service bus 2B. Unit 2 emergency bus H is fed through the E transfer bus from the B RSST and it is fed from 34.5 kV bus #4. Unit 2 emergency bus J is fed through the F transfer bus from the C RSST that is fed from 34.5 kV bus #3. This arrangement provides a separation of the offsite circuits by one 34.5 kV (bus #4) supplying the A and B RSSTs and the other offsite circuit being supplied from 34.5 kV (bus #3) supplying the C RSST. Specific breaker nomenclature for individual circuits may be obtained from drawings in the UFSAR, Chapter 8 (Ref. 2).

Each EDG must be capable of starting, accelerating to rated speed and voltage, and connecting to its respective ESF bus on detection of bus undervoltage or degraded voltage. This will be accomplished within 10 seconds. Each EDG must also be capable of accepting required loads within the assumed loading sequence intervals, and continue to operate until offsite power can be restored to the ESF buses. These capabilities are required to be met from a variety of initial conditions such as EDG in standby with the engine hot and EDG in standby with the engine at ambient conditions. Additional EDG capabilities must be demonstrated to meet required Surveillances.

Proper sequencing of loads is a required function for EDG OPERABILITY.

The other unit's offsite circuit(s) and EDG(s) are required to be OPERABLE to support the SW, MCR/ESGR ventilation, and Auxiliary Building central exhaust functions needed for this unit. These functions share components, pump or fans, which are electrically powered from both units.

The AC sources in one train must be separate and independent (to the extent possible) of the AC sources in the other train. For the EDGs, separation and independence are complete.

(continued)

BASES

LCO (continued)

For the offsite AC sources, separation and independence are to the extent practical.

APPLICABILITY

The AC sources and sequencing timing relays are required to be OPERABLE in MODES 1, 2, 3, and 4 to ensure that:

a. Acceptable fuel design limits and reactor coolant pressure boundary limits are not exceeded as a result of AOOs or abnormal transients; and

b. Adequate core cooling is provided and containment OPERABILITY and other vital functions are maintained in the event of a postulated DBA.

The AC power requirements for MODES 5 and 6 are covered in LCO 3.8.2, "AC Sources—Shutdown."

ACTIONS

A.1

To ensure a highly reliable power source remains with one offsite circuit inoperable, it is necessary to verify the OPERABILITY of the remaining required offsite circuit(s) on a more frequent basis. Since the Required Action only specifies "perform," a failure of SR 3.8.1.1 acceptance criteria does not result in a Required Action not met. However, if a second required circuit fails SR 3.8.1.1, the second offsite circuit is inoperable, and Condition G, for two offsite circuits inoperable, is entered.

A.2

Required Action A.2, which only applies if the train cannot be powered from an offsite source, is intended to provide assurance that an event coincident with a single failure of the associated EDG will not result in a complete loss of safety function of critical redundant required features. These features are powered from the redundant AC electrical power train.

The Completion Time for Required Action A.2 is intended to allow the operator time to evaluate and repair any discovered inoperabilities. This Completion Time also allows

(continued)

BASES

ACTIONS

A.2 (continued)

for an exception to the normal "time zero" for beginning the allowed outage time "clock." In this Required Action, the Completion Time only begins on discovery that both:

a. The train has no offsite power supplying its loads; and

b. A required feature on the other train is inoperable.

If at any time during the existence of Condition A (one offsite circuit inoperable) a redundant required feature subsequently becomes inoperable, this Completion Time begins to be tracked.

Discovering no offsite power to one train of the onsite Class 1E Electrical Power Distribution System coincident with one or more inoperable required support or supported features, or both, that are associated with the other train that has offsite power, results in starting the Completion Times for the Required Action. Twenty-four hours is acceptable because it minimizes risk while allowing time for restoration before subjecting the unit to transients associated with shutdown.

The remaining OPERABLE offsite circuit and EDGs are adequate to supply electrical power to Train H and Train J of the onsite Class 1E Distribution System. The 24 hour Completion Time takes into account the component OPERABILITY of the redundant counterpart to the inoperable required feature. Additionally, the 24 hour Completion Time takes into account the capacity and capability of the remaining AC sources, a reasonable time for repairs, and the low probability of a DBA occurring during this period.

A.3

According to Regulatory Guide 1.93 (Ref. 6), operation may continue in Condition A for a period that should not exceed 72 hours. With one offsite circuit inoperable, the reliability of the offsite system is degraded, and the potential for a loss of offsite power is increased, with attendant potential for a challenge to the unit safety systems. In this Condition, however, the remaining OPERABLE offsite circuit and EDGs are adequate to supply electrical power to the onsite Class 1E Distribution System.

(continued)

BASES

ACTIONS

A.3 (continued)

The 72 hour Completion Time takes into account the capacity and capability of the remaining AC sources, a reasonable time for repairs, and the low probability of a DBA occurring during this period.

The second Completion Time for Required Action A.3 establishes a limit on the maximum time allowed for any combination of required AC power sources to be inoperable during any single contiguous occurrence of failing to meet the LCO. If Condition A is entered while, for instance, an EDG is inoperable and that EDG is subsequently returned OPERABLE, the LCO may already have been not met for up to 14 days. This could lead to a total of 17 days, since initial failure to meet the LCO, to restore the offsite circuit. At this time, an EDG could again become inoperable, the circuit restored OPERABLE, and an additional 14 days (for a total of 31 days) allowed prior to complete restoration of the LCO. The 17 day Completion Time provides a limit on the time allowed in a specified condition after discovery of failure to meet the LCO. This limit is considered reasonable for situations in which Conditions A and B are entered concurrently. The "AND" connector between the 72 hour and 17 day Completion Times means that both Completion Times apply simultaneously, and the more restrictive Completion Time must be met.

As in Required Action A.2, the Completion Time allows for an exception to the normal "time zero" for beginning the allowed outage time "clock." This will result in establishing the "time zero" at the time that the LCO was initially not met, instead of at the time Condition A was entered.

B.1

Condition B is entered for an inoperable EDG and requires the OPERABILITY of additional electrical sources for the allowed Completion Time of 14 days. The additional electrical sources required to be OPERABLE are the Alternate AC (AAC) diesel generator (DG) (Station Black Out (SBO) diesel generator), and both EDGs of the other unit. If any of these additional sources are inoperable at the time an EDG becomes inoperable, or become inoperable with an EDG in Condition B, Condition C must also be entered for the inoperable EDG.

(continued)

BASES

ACTIONS

B.1 (continued)

To ensure a highly reliable power source remains with an inoperable EDG, it is necessary to verify the availability of the offsite circuits on a more frequent basis. Since the Required Action only specifies "perform," a failure of SR 3.8.1.1 acceptance criteria does not result in a Required Action being not met. However, if a circuit fails to pass SR 3.8.1.1, it is inoperable. Upon offsite circuit inoperability, additional Conditions and Required Actions must then be entered.

B.2

Required Action B.2 is intended to provide assurance that a loss of offsite power, during the period that an EDG is inoperable, does not result in a complete loss of safety function of critical systems. These features are designed with redundant safety related trains. Redundant required feature failures consist of inoperable features associated with a train, redundant to the train that has an inoperable EDG.

The Completion Time for Required Action B.2 is intended to allow the operator time to evaluate and repair any discovered inoperabilities. This Completion Time also allows for an exception to the normal "time zero" for beginning the allowed outage time "clock." In this Required Action, the Completion Time only begins on discovery that both:

a. An inoperable EDG exists; and

b. A required feature on the other train (Train H or Train J) is inoperable.

If at any time during the existence of this Condition (one EDG inoperable) a required feature subsequently becomes inoperable, this Completion Time would begin to be tracked.

Discovering one required EDG inoperable coincident with one or more inoperable required support or supported features, or both, that are associated with the OPERABLE EDG, results in starting the Completion Time for the Required Action. Four hours from the discovery of these events existing

(continued)

BASES

ACTIONS

B.2 (continued)

concurrently is acceptable because it minimizes risk while allowing time for restoration before subjecting the unit to transients associated with shutdown.

In this Condition, the remaining OPERABLE EDG and offsite circuits are adequate to supply electrical power to the onsite Class 1E Distribution System. Thus, on a component basis, single failure protection for the required feature's function may have been lost; however, function has not been lost. The 4 hour Completion Time takes into account the OPERABILITY of the redundant counterpart to the inoperable required feature. Additionally, the 4 hour Completion Time takes into account the capacity and capability of the remaining AC sources, a reasonable time for repairs, and the low probability of a DBA occurring during this period.

B.3.1 and B.3.2

Required Action B.3.1 provides an allowance to avoid unnecessary testing of the OPERABLE EDG. If it can be determined that the cause of the inoperable EDG does not exist on the OPERABLE EDG, SR 3.8.1.2 does not have to be performed. If the cause of inoperability exists on the other EDG, the other EDG would be declared inoperable upon discovery and Condition I of LCO 3.8.1 would be entered. Once the failure is repaired, the common cause failure no longer exists, and Required Action B.3.1 is satisfied. If the cause of the initial inoperable EDG cannot be confirmed not to exist on the remaining EDG, performance of SR 3.8.1.2 suffices to provide assurance of continued OPERABILITY of that EDG.

In the event the inoperable EDG is restored to OPERABLE status prior to completing either B.3.1 or B.3.2, the plant corrective action program will continue to evaluate the common cause possibility, including the other unit's EDGs. This continued evaluation, however, is no longer under the 24 hour constraint imposed while in Condition B.

According to Generic Letter 84-15 (Ref. 7), 24 hours is reasonable to confirm that the OPERABLE EDG is not affected by the same problem as the inoperable EDG.

BASES

ACTIONS (continued)

B.4

In Condition B, the remaining OPERABLE EDG, offsite circuits, AAC DG, and the other unit's EDGs are adequate to supply electrical power to the onsite Class 1E Distribution System. The 14 day Completion Time takes into account the capacity and capability of the remaining AC sources, a reasonable time for repairs, and the low probability of a DBA occurring during this period.

The second Completion Time for Required Action B.4 establishes a limit on the maximum time allowed for any combination of required AC power sources to be inoperable during any single contiguous occurrence of failing to meet the LCO. If Condition B is entered while, for instance, an offsite circuit is inoperable and that circuit is subsequently restored OPERABLE, the LCO may already have been not met for up to 72 hours. This could lead to a total of 17 days, since initial failure to meet the LCO, to restore the EDG. At this time, an offsite circuit could again become inoperable, the EDG restored OPERABLE, and an additional 72 hours (for a total of 20 days) allowed prior to complete restoration of the LCO. The 17 day Completion Time provides a limit on time allowed in a specified condition after discovery of failure to meet the LCO. This limit is considered reasonable for situations in which Conditions A and B are entered concurrently. The "AND" connector between the 14 day and 17 day Completion Times means that both Completion Times apply simultaneously, and the more restrictive Completion Time must be met.

As in Required Action B.2, the Completion Time allows for an exception to the normal "time zero" for beginning the allowed time "clock." This will result in establishing the "time zero" at the time that the LCO was initially not met, instead of at the time Condition B was entered.

C.1 and C.2

To ensure a highly reliable electrical power source remains available when one EDG is inoperable, Condition C is established to monitor the OPERABILITY of the AAC DG and the other unit's EDGs. Condition B is entered any time an EDG becomes inoperable and the Required Actions and Completion Times are followed. Concurrently, if the AAC DG or one or more of the other unit's EDG(s) is inoperable, or become inoperable, in addition to the Required Actions of

(continued)

BASES

ACTIONS

C.1 and C.2 (continued)

Condition B, Required Actions C.1 and C.2 limit the time the EDG may be out of service to 72 hours. If the AAC DG or the other unit's EDG(s) is inoperable when the EDG becomes inoperable, the allowed outage time (AOT) is limited to 72 hours, unless the AAC DG and the other unit's EDG(s) are returned to OPERABLE status. If during the 72 hour Completion Time of C.1 or C.2, the AAC DG and the other unit's EDG(s) are returned to OPERABLE status, Condition C is exited and AOT is restricted by the Completion Time tracked in Condition B. If the AAC DG or one or more of the other unit's EDG(s) becomes inoperable at sometime after the initial EDG inoperability, Condition C requires the restoration of the AAC DG and the other unit's EDG(s) within 72 hours or Condition L is required to be entered.

The 72 hour Completion Time is considered reasonable and takes into account the assumption in the probabilistic safety analysis (PSA) for potential core damage frequency.

D.1, D.2, and D.3

Condition D is modified by a Note indicating that separate Condition entry is allowed for each offsite circuit on the other unit that provides electrical power to required shared components.

To provide the necessary electrical power for the SW, MCR/ESGR EVS, and Auxiliary Building central exhaust functions for a unit, AC electrical sources of both units may be required to be OPERABLE. Action D is entered for one or more inoperable offsite circuit(s) on the other unit that is necessary to support required shared components. These shared components are the SW pump(s), MCR/ESGR fan(s), and Auxiliary Building central exhaust fan(s). Required Action D.1 verifies the OPERABILITY of the remaining required offsite sources within an hour of the inoperability and every 8 hours thereafter. Since the Required Action only specifies "perform," a failure of the SR 3.8.1.1 acceptance criteria does not result in a Required Action not met.

The Completion Time for Required Action D.2 is intended to allow the operator time to evaluate and repair any discovered inoperabilities. This Completion Time also allows

(continued)

BASES

ACTIONS

D.1, D.2 and D.3 (continued)

for an exception to the normal "time zero" for beginning the allowed outage time "clock." In this Required Action, the Completion Time only begins on discovery that both:

a. The required shared component has no offsite power; and

b. More than one shared component is inoperable.

If at any time during the existence of Condition D (one offsite circuit inoperable on the other unit needed to supply electrical power for a required shared component) another required shared component in the same system subsequently becomes inoperable, this Completion Time begins to be tracked.

Discovering no offsite power on the other unit that supports a required shared component and an additional required shared component in the same system inoperable, results in starting the Completion Times for the Required Action. Twenty-four hours is acceptable because it minimizes risk while allowing time for restoration before subjecting the unit to transients associated with shutdown.

The remaining OPERABLE offsite circuits and EDGs that power the required shared components are adequate to support the SW, MCR/ESGR EVS, and Auxiliary Building central exhaust system Functions. The 24 hour Completion Time takes into account the component OPERABILITY of the remaining shared component(s), a reasonable time for repairs, and the low probability of a DBA occurring during this period.

Operation may continue in Condition D for a period of 72 hours. With one offsite circuit inoperable on the other unit supplying electrical power to a required shared component, the reliability of the SW, MCR/ESGR EVS, and Auxiliary Building central exhaust system Functions are degraded. The potential for the loss of offsite power to the other required shared components is increased, with the attendant potential for a challenge to SW, MCR/ESGR EVS, and Auxiliary Building central exhaust system Functions.

The required offsite circuit must be returned to OPERABLE status within 72 hours, or the support function for the associated shared component is considered inoperable. At

(continued)

BASES

ACTIONS

D.1, D.2 and D.3 (continued)

that time, the required shared component must be declared inoperable and the appropriate Conditions of the LCO 3.7.8, "Service Water System," LCO 3.7.10, "MCR/ESGR Emergency Ventilation System," and LCO 3.7.12, "Emergency Core Cooling System (ECCS) Pump Room Exhaust Air Cleanup System," must be entered. The 72 hour Completion Time takes into account the capacity and capability of the remaining AC sources providing electrical power to the required shared components, a reasonable time for repairs and the low probability of a DBA occurring during this period of time.

E.1, E.2, and E.3

To ensure a highly reliable power source remains with an inoperable EDG, it is necessary to verify the availability of the required offsite circuits on a more frequent basis. Since the Required Action only specifies "perform," a failure of SR 3.8.1.1 acceptance criteria does not result in a Required Action being not met. Required Action E.1 verifies the OPERABILITY of the required offsite sources within an hour of the inoperability and every 8 hours thereafter. However, if a circuit fails to pass SR 3.8.1.1, it is inoperable. Upon offsite circuit inoperability, additional Conditions and Required Actions must be entered.

Required Action E.2 is intended to provide assurance that a loss of offsite power, during the period that an EDG is inoperable, does not result in a complete loss of the SW, MCR/ESGR EVS, or Auxiliary Building central exhaust system Functions.

The Completion Time for Required Action E.2 is intended to allow the operator time to evaluate and repair any discovered inoperabilities. This Completion Time also allows for an exception to the normal "time zero" for beginning the allowed outage time "clock." In this Required Action, the Completion Time only begins on discovery that both:

a. The required shared component with an inoperable EDG; and

b. More than one shared component in the same system is inoperable.

(continued)

BASES

ACTIONS

E.1, E.2, and E.3 (continued)

If at any time during the existence of Condition E (one EDG inoperable on the other unit needed to supply electrical power for a required shared component) another required shared component subsequently becomes inoperable, this Completion Time begins to be tracked.

Discovering an EDG on the other unit that supports a required shared component and an additional required shared component inoperable, results in starting the Completion Times for the Required Action. Four hours is acceptable because it minimizes risk while allowing time for restoration before subjecting the unit to transients associated with shutdown.

The remaining OPERABLE offsite circuits and EDGs that power the required shared components are adequate to support the SW, MCR/ESGR EVS, or Auxiliary Building central exhaust system Functions. The 4 hour Completion Time takes into account the component OPERABILITY of the remaining shared components, a reasonable time for repairs, and the low probability of a DBA occurring during this period.

Operation may continue in Condition E for a period of 14 days. With one EDG inoperable on the other unit supplying electrical power to a required shared component, the reliability of the respective Function is degraded. The potential for the loss of EDGs to the other required shared components is increased, with the attendant potential for a challenge to respective Function.

The required EDG must be returned to OPERABLE status within 14 days, or the support function for the associated shared component is considered inoperable. At that time, the required shared component must be declared inoperable and the appropriate Conditions of the LCOs 3.7.8, 3.7.10, and 3.7.12 must be entered. The 14 day Completion Time takes into account the capacity and capability of the remaining AC sources providing electrical power to the required shared components, a reasonable time for repairs and the low probability of a DBA occurring during this period of time.

F.1 and F.2

To ensure a highly reliable electrical power source remains available when one EDG is inoperable that is required to support a required shared component on the other unit,

(continued)

BASES

ACTIONS

F.1 and F.2 (continued)

Condition F is established to monitor the OPERABILITY of the AAC DG and the LCO 3.8.1.b EDGs. Condition F is entered any time an EDG that is required to support a required shared component that receives its electrical power from the other unit becomes inoperable and the Required Actions and Completion Times are followed. Concurrently, if the AAC DG or one or more of this unit's EDG(s) is inoperable, or become inoperable, in addition to the Required Actions of Condition E, Required Actions F.1 and F.2 limit the time the EDG may be out of service to 72 hours. If the AAC DG or this unit's EDG(s) is inoperable when the other unit's EDG becomes inoperable, the AOT is limited to 72 hours, unless the AAC DG and this unit's EDG(s) are returned to OPERABLE status. If during the 72 hour Completion Time of F.1 or F.2, the AAC DG and this unit's EDG are return to OPERABLE status, Condition F is exited and AOT is restricted by the Completion Time tracked in Condition E. If the AAC DG or one or more of this unit's EDG(s) becomes inoperable at sometime after the initial EDG inoperability, Condition F requires the restoration of the AAC DG and this unit's EDG(s) within 72 hours or the supported shared component must be declared inoperable and LCOs 3.7.8, 3.7.10, and 3.7.12 provides the appropriate restrictions.

The 72 hour Completion Time is considered reasonable and takes into account the assumption in the probabilistic safety analysis (PSA) for potential core damage frequency.

G.1 and G.2

Required Action G.1, which applies when two offsite circuits are inoperable, is intended to provide assurance that an event with a coincident single failure will not result in a complete loss of redundant required safety functions. The Completion Time for this failure of redundant required features is reduced to 12 hours from that allowed for one train without offsite power (Required Action A.2). The rationale for the reduction to 12 hours is that Regulatory Guide 1.93 (Ref. 6) allows a Completion Time of 24 hours for two required offsite circuits inoperable, based upon the assumption that two complete safety trains are OPERABLE. When a concurrent redundant required feature failure exists, this assumption is not the case, and a shorter Completion Time of 12 hours is appropriate. These features are powered from redundant AC safety trains.

(continued)

BASES

ACTIONS

G.1 and G.2 (continued)

The Completion Time for Required Action G.1 is intended to allow the operator time to evaluate and repair any discovered inoperabilities. This Completion Time also allows for an exception to the normal "time zero" for beginning the allowed outage time "clock." In this Required Action the Completion Time only begins on discovery that both:

a. All required offsite circuits are inoperable; and

b. A required feature is inoperable.

If at any time during the existence of Condition G (two offsite circuits inoperable) a required feature becomes inoperable, this Completion Time begins to be tracked.

According to Regulatory Guide 1.93 (Ref. 6), operation may continue in Condition G for a period that should not exceed 24 hours. This level of degradation means that the offsite electrical power system does not have the capability to effect a safe shutdown and to mitigate the effects of an accident; however, the onsite AC sources have not been degraded. This level of degradation generally corresponds to a total loss of the immediately accessible offsite power sources.

Because of the normally high availability of the offsite sources, this level of degradation may appear to be more severe than other combinations of two AC sources inoperable that involve one or more EDGs inoperable. However, two factors tend to decrease the severity of this level of degradation:

a. The configuration of the redundant AC electrical power system that remains available is not susceptible to a single bus or switching failure; and

b. The time required to detect and restore an unavailable offsite power source is generally much less than that required to detect and restore an unavailable onsite AC source.

With both of the required offsite circuits inoperable, sufficient onsite AC sources are available to maintain the unit in a safe shutdown condition in the event of a DBA or

(continued)

BASES

ACTIONS

G.1 and G.2 (continued)

transient. In fact, a simultaneous loss of offsite AC sources, a LOCA, and a worst case single failure were postulated as a part of the design basis in the safety analysis. Thus, the 24 hour Completion Time provides a period of time to effect restoration of one of the offsite circuits commensurate with the importance of maintaining an AC electrical power system capable of meeting its design criteria.

According to Reference 6, with the available offsite AC sources, two less than required by the LCO, operation may continue for 24 hours. If two offsite sources are restored within 24 hours, unrestricted operation may continue. If only one offsite source is restored within 24 hours, power operation continues in accordance with Condition A.

H.1 and H.2

Pursuant to LCO 3.0.6, the Distribution System ACTIONS would not be entered even if all AC sources to it were inoperable, resulting in de-energization. Therefore, the Required Actions of Condition H are modified by a Note to indicate that when Condition H is entered with no AC source to any train, the Conditions and Required Actions for LCO 3.8.9, "Distribution Systems—Operating," must be immediately entered. This allows Condition H to provide requirements for the loss of one offsite circuit and one EDG, without regard to whether a train is de-energized. LCO 3.8.9 provides the appropriate restrictions for a de-energized train.

According to Regulatory Guide 1.93 (Ref. 6), operation may continue in Condition H for a period that should not exceed 12 hours.

In Condition H, individual redundancy is lost in both the offsite electrical power system and the onsite AC electrical power system. Since power system redundancy is provided by two diverse sources of power, however, the reliability of the power systems in this Condition may appear higher than that in Condition G (loss of both required offsite circuits). This difference in reliability is offset by the susceptibility of this power system configuration to a single bus or switching failure. The 12 hour Completion Time takes into account the capacity and capability of the remaining AC sources, a reasonable time for repairs, and the low probability of a DBA occurring during this period.

BASES

ACTIONS (continued)

I.1

With Train H and Train J EDGs inoperable, there are no remaining standby AC sources. Thus, with an assumed loss of offsite electrical power, insufficient standby AC sources are available to power the minimum required ESF functions. Since the offsite electrical power system is the only source of AC power for this level of degradation, the risk associated with continued operation for a very short time could be less than that associated with an immediate controlled shutdown (the immediate shutdown could cause grid instability, which could result in a total loss of AC power). Since any inadvertent generator trip could also result in a total loss of offsite AC power, however, the time allowed for continued operation is severely restricted. The intent here is to avoid the risk associated with an immediate controlled shutdown and to minimize the risk associated with this level of degradation.

According to Reference 6, with both EDGs inoperable, operation may continue for a period that should not exceed 2 hours.

J.1

With two LCO 3.8.1.c required EDGs inoperable, as many as two required shared and potentially required components have no remaining standby AC sources. Thus, with an assumed loss of offsite power condition, the required shared components powered from the other unit would be significantly degraded. Therefore, the required shared component would immediately declared inoperable and LCOs 3.7.8, 3.7.10, and 3.7.12 would provide the appropriate restrictions.

K.1 and K.2

Condition K is modified by a Note indicating that separate Condition entry is allowed for each inoperable sequencing timing relay.

Condition K is entered any time a required sequencing timing relay (STR) becomes inoperable. Required Action K.1 directs the entry into the Required Actions and Completion Times associated for the individual component served by the inoperable relay. The instrumentation signals that provide the actuation are governed by LCO 3.3.2, "Engineered Safety Features Actuation System Instrumentation" for safety

(continued)

BASES

ACTIONS

K.1 and K.2 (continued)

injection (SI), Containment Spray (Containment Depressurization Actuation (CDA)) and LCO 3.3.5, "Loss of Power (LOP) Emergency Diesel Generator (EDG) Start Instrumentation" for the LOP.

The STRs provide a time delay for the individual component to close its breaker to the associated emergency electrical bus. Each component is sequenced onto the emergency bus by an initiating signal. Required Action K.2 provides for the immediate isolation of the component(s) ability to automatically load on an emergency electrical bus with an inoperable STR. This provides an assurance that the component will not be loaded onto an emergency bus at an incorrect time. Improper loading sequence may cause the emergency bus to become inoperable. Rendering a component with an inoperable STR incapable of loading to the emergency bus prevents a possible overload condition. Required Action K.2.2 provides an alternative option for isolating the component with an inoperable STR from the emergency bus by allowing the associated EDG to be declared inoperable.

L.1 and L.2

If the inoperable AC electric power sources cannot be restored to OPERABLE status within the required Completion Time, the unit must be brought to a MODE in which the LCO does not apply. To achieve this status, the unit must be brought to at least MODE 3 within 6 hours and to MODE 5 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging unit systems.

M.1

Condition M corresponds to a level of degradation in which all redundancy in the AC electrical power supplies has been lost. At this severely degraded level, any further losses in the AC electrical power system will cause a loss of function. Therefore, no additional time is justified for continued operation. The unit is required by LCO 3.0.3 to commence a controlled shutdown.

BASES

SURVEILLANCE REQUIREMENTS

The AC sources are designed to permit inspection and testing of all important areas and features, especially those that have a standby function, in accordance with GDC 18 (Ref. 1). Periodic component tests are supplemented by extensive functional tests during refueling outages (under simulated accident conditions). The SRs for demonstrating the OPERABILITY of the EDGs are in accordance with the recommendations of Safety Guide 9 (Ref. 3), Regulatory Guide 1.108 (Ref. 8), and Regulatory Guide 1.137 (Ref. 9), as addressed in the UFSAR.

Where the SRs discussed herein specify voltage and frequency tolerances, the following is applicable. The minimum steady state output voltage of 3740 V is 90% of the nominal 4160 V output voltage. This value, which is specified in ANSI C84.1 (Ref. 10), allows for voltage drop to the terminals of 4000 V motors whose minimum operating voltage is specified as 90% or 3600 V. It also allows for voltage drops to motors and other equipment down through the 120 V level where minimum operating voltage is also usually specified as 90% of name plate rating. The specified maximum steady state output voltage of 4580 V is equal to the maximum operating voltage specified for 4000 V motors. It ensures that for a lightly loaded distribution system, the voltage at the terminals of 4000 V motors is no more than the maximum rated operating voltages. The specified minimum and maximum frequencies of the EDG are 59.5 Hz and 60.5 Hz, respectively. These values are < ±1% of the 60 Hz nominal frequency and are derived from the safety analysis assumptions for operation of ECCS pump criteria.

SR 3.8.1.1

This SR ensures proper circuit continuity for the offsite AC electrical power supply to the onsite distribution network and availability of offsite AC electrical power. The breaker alignment verifies that each breaker is in its correct position to ensure that distribution buses and loads are connected to their preferred or alternate power source, and that appropriate independence of offsite circuits is maintained. The 7 day Frequency is adequate since breaker position is not likely to change without the operator being aware of it and because its status is displayed in the control room.

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.8.1.2 and SR 3.8.1.7

These SRs help to ensure the availability of the standby electrical power supply to mitigate DBAs and transients and to maintain the unit in a safe shutdown condition.

To minimize the wear on moving parts that do not get lubricated when the engine is not running, these SRs are modified by a Note (Note 1 for SR 3.8.1.2) to indicate that all EDG starts for these Surveillances may be preceded by an engine prelube period and followed by a warmup period prior to loading.

For the purposes of SR 3.8.1.2 and SR 3.8.1.7 testing, the EDGs are started from standby conditions. Standby conditions for an EDG mean that the diesel engine coolant and oil are being continuously circulated, as required, and temperature is being maintained consistent with manufacturer recommendations.

In order to reduce stress and wear on diesel engines, the manufacturer recommends a modified start in which the starting speed of EDGs is limited, warmup is limited to this lower speed, and the EDGs are gradually accelerated to synchronous speed prior to loading. These start procedures are the intent of Note 2.

SR 3.8.1.7 requires that, at a 184 day Frequency, the EDG starts from standby conditions and achieves required voltage and frequency within 10 seconds. The 10 second start requirement supports the assumptions of the design basis LOCA analysis in the UFSAR, Chapter 15 (Ref. 5).

The 10 second start requirement is not applicable to SR 3.8.1.2 (see Note 2) when a modified start procedure as described above is used. If a modified start is not used, the 10 second start requirement of SR 3.8.1.7 applies.

Since SR 3.8.1.7 requires a 10 second start, it is more restrictive than SR 3.8.1.2, and it may be performed in lieu of SR 3.8.1.2.

In addition to the SR requirements, the time for the EDG to reach steady state operation, unless the modified EDG start method is employed, is periodically monitored and the trend evaluated to identify degradation of governor and voltage regulator performance.

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.1.2 and SR 3.8.1.7 (continued)

The 31 day Frequency for SR 3.8.1.2 and the 184 day Frequency for SR 3.8.1.7 are acceptable based on operating experience. These Frequencies provide adequate assurance of EDG OPERABILITY, while minimizing degradation resulting from testing.

SR 3.8.1.3

This Surveillance verifies that the EDGs are capable of synchronizing with the offsite electrical system and accepting loads greater than or equal to the equivalent of 90% to 100% of continuous rating (2500 to 2600 kW). A minimum run time of 60 minutes is required to stabilize engine temperatures, while minimizing the time that the EDG is connected to the offsite source.

Although no power factor requirements are established by this SR, the EDG is normally operated at a power factor between 0.8 lagging and 1.0. The 0.8 value is the design rating of the machine, while the 1.0 is an operational limitation to ensure circulating currents are minimized. The load band is provided to avoid routine overloading of the EDG. Routine overloading may result in more frequent teardown inspections in accordance with vendor recommendations in order to maintain EDG OPERABILITY.

The 31 day Frequency for this Surveillance is acceptable based on operating experience.

This SR is modified by four Notes. Note 1 indicates that diesel engine runs for this Surveillance may include gradual loading, as recommended by the manufacturer, so that mechanical stress and wear on the diesel engine are minimized. Note 2 states that momentary transients, because of changing bus loads, do not invalidate this test. Similarly, momentary power factor transients above the limit do not invalidate the test. Note 3 indicates that this Surveillance should be conducted on only one EDG at a time in order to avoid common cause failures that might result from offsite circuit or grid perturbations. Note 4 stipulates a prerequisite requirement for performance of this SR. A successful EDG start must precede this test to credit satisfactory performance.

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.8.1.4

This SR provides verification that the level of fuel oil in the day tank is at or above the level at which fuel oil is automatically added. The level is expressed as an equivalent volume in gallons, and is selected to ensure adequate fuel oil for a minimum of 1 hour of EDG operation at full load plus 10%.

The 31 day Frequency is adequate to assure that a sufficient supply of fuel oil is available, since low level alarms are provided and facility operators would be aware of any large uses of fuel oil during this period.

SR 3.8.1.5

Microbiological fouling is a major cause of fuel oil degradation. There are numerous bacteria that can grow in fuel oil and cause fouling, but all must have a water environment in order to survive. Removal of water from the fuel oil day tanks once every 92 days eliminates the necessary environment for bacterial survival. This is the most effective means of controlling microbiological fouling. In addition, it eliminates the potential for water entrainment in the fuel oil during EDG operation. Water may come from any of several sources, including condensation, ground water, rain water, contaminated fuel oil, and breakdown of the fuel oil by bacteria. Frequent checking for and removal of accumulated water minimizes fouling and provides data regarding the watertight integrity of the fuel oil system. The Surveillance Frequencies are consistent with the recommendations of Regulatory Guide 1.137 (Ref. 9). This SR is for preventative maintenance. The presence of water does not necessarily represent failure of this SR, provided the accumulated water is removed during the performance of this Surveillance.

SR 3.8.1.6

This Surveillance demonstrates that each required fuel oil transfer pump operates and transfers fuel oil from its associated storage tank to its associated day tank. This is required to support continuous operation of standby power sources. This Surveillance provides assurance that the fuel oil transfer pump is OPERABLE, the fuel oil piping system is

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.1.6 (continued)

intact, the fuel delivery piping is not obstructed, and the controls and control systems for fuel transfer systems are OPERABLE.

The 92 day Frequency corresponds to the testing requirements of pumps as contained in the ASME Code, Section XI (Ref. 10). The fuel oil transfer system is such that the pumps must be started manually in order to maintain an adequate volume of fuel in the day tank during or following EDG testing, and a 92 day Frequency is appropriate.

SR 3.8.1.7

See SR 3.8.1.2.

SR 3.8.1.8

Transfer of each 4.16 kV ESF bus power supply from the normal offsite circuit to the alternate offsite circuit demonstrates the OPERABILITY of the alternate circuit distribution network to power the shutdown loads for Unit 1 only. The 18 month Frequency of the Surveillance is based on engineering judgment, taking into consideration the unit conditions required to perform the Surveillance, and is intended to be consistent with expected fuel cycle lengths. Operating experience has shown that these components usually pass the SR when performed at the 18 month Frequency. Therefore, the Frequency was concluded to be acceptable from a reliability standpoint.

This SR is modified by a Note that states that the SR is applicable to Unit 1 only. The SR is not applicable to Unit 2 because it does not have an alternate offsite feed for the emergency buses.

SR 3.8.1.9

Each EDG is provided with an engine overspeed trip to prevent damage to the engine. Recovery from the transient caused by the loss of a large load could cause diesel engine overspeed, which, if excessive, might result in a trip of the engine. This Surveillance demonstrates the EDG load response characteristics and capability to reject the largest single load without exceeding predetermined voltage and frequency

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.1.9 (continued)

and while maintaining a specified margin to the overspeed trip. For this unit, the single load for each EDG is 610 kW. This Surveillance may be accomplished by:

a. Tripping the EDG output breaker with the EDG carrying greater than or equal to its associated single largest post-accident load while paralleled to offsite power, or while solely supplying the bus; or

b. Tripping its associated single largest post-accident load with the EDG solely supplying the bus.

As required by IEEE-308 (Ref. 11), the load rejection test is acceptable if the increase in diesel speed does not exceed 75% of the difference between synchronous speed and the overspeed trip setpoint, or 15% above synchronous speed, whichever is lower.

The time, voltage, and frequency tolerances specified in this SR are derived from Safety Guide 9 (Ref. 3) recommendations for response during load sequence intervals. The 3 seconds specified is equal to 60% of a typical 5 second load sequence interval associated with sequencing of the largest load. The voltage and frequency specified are consistent with the design range of the equipment powered by the EDG. SR 3.8.1.9.a corresponds to the maximum frequency excursion, while SR 3.8.1.9.b and SR 3.8.1.9.c are steady state voltage and frequency values to which the system must recover following load rejection. The 18 month Frequency is consistent with the recommendation of Regulatory Guide 1.108 (Ref. 8).

This SR is modified by a Note. The Note ensures that the EDG is tested under load conditions that are as close to design basis conditions as possible. When synchronized with offsite power, testing should be performed at a power factor of ≤0.9. This power factor is representative of the actual inductive loading an EDG would see under design basis accident conditions. Under certain conditions, however, the Note allows the surveillance to be conducted at a power factor other than ≤0.9. These conditions occur when grid voltage is high, and the additional field excitation needed to get the power factor to ≤0.9 results in voltages on the emergency busses that are too high. Under these conditions,

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.1.9 (continued)

the power factor should be maintained as close as practicable to 0.9 while still maintaining acceptable voltage limits on the emergency busses. In other circumstances, the grid voltage may be such that the EDG excitation levels needed to obtain a power factor of 0.9 may not cause unacceptable voltages on the emergency busses, but the excitation levels are in excess of those recommended for the EDG. In such cases, the power factor shall be maintained as close as practicable to 0.9 without exceeding the EDG excitation limits.

SR 3.8.1.10

Consistent with the recommendations of Regulatory Guide 1.108 (Ref. 8), paragraph 2.a.(1), this Surveillance demonstrates the as designed operation of the standby power sources during loss of the offsite source. This test verifies all actions encountered from the loss of offsite power, including shedding of the nonessential loads and energization of the emergency buses and respective loads from the EDG. It further demonstrates the capability of the EDG to automatically achieve the required voltage and frequency within the specified time.

The EDG autostart time of 10 seconds is derived from requirements of the accident analysis to respond to a design basis large break LOCA. The Surveillance should be continued for a minimum of 5 minutes in order to demonstrate that all starting transients have decayed and stability is achieved.

The requirement to verify the connection and power supply of permanent and autoconnected loads is intended to satisfactorily show the relationship of these loads to the EDG loading logic. In certain circumstances, many of these loads cannot actually be connected or loaded without undue hardship or potential for undesired operation. For instance, Emergency Core Cooling Systems (ECCS) injection valves are not desired to be stroked open, or high pressure injection systems are not capable of being operated at full flow, and not desired to be realigned to the ECCS mode of operation. In lieu of actual demonstration of connection and loading of loads, testing that adequately shows the capability of the EDG systems to perform these functions is acceptable. This

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.1.10 (continued)

testing may include any series of sequential, overlapping, or total steps so that the entire connection and loading sequence is verified.

The Frequency of 18 months is consistent with the recommendations of Regulatory Guide 1.108 (Ref. 8), paragraph 2.a.(1), takes into consideration unit conditions required to perform the Surveillance, and is intended to be consistent with expected fuel cycle lengths.

This SR is modified by two Notes. The reason for Note 1 is to minimize wear and tear on the EDGs during testing. For the purpose of this testing, the EDGs must be started from standby conditions, that is, with the engine coolant and oil continuously circulated, as required, and temperature maintained consistent with manufacturer recommendations. The reason for Note 2 is that performing the Surveillance would remove a required offsite circuit from service, perturb the electrical distribution system, and challenge safety systems. This restriction from normally performing the Surveillance in MODE 1, 2, 3, or 4 is further amplified to allow portions of the Surveillance to be performed for the purpose of reestablishing OPERABILITY (e.g., post work testing following corrective maintenance, corrective modification, deficient or incomplete surveillance testing, and other unanticipated OPERABILITY concerns) provided an assessment determines unit safety is maintained or enhanced. This assessment shall, as a minimum, consider the potential outcomes and transients associated with a failed partial Surveillance, a successful partial Surveillance, and a perturbation of the offsite or onsite system when they are tied together or operated independently for the partial Surveillance; as well as the operator procedures available to cope with these outcomes. These shall be measured against the avoided risk of the unit shutdown and startup to determine that unit safety is maintained or enhanced when portions of the Surveillance are performed in MODE 1, 2, 3, or 4. Risk insights or deterministic methods may be used for this assessment.

SR 3.8.1.11

This Surveillance demonstrates that the EDG automatically starts and achieves the required voltage and frequency within the specified time (10 seconds) from the design basis

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.1.11 (continued)

actuation signal (LOCA signal) and operates for ≥ 5 minutes. The 5 minute period provides sufficient time to demonstrate stability. SR 3.8.1.11.d and SR 3.8.1.11.e ensure that permanently connected loads and emergency loads are energized from the offsite electrical power system on an ESF signal without loss of offsite power.

The requirement to verify the connection of permanent and autoconnected loads is intended to satisfactorily show the relationship of these loads to the EDG loading logic. In certain circumstances, many of these loads cannot actually be connected or loaded without undue hardship or potential for undesired operation. For instance, ECCS injection valves are not desired to be stroked open, or high pressure injection systems are not capable of being operated at full flow. In lieu of actual demonstration of connection and loading of loads, testing that adequately shows the capability of the EDG system to perform these functions is acceptable. This testing may include any series of sequential, overlapping, or total steps so that the entire connection and loading sequence is verified.

The Frequency of 18 months takes into consideration unit conditions required to perform the Surveillance and is intended to be consistent with the expected fuel cycle lengths. Operating experience has shown that these components usually pass the SR when performed at the 18 month Frequency. Therefore, the Frequency was concluded to be acceptable from a reliability standpoint.

This SR is modified by two Notes. The reason for Note 1 is to minimize wear and tear on the EDGs during testing. For the purpose of this testing, the EDGs must be started from standby conditions, that is, with the engine coolant and oil continuously circulated and temperature maintained consistent with manufacturer recommendations. The reason for Note 2 is that during operation with the reactor critical, performance of this Surveillance could cause perturbations to the electrical distribution systems that could challenge continued steady state operation and, as a result, unit safety systems. This restriction from normally performing the Surveillance in MODE 1 or 2 is further amplified to allow portions of the Surveillance to be performed for the purpose of reestablishing OPERABILITY (e.g., post work testing following corrective maintenance, corrective

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.1.11 (continued)

modification, deficient or incomplete surveillance testing, and other unanticipated OPERABILITY concerns) provided an assessment determines unit safety is maintained or enhanced. This assessment shall, as a minimum, consider the potential outcomes and transients associated with a failed partial Surveillance, a successful partial Surveillance, and a perturbation of the offsite or onsite system when they are tied together or operated independently for the partial Surveillance; as well as the operator procedures available to cope with these outcomes. These shall be measured against the avoided risk of the unit shutdown and startup to determine that unit safety is maintained or enhanced when portions of the Surveillance are performed in MODE 1 or 2. Risk insights or deterministic methods may be used for this assessment.

SR 3.8.1.12

This Surveillance demonstrates that EDG noncritical protective functions (e.g., high jacket water temperature) are bypassed on actual or simulated signals from an ESF actuation, a loss of voltage, or a loss of voltage signal concurrent with an ESF actuation test signal, and critical protective functions (engine overspeed and generator differential current) trip the EDG to avert substantial damage to the EDG unit. The noncritical trips are bypassed during DBAs and provide an alarm on an abnormal engine condition. This alarm provides the operator with sufficient time to react appropriately. The EDG availability to mitigate the DBA is more critical than protecting the engine against minor problems that are not immediately detrimental to emergency operation of the EDG.

The 18 month Frequency is based on engineering judgment, taking into consideration unit conditions required to perform the Surveillance, and is intended to be consistent with expected fuel cycle lengths. Operating experience has shown that these components usually pass the SR when performed at the 18 month Frequency. Therefore, the Frequency was concluded to be acceptable from a reliability standpoint.

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.8.1.13

Regulatory Guide 1.108 (Ref. 8), paragraph 2.a.(3), provides an acceptable method to demonstrate once per 18 months that the EDGs can start and run continuously at full load capability for an interval of not less than 24 hours, ≥ 2 hours of which is at a load equivalent from 105% to 110% of the continuous duty rating and the remainder of the time at a load equivalent from 90% to 100% of the continuous duty rating of the EDG. The EDG starts for this Surveillance can be performed either from standby or hot conditions. The provisions for prelubricating and warmup, discussed in SR 3.8.1.2, and for gradual loading, discussed in SR 3.8.1.3, are applicable to this SR.

The load band is provided to avoid routine overloading of the EDG. Routine overloading may result in more frequent teardown inspections in accordance with vendor recommendations in order to maintain EDG OPERABILITY.

The 18 month Frequency is consistent with the recommendations of Regulatory Guide 1.108 (Ref. 8), paragraph 2.a.(3), takes into consideration unit conditions required to perform the Surveillance, and is intended to be consistent with expected fuel cycle lengths.

This Surveillance is modified by two Notes. Note 1 states that momentary transients due to changing bus loads do not invalidate this test. Similarly, momentary power factor transients above the power factor limit will not invalidate the test. Note 2 ensures that the EDG is tested under load conditions that are as close to design basis conditions as possible. When synchronized with offsite power, testing should be performed at a power factor of ≤0.9. This power factor is representative of the actual inductive loading an EDG would see under design basis accident conditions. Under certain conditions, however, Note 2 allows the surveillance to be conducted at a power factor other than ≤0.9. These conditions occur when grid voltage is high, and the additional field excitation needed to get the power factor to ≤0.9 results in voltages on the emergency busses that are too high. Under these conditions, the power factor should be maintained as close as practicable to 0.9 while still maintaining acceptable voltage limits on the emergency busses. In other circumstances, the grid voltage may be such that the EDG excitation levels needed to obtain a power factor of 0.9 may not cause unacceptable voltages on the

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.1.13 (continued)

emergency busses, but the excitation levels are in excess of those recommended for the EDG. In such cases, the power factor shall be maintained as close as practicable to 0.9 without exceeding the EDG excitation limits.

SR 3.8.1.14

This Surveillance demonstrates that the diesel engine can restart from a hot condition, such as subsequent to shutdown from normal Surveillances, and achieve the required voltage and frequency within 10 seconds. The 10 second time is derived from the requirements of the accident analysis to respond to a design basis large break LOCA. The 18 month Frequency is consistent with the recommendations of Regulatory Guide 1.108 (Ref. 8), paragraph 2.a.(5).

This SR is modified by two Notes. Note 1 ensures that the test is performed with the diesel sufficiently hot. The load band is provided to avoid routine overloading of the EDG. Routine overloads may result in more frequent teardown inspections in accordance with vendor recommendations in order to maintain EDG OPERABILITY. The requirement that the diesel has operated for at least 2 hours at full load conditions, or after operating temperatures reach a stabilized state, prior to performance of this Surveillance is based on manufacturer recommendations for achieving hot conditions. Momentary transients due to changing bus loads do not invalidate this test. Note 2 allows all EDG starts to be preceded by an engine prelube period to minimize wear and tear on the diesel during testing.

SR 3.8.1.15

As required by Regulatory Guide 1.108 (Ref. 8), paragraph 2.a.(6), this Surveillance ensures that the manual synchronization and automatic load transfer from the EDG to the offsite source can be made and the EDG can be returned to ready to load status when offsite power is restored. It also ensures that the autostart logic is reset to allow the EDG to reload if a subsequent loss of offsite power occurs. The EDG is considered to be in ready to load status when the EDG is at rated speed and voltage, the output breaker is open and can receive an autoclose signal on bus undervoltage, and the load sequencing timing relays are reset. EDG loading of the emergency bus is limited to normal energized loads.

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.1.15 (continued)

The Frequency of 18 months is consistent with the recommendations of Regulatory Guide 1.108 (Ref. 8), paragraph 2.a.(6), and takes into consideration unit conditions required to perform the Surveillance.

This SR is modified by a Note. The reason for the Note is that performing the Surveillance would remove a required offsite circuit from service, perturb the electrical distribution system, and challenge safety systems. This restriction from normally performing the Surveillance in MODE 1, 2, 3, or 4 is further amplified to allow the Surveillance to be performed for the purpose of reestablishing OPERABILITY (e.g., post work testing following corrective maintenance, corrective modification, deficient or incomplete surveillance testing, and other unanticipated OPERABILITY concerns) provided an assessment determines unit safety is maintained or enhanced. This assessment shall, as a minimum, consider the potential outcomes and transients associated with a failed Surveillance, a successful Surveillance, and a perturbation of the offsite or onsite system when they are tied together or operated independently for the Surveillance; as well as the operator procedures available to cope with these outcomes. These shall be measured against the avoided risk of the unit shutdown and startup to determine that unit safety is maintained or enhanced when the Surveillance are performed in MODE 1, 2, 3, or 4. Risk insights or deterministic methods may be used for this assessment.

SR 3.8.1.16

Under accident conditions, loads are sequentially connected to the bus by the automatic load sequencing timing relays. The sequencing timing relays control the permissive and starting signals to motor breakers to prevent overloading of the EDGs due to high motor starting currents. The load sequence time interval tolerances, listed in the Technical Requirements Manual (Ref. 12), ensure that sufficient time exists for the EDG to restore frequency and voltage prior to applying the next load and that safety analysis assumptions regarding ESF equipment time delays are not violated. Reference 2 provides a summary of the automatic loading of ESF buses.

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.1.16 (continued)

The Frequency of 18 months is consistent with the recommendations of Regulatory Guide 1.108 (Ref. 8), paragraph 2.a.(2), takes into consideration unit conditions required to perform the Surveillance, and is intended to be consistent with expected fuel cycle lengths.

This SR is modified by a Note. The reason for the Note is that performing the Surveillance would remove a required offsite circuit from service, perturb the electrical distribution system, and challenge safety systems. This restriction from normally performing the Surveillance in MODE 1, 2, 3, or 4 is further amplified to allow the Surveillance to be performed for the purpose of reestablishing OPERABILITY (e.g., post work testing following corrective maintenance, corrective modification, deficient or incomplete surveillance testing, and other unanticipated OPERABILITY concerns) provided an assessment determines unit safety is maintained or enhanced. This assessment shall, as a minimum, consider the potential outcomes and transients associated with a failed Surveillance, a successful Surveillance, and a perturbation of the offsite or onsite system when they are tied together or operated independently for the Surveillance; as well as the operator procedures available to cope with these outcomes. These shall be measured against the avoided risk of the unit shutdown and startup to determine that unit safety is maintained or enhanced when the Surveillance are performed in MODE 1, 2, 3, or 4. Risk insights or deterministic methods may be used for this assessment.

SR 3.8.1.17

In the event of a DBA coincident with a loss of offsite power, the EDGs are required to supply the necessary power to ESF systems so that the fuel, RCS, and containment design limits are not exceeded.

This Surveillance demonstrates the EDG operation, as discussed in the Bases for SR 3.8.1.10, during a loss of offsite power actuation test signal in conjunction with an ESF actuation signal. In lieu of actual demonstration of connection and loading of loads, testing that adequately shows the capability of the EDG system to perform these

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.1.17 (continued)

functions is acceptable. This testing may include any series of sequential, overlapping, or total steps so that the entire connection and loading sequence is verified.

The Frequency of 18 months takes into consideration unit conditions required to perform the Surveillance and is intended to be consistent with an expected fuel cycle length of 18 months.

This SR is modified by two Notes. The reason for Note 1 is to minimize wear and tear on the EDGs during testing. For the purpose of this testing, the EDGs must be started from standby conditions, that is, with the engine coolant and oil continuously circulated and temperature maintained consistent with manufacturer recommendations for EDGs. The reason for Note 2 is that the performance of the Surveillance would remove a required offsite circuit from service, perturb the electrical distribution system, and challenge safety systems. This restriction from normally performing the Surveillance in MODE 1, 2, 3, or 4 is further amplified to allow portions of the Surveillance to be performed for the purpose of reestablishing OPERABILITY (e.g., post work testing following corrective maintenance, corrective modification, deficient or incomplete surveillance testing, and other unanticipated OPERABILITY concerns) provided an assessment determines unit safety is maintained or enhanced. This assessment shall, as a minimum, consider the potential outcomes and transients associated with a failed partial Surveillance, a successful partial Surveillance, and a perturbation of the offsite or onsite system when they are tied together or operated independently for the partial Surveillance; as well as the operator procedures available to cope with these outcomes. These shall be measured against the avoided risk of the unit shutdown and startup to determine that unit safety is maintained or enhanced when portions of the Surveillance are performed in MODE 1, 2, 3, or 4. Risk insights or deterministic methods may be used for this assessment.

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.8.1.18

This Surveillance demonstrates that the EDG starting independence has not been compromised. Also, this Surveillance demonstrates that each engine can achieve proper speed within the specified time when the EDGs are started simultaneously.

The 10 year Frequency is consistent with the recommendations of Regulatory Guide 1.108 (Ref. 8).

This SR is modified by a Note. The reason for the Note is to minimize wear on the EDG during testing. For the purpose of this testing, the EDGs must be started from standby conditions, that is, with the engine coolant and oil continuously circulated and temperature maintained consistent with manufacturer recommendations.

REFERENCES

1. UFSAR, Chapter 3.
2. UFSAR, Chapter 8.
3. Safety Guide 9, March 1971.
4. UFSAR, Chapter 6.
5. UFSAR, Chapter 15.
6. Regulatory Guide 1.93, Rev. 0, December 1974.
7. Generic Letter 84-15, "Proposed Staff Actions to Improve and Maintain Diesel Generator Reliability," July 2, 1984.
8. Regulatory Guide 1.108, Rev. 1, August 1977.
9. Regulatory Guide 1.137, Rev. 1, October 1979.
10. ASME, Boiler and Pressure Vessel Code, Section XI.
11. IEEE Standard 308-1971.
12. Technical Requirements Manual.

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B 3.8 ELECTRICAL POWER SYSTEMS

B 3.8.2 AC Sources–Shutdown

BASES

BACKGROUND

A description of the AC sources is provided in the Bases for LCO 3.8.1, "AC Sources–Operating."

APPLICABLE SAFETY ANALYSES

The OPERABILITY of the minimum AC sources during MODES 5 and 6 and during movement of recently irradiated fuel assemblies ensures that:

a. The unit can be maintained in the shutdown or refueling condition for extended periods;

b. Sufficient instrumentation and control capability is available for monitoring and maintaining the unit status; and

c. Adequate AC electrical power is provided to mitigate events postulated during shutdown, such as a fuel handling accident involving handling recently irradiated fuel. Due to radioactive decay, AC electrical power is only required to mitigate fuel handling accident involving handling recently irradiated fuel. (i.e., fuel that has occupied part of a critical reactor core within a time frame established by analysis. The term recently is defined as all irradiated fuel assemblies, until analysis is performed to determine a specific time frame.)

In general, when the unit is shut down, the Technical Specifications requirements ensure that the unit has the capability to mitigate the consequences of postulated accidents. However, assuming a single failure and concurrent loss of all offsite or all onsite power is not required. The rationale for this is based on the fact that many Design Basis Accidents (DBAs) that are analyzed in MODES 1, 2, 3, and 4 have no specific analyses in MODES 5 and 6. Worst case bounding events are deemed not credible in MODES 5 and 6 because the energy contained within the reactor pressure boundary, reactor coolant temperature and pressure, and the corresponding stresses result in the probabilities of occurrence being significantly reduced or eliminated, and in

(continued)

BASES

APPLICABLE SAFETY ANALYSES (continued)

minimal consequences. These deviations from DBA analysis assumptions and design requirements during shutdown conditions are allowed by the LCO for required systems.

During MODES 1, 2, 3, and 4, various deviations from the analysis assumptions and design requirements are allowed within the Required Actions. This allowance is in recognition that certain testing and maintenance activities must be conducted provided an acceptable level of risk is not exceeded. During MODES 5 and 6, performance of a significant number of required testing and maintenance activities is also required. In MODES 5 and 6, the activities are generally planned and administratively controlled. Relaxations from MODE 1, 2, 3, and 4 LCO requirements are acceptable during shutdown modes based on:

a. The fact that time in an outage is limited. This is a risk prudent goal as well as a utility economic consideration.

b. Requiring appropriate compensatory measures for certain conditions. These may include administrative controls, reliance on systems that do not necessarily meet typical design requirements applied to systems credited in operating MODE analyses, or both.

c. Prudent utility consideration of the risk associated with multiple activities that could affect multiple systems.

d. Maintaining, to the extent practical, the ability to perform required functions (even if not meeting MODE 1, 2, 3, and 4 OPERABILITY requirements) with systems assumed to function during an event.

In the event of an accident during shutdown, this LCO ensures the capability to support systems necessary to avoid immediate difficulty, assuming either a loss of all offsite power or a loss of all onsite emergency diesel generator (EDG) power.

The AC sources satisfy Criterion 3 of 10 CFR 50.36(c)(2)(ii).

LCO

One offsite circuit capable of supplying the onsite Class 1E power distribution subsystem(s) of LCO 3.8.10, "Distribution Systems–Shutdown," ensures that all required loads are

(continued)

BASES

LCO (continued)

powered from offsite power. An OPERABLE EDG, associated with the distribution system trains required to be OPERABLE by LCO 3.8.10, ensures a diverse power source is available to provide electrical power support, assuming a loss of the offsite circuit. Together, OPERABILITY of the required offsite circuit and EDG ensures the availability of sufficient AC sources to operate the unit in a safe manner and to mitigate the consequences of postulated events during shutdown (e.g., fuel handling accidents involving handling recently irradiated fuel).

Offsite circuits consist of the 34.5 kV buses supplying the Reserve Station Service Transformer(s) (RSST) which feed the transfer buses. The D, E, and F transfer buses supply the onsite electrical power to the four emergency buses for the two units. Unit 1 emergency bus H is fed through the F transfer bus from the C RSST that is supplied from 34.5 kV bus #3. Unit 1 emergency bus J is fed through the D transfer bus from the A RSST that is fed from 34.5 kV bus #4. Unit 1 station service bus 1B can be an alternate feed for Unit 1 H emergency bus, while Unit 1 J emergency bus may be fed from Unit 2 station service bus 2B. Unit 2 emergency bus H is fed through the E transfer bus from the B RSST and it is fed from 34.5 kV bus #4. Unit 2 emergency bus J is fed through the F transfer bus from the C RSST that is fed from 34.5 kV bus #3. This arrangement provides a separation of the offsite circuits by one 34.5 kV (bus #4) supplying the A and B RSSTs and the other offsite circuit being supplied from 34.5 kV (bus #3) supplying the C RSST.

It is acceptable for trains to be cross tied during shutdown conditions, allowing a single offsite power circuit to supply all required trains.

APPLICABILITY

The AC sources required to be OPERABLE in MODES 5 and 6 and during movement of recently irradiated fuel assemblies provide assurance that:

a. Systems to provide adequate coolant inventory makeup are available for the irradiated fuel assemblies in the core;

(continued)

BASES

APPLICABILITY (continued)

b. Systems needed to mitigate a fuel handling accident involving handling recently irradiated fuel (i.e., fuel that has occupied part of a critical reactor core within a time frame established by analysis. The term recently is defined as all irradiated fuel assemblies, until analysis is performed to determine a specific time frame.) are available;

c. Systems necessary to mitigate the effects of events that can lead to core damage during shutdown are available; and

d. Instrumentation and control capability is available for monitoring and maintaining the unit in a cold shutdown condition or refueling condition.

The AC power requirements for MODES 1, 2, 3, and 4 are covered in LCO 3.8.1.

ACTIONS

A.1

An offsite circuit would be considered inoperable if it were not available to the necessary portions of the electrical power distribution subsystem(s). One train with offsite power available may be capable of supporting sufficient required features to allow continuation of CORE ALTERATIONS and recently irradiated fuel movement. By the allowance of the option to declare required features inoperable, with no offsite power available, appropriate restrictions will be implemented in accordance with the affected required features LCO's ACTIONS.

A.2.1, A.2.2, A.2.3, A.2.4, B.1, B.2, B.3, and B.4

With the offsite circuit not available to all required trains, the option would still exist to declare all required features inoperable. Since this option may involve undesired administrative efforts, the allowance for sufficiently conservative actions is made. With the required EDG inoperable, the minimum required diversity of AC power sources is not available. It is, therefore, required to suspend CORE ALTERATIONS, movement of recently irradiated fuel assemblies, and operations involving positive reactivity additions that could result in loss of required SDM (MODE 5) or boron concentration (MODE 6). Suspending

(continued)

BASES

ACTIONS

A.2.1, A.2.2, A.2.3, A.2.4, B.1, B.2, B.3, and B.4 (continued)

positive reactivity additions that could result in failure to meet the minimum SDM or boron concentration limit is required to assure continued safe operation. Introduction of coolant inventory must be from sources that have a boron concentration greater than what would be required in the RCS for minimum SDM or refueling boron concentration. This may result in an overall reduction in RCS boron concentration, but provides acceptable margin to maintaining subcritical operation. Introduction of temperature changes including temperature increases when operating with a positive MTC must also be evaluated to ensure they do not result in a loss of required SDM.

Suspension of these activities does not preclude completion of actions to establish a safe conservative condition. These actions minimize the probability or the occurrence of postulated events. It is further required to immediately initiate action to restore the required AC sources and to continue this action until restoration is accomplished in order to provide the necessary AC power to the unit safety systems.

The Completion Time of immediately is consistent with the required times for actions requiring prompt attention. The restoration of the required AC electrical power sources should be completed as quickly as possible in order to minimize the time during which the unit safety systems may be without sufficient power.

Pursuant to LCO 3.0.6, the Distribution System's ACTIONS would not be entered even if all AC sources to it are inoperable, resulting in de-energization. Therefore, the Required Actions of Condition A are modified by a Note to indicate that when Condition A is entered with no AC power to any required ESF bus, the ACTIONS for LCO 3.8.10 must be immediately entered. This Note allows Condition A to provide requirements for the loss of the offsite circuit, whether or not a train is de-energized. LCO 3.8.10 would provide the appropriate restrictions for the situation involving a de-energized train.

BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.2.1

SR 3.8.2.1 requires the SRs from LCO 3.8.1 that are necessary for ensuring the OPERABILITY of the AC sources in other than MODES 1, 2, 3, and 4. SR 3.8.1.8 is not required to be met since only one offsite circuit is required to be OPERABLE. SR 3.8.1.10, SR 3.8.1.11, SR 3.8.1.12, SR 3.8.1.16, and SR 3.8.1.17 are not required because the ESF actuation signals are not required to be OPERABLE. These SRs are not required to be met because the required OPERABLE EDG and sequencing timing relays are not required to be OPERABLE because no ESF loads are assumed to be powered from the emergency bus by the safety analyses. SR 3.8.1.18 is excepted because starting independence is not required with the EDG(s) that is not required to be OPERABLE.

This SR is modified by a Note. The reason for this Note is to preclude requiring the required OPERABLE EDG(s) from being paralleled with the offsite power network or otherwise rendered inoperable during performance of SRs, and to preclude de-energizing a required 4160 V ESF bus or disconnecting a required offsite circuit during performance of SRs. With limited AC sources available, a single event could compromise both the required circuit and the EDG. It is the intent that these SRs must still be capable of being met, but actual performance is not required during periods when the EDG and offsite circuit is required to be OPERABLE. Refer to the corresponding Bases for LCO 3.8.1 for a discussion of each SR.

REFERENCES

None.

B 3.8 ELECTRICAL POWER SYSTEMS

B 3.8.3 Diesel Fuel Oil and Starting Air

BASES

BACKGROUND

The four Emergency Diesel Generators (EDGs) are provided with two storage tanks, each having a fuel oil capacity sufficient to operate an EDG for a period of 7 days while it is supplying maximum post loss of coolant accident load demand discussed in the UFSAR, Section 9.5.4.2 (Ref. 1). The maximum load demand is calculated using the assumption that a minimum of one EDG on a unit is available. This onsite fuel oil capacity is sufficient to operate the EDGs for longer than the time to replenish the onsite supply from outside sources.

Fuel oil is transferred from storage tank to day tank by either of two transfer pumps associated with each storage tank. Redundancy of pumps and piping precludes the failure of one pump, or the rupture of any pipe, valve or tank to result in the loss of more than one EDG. All outside tanks, pumps, and piping are located underground or in a missile protected area.

For proper operation of the standby EDGs, it is necessary to ensure the proper quality of the fuel oil. Regulatory Guide 1.137 (Ref. 2) addresses the recommended fuel oil practices as supplemented by ANSI N195 (Ref. 3). The fuel oil properties governed by these SRs are the water and sediment content, the kinematic viscosity, specific gravity (or API gravity), and impurity level.

Each EDG has an air start system that contains two separate and independent subsystems. Normally, each subsystem is aligned to provide starting air to the associated EDG. Each subsystem consists of a receiver and a compressor. Only one air start subsystem is required to be OPERABLE for the EDG to be considered OPERABLE.

APPLICABLE SAFETY ANALYSES

The initial conditions of Design Basis Accident (DBA) and transient analyses in the UFSAR, Chapter 6 (Ref. 4), and in the UFSAR, Chapter 15 (Ref. 5), assume Engineered Safety Feature (ESF) systems are OPERABLE. The EDGs are designed to provide sufficient capacity, capability, redundancy, and reliability to ensure the availability of necessary power to

(continued)

BASES

APPLICABLE SAFETY ANALYSES (continued)

ESF systems so that fuel, Reactor Coolant System and containment design limits are not exceeded. These limits are discussed in more detail in the Bases for Section 3.2, Power Distribution Limits; Section 3.4, Reactor Coolant System (RCS); and Section 3.6, Containment Systems.

Since diesel fuel oil and the air start subsystem support the operation of the standby AC power sources, they satisfy Criterion 3 of 10 CFR 50.36(c)(2)(ii).

LCO

Stored diesel fuel oil is required to have sufficient supply for 7 days of full load operation for one EDG. It is also required to meet specific standards for quality. This requirement, in conjunction with an ability to obtain replacement supplies within 2 days, supports the availability of EDGs required to shut down the reactor and to maintain it in a safe condition for an anticipated operational occurrence (AOO) or a postulated DBA with loss of offsite power. EDG day tank fuel requirements, as well as transfer capability from the storage tank to the day tank, are addressed in LCO 3.8.1, "AC Sources–Operating," and LCO 3.8.2, "AC Sources–Shutdown."

One air start subsystem is required to be OPERABLE to ensure EDG OPERABILITY. The required starting air subsystem receiver is required to have a minimum of 175 psig to provide the EDG with more than one start attempt without recharging the air start receivers.

APPLICABILITY

The AC sources (LCO 3.8.1 and LCO 3.8.2) are required to ensure the availability of the required power to shut down the reactor and maintain it in a safe shutdown condition after an AOO or a postulated DBA. Since stored diesel fuel oil and the starting air subsystem support LCO 3.8.1 and LCO 3.8.2, stored diesel fuel oil and starting air are required to be within limits when the associated EDG is required to be OPERABLE.

ACTIONS

The ACTIONS Table is modified by a Note indicating that separate Condition entry is allowed for each EDG. This is acceptable, since the Required Actions for each Condition provide appropriate compensatory actions for each inoperable EDG subsystem. Complying with the Required Actions for one inoperable EDG subsystem may allow for continued operation,

(continued)

BASES

ACTIONS (continued)

and subsequent inoperable EDG subsystem(s) are governed by separate Condition entry and application of associated Required Actions.

A.1, A.2, A.3, and A.4

In this Condition, the underground fuel oil storage tank is not within limits for the purpose of tank repair or inspection. Every ten years the fuel oil tank must be inspected for integrity under the requirements of ASME Code, Section XI. Because one tank is the source of fuel oil for all EDGs on both units, a dual unit outage would be required in order to provide the necessary time to complete the required maintenance or inspection. Prior to removal of the tank for repairs or inspection, verify 50,000 gallons of replacement fuel oil is available offsite and transportation is available to deliver that volume of fuel oil within 48 hours. Restrictions are placed on the remaining OPERABLE fuel oil storage tank and the 210,000-gallon above ground tank. The remaining OPERABLE fuel oil storage tank supplies fuel oil to the redundant EDGs of both units. Under this Condition, verification of the redundant fuel oil tank is required to confirm the required minimum amount of diesel fuel oil. In addition, the above ground tank, used to supply make up to the underground tanks, is required to be verified to contain the minimum level corresponding to 100,000 gallons. Verifications of onsite fuel oil are required on a 12 hour frequency to ensure an adequate source of fuel oil to the EDGs remains available. The inoperable underground fuel oil tank must be restored within limits in 7 days. This time is considered reasonable based on the required maintenance and the requirements provided by the Required Actions.

B.1 and B.2

With the Required Actions and associated Completion Times for Condition A not met, then the unit must be brought to a MODE in which the LCO does not apply. To achieve this status, the unit must be brought to at least MODE 3 within 6 hours and MODE 5 within 36 hours. The allowed Completion Times are reasonable based on operating experience, to reach the required conditions from full power conditions in an orderly manner and without challenging unit systems.

BASES

ACTIONS (continued)

C.1

In this Condition, the 7 day fuel oil supply for an EDG is not available. The EDG fuel oil transfer pumps are aligned so that the lead pump for each EDG takes suction on the 'A' tank. The backup pumps are aligned to take suction on the 'B' tank. However, the Condition is restricted to fuel oil level reductions that maintain at least a 6 day supply. These circumstances may be caused by events, such as full load operation required after an inadvertent start while at minimum required level, or feed and bleed operations, which may be necessitated by increasing particulate levels or any number of other oil quality degradations. This restriction allows sufficient time for obtaining the requisite replacement volume and performing the analyses required prior to addition of fuel oil to the tank. A period of 48 hours is considered sufficient to complete restoration of the required level prior to declaring the EDG inoperable. This period is acceptable based on the remaining capacity (> 6 days), the fact that procedures will be initiated to obtain replenishment, and the low probability of an event during this brief period. This Condition applies for reasons other than Condition A.

D.1

This Condition is entered as a result of a failure to meet the acceptance criterion of SR 3.8.3.2. Normally, trending of particulate levels allows sufficient time to correct high particulate levels prior to reaching the limit of acceptability. Poor sample procedures (bottom sampling), contaminated sampling equipment, and errors in laboratory analysis can produce failures that do not follow a trend. Since the presence of particulates does not mean failure of the fuel oil to burn properly in the diesel engine, and particulate concentration is unlikely to change significantly between Surveillance Frequency intervals, and proper engine performance has been recently demonstrated (within 31 days), it is prudent to allow a brief period prior to declaring the associated EDG inoperable. The 7 day Completion Time allows for further evaluation, resampling and re-analysis of the EDG fuel oil stored in the below ground tanks.

BASES

ACTIONS (continued)

E.1

With the fuel oil properties of the below ground tank defined in the Bases for SR 3.8.3.2 not within the required limits, a period of 30 days is allowed for restoring the stored fuel oil properties. This period provides sufficient time to test the stored fuel oil ensuring it remains acceptable or to restore the stored fuel oil properties. This restoration may involve feed and bleed procedures, filtering, or combinations of these procedures. Even if an EDG start and load was required during this time interval and the fuel oil properties were outside limits, there is a high likelihood that the EDG would still be capable of performing its intended function.

F.1

With the one required starting air receiver pressure < 175 psig, sufficient capacity for several EDG start attempts does not exist. However, as long as the receiver pressure is > 150 psig, there is adequate capacity for at least one start attempt, and the EDG can be considered OPERABLE while the air receiver pressure is restored to the required limit. A period of 48 hours is considered sufficient to complete restoration to the required pressure prior to declaring the EDG inoperable. This period is acceptable based on the remaining air start capacity, the fact that most EDG starts are accomplished on the first attempt, and the low probability of an event during this brief period.

G.1

With a Required Action and associated Completion Time not met, or one or more EDG's fuel oil or the required starting air subsystem not within limits for reasons other than addressed by Conditions C, D, E, or F, the associated EDG may be incapable of performing its intended function and must be immediately declared inoperable. Only one starting air subsystem is required to be OPERABLE.

BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.3.1

This SR provides verification that there is an adequate inventory of fuel oil in the storage tanks to support one EDG's operation for 7 days at full load. The 7 day period is sufficient time to place the unit in a safe shutdown condition and to bring in replenishment fuel from an offsite location.

The 31 day Frequency is adequate to ensure that a sufficient supply of fuel oil is available, since low level alarms are provided and unit operators would be aware of any large uses of fuel oil during this period.

SR 3.8.3.2

The tests listed below are a means of determining whether new fuel oil is of the appropriate grade and has not been contaminated with substances that would have an immediate, detrimental impact on diesel engine combustion. If results from these tests are within acceptable limits, the fuel oil may be added to the storage tanks without concern for contaminating the entire volume of fuel oil in the storage tanks. These tests are to be conducted prior to adding the new fuel to the storage tank(s), but in no case is the time between receipt of new fuel and conducting the tests to exceed 31 days. The tests, limits, and applicable ASTM Standards are as follows:

a. Sample the new fuel oil in accordance with ASTM D4057-88 (Ref. 6);

b. Verify in accordance with the tests specified in ASTM D975-83 (Ref. 6) that the sample has an absolute specific gravity at 60/60°F of ≥ 0.83 and ≤0.89 or an API gravity at 60°F of ≥ 27° and ≤39°, a kinematic viscosity at 100°F of ≥ 1.9 centistokes and ≤4.1 centistokes, and a flash point of ≥ 125°F; and

c. Verify that the new fuel oil is checked for water and sediment in accordance with the Diesel Fuel Oil Testing Program.

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.3.2 (continued)

Failure to meet any of the above limits is cause for rejecting the new fuel oil, but does not represent a failure to meet the LCO concern since the fuel oil is not added to the storage tanks.

Within 31 days following the initial new fuel oil sample, the fuel oil is analyzed to establish that the other properties specified in Table 1 of ASTM D975-89a (Ref. 7) are met for new fuel oil when tested in accordance with ASTM D975-83 (Ref. 6), except that the analysis for sulfur may be performed in accordance with ASTM D1552-88 (Ref. 6) or ASTM D2622-82 (Ref. 6). The 31 day period is acceptable because the fuel oil properties of interest, even if they were not within stated limits, would not have an immediate effect on EDG operation. This Surveillance ensures the availability of high quality fuel oil for the EDGs.

Fuel oil degradation during long term storage shows up as an increase in particulate, due mostly to oxidation. The presence of particulate does not mean the fuel oil will not burn properly in a diesel engine. The particulate can cause fouling of filters and fuel oil injection equipment, however, which can cause engine failure.

Particulate concentrations should be determined in accordance with ASTM D2276-83, Method A (Ref. 6). This method involves a gravimetric determination of total particulate concentration in the fuel oil and has a limit of 10 mg/l. It is acceptable to obtain a field sample for subsequent laboratory testing in lieu of field testing. Each tank is considered and tested separately.

The Frequency of this test takes into consideration fuel oil degradation trends that indicate that particulate concentration is unlikely to change significantly between Frequency intervals.

SR 3.8.3.3

This Surveillance ensures that, without the aid of the refill compressor, sufficient air start capacity for each EDG is available. The system design requirements were verified for a minimum of five engine start cycles without recharging. A start cycle is measured in terms of time (seconds of cranking). One air start subsystem is

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.3.3 (continued)

adequate to start the EDG with a minimum pressure ≥ 150 psig. The pressure specified in this SR is intended to reflect the lowest value at which more than one start can be accomplished.

The 31 day Frequency takes into account the capacity, capability, redundancy, and diversity of the AC sources and other indications available in the control room, including alarms, to alert the operator to below normal air start pressure.

SR 3.8.3.4

Microbiological fouling is a major cause of fuel oil degradation. There are numerous bacteria that can grow in fuel oil and cause fouling, but all must have a water environment in order to survive. Removal of water from the fuel storage tanks once every 92 days eliminates the necessary environment for bacterial survival. This is the most effective means of controlling microbiological fouling. In addition, it eliminates the potential for water entrainment in the fuel oil during EDG operation. Water may come from any of several sources, including condensation, ground water, rain water, and contaminated fuel oil, and from breakdown of the fuel oil by bacteria. Frequent checking for and removal of accumulated water minimizes fouling and provides data regarding the watertight integrity of the fuel oil system. The Surveillance Frequencies are established by Regulatory Guide 1.137 (Ref. 2). This SR is for preventive maintenance. The presence of water does not necessarily represent failure of this SR, provided the accumulated water is removed during performance of the Surveillance.

REFERENCES

1. UFSAR, Section 9.5.4.2.

2. Regulatory Guide 1.137.

3. ANSI N195-1976, Appendix B.

4. UFSAR, Chapter 6.

5. UFSAR, Chapter 15.

BASES

REFERENCES (continued)

6. ASTM Standards: D4057-88; D975-83; D4176-86; D1552-88; D2622-82; D2276, Method A.

7. ASTM Standards, D975, Table 1, 1974.

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B 3.8 ELECTRICAL POWER SYSTEMS

B 3.8.4 DC Sources—Operating

BASES

BACKGROUND

The station DC electrical power system provides the AC emergency power system with control power. It also provides both motive and control power to selected safety related equipment and preferred AC vital bus power (via inverters). As required by GDC 17 (Ref. 1), the DC electrical power system is designed to have sufficient independence, redundancy, and testability to perform its safety functions, assuming a single failure. The DC electrical power system also conforms to the recommendations of Safety Guide 6 (Ref. 2) and IEEE-308 (Ref. 3).

The 125 VDC electrical power system consists of two independent and redundant safety related Class 1E DC electrical power subsystems (Train H and Train J). Each subsystem consists of two 125 VDC batteries, the associated battery charger(s) for each battery, and all the associated control equipment and interconnecting cabling. A spare battery charger is installed on each train and can be substituted for either of the train's chargers.

During normal operation, the 125 VDC load is powered from the battery chargers with the batteries floating on the system. In case of loss of normal power to the battery charger, the DC load is automatically powered from the station batteries.

The Train H and Train J DC electrical power subsystems provide the control power for its associated Class 1E AC power load group, 4.16 kV switchgear, and 480 V load centers. The DC electrical power subsystems also provide DC electrical power to the inverters, which in turn power the AC vital buses.

The DC power distribution system is described in more detail in Bases for LCO 3.8.9, "Distribution Systems—Operating," and LCO 3.8.10, "Distribution Systems—Shutdown."

Each battery has adequate storage capacity to carry the required load continuously for at least 2 hours.

(continued)

BASES

BACKGROUND (continued)

Each 125 VDC battery is separately housed in a ventilated room apart from its charger and distribution centers. Each subsystem is located in an area separated physically and electrically from the other subsystem to ensure that a single failure in one subsystem does not cause a failure in a redundant subsystem. There is no sharing between redundant Class 1E subsystems, such as batteries, battery chargers, or distribution panels.

The criteria for sizing large lead storage batteries are defined in IEEE-485 (Ref. 5).

Each Train H and Train J DC electrical power subsystem has ample power output capacity for the steady state operation of connected loads required during normal operation, while at the same time maintaining its battery bank fully charged. Each battery charger also has sufficient capacity to restore the battery from the design minimum charge to its fully charged state within 24 hours while supplying normal steady state loads discussed in the UFSAR, Chapter 8 (Ref. 4).

The EDG DC electrical power system consists of the battery, battery charger, and interconnecting cabling to supply the required DC voltage to allow the associated EDG components to perform the required safety function.

For the other unit, control power for breakers and electrical power for solenoid operated valves that are needed to support operation of each required Service Water (SW) pump, Main Control Room (MCR)/Emergency Switchgear Room (ESGR) Emergency Ventilation System (EVS) fan, and Auxiliary Building central exhaust fan. SW, MCR/ESGR EVS, and Auxiliary Building central exhaust system are shared systems.

APPLICABLE SAFETY ANALYSES

The initial conditions of Design Basis Accident (DBA) and transient analyses in the UFSAR, Chapter 6 (Ref. 6), and in the UFSAR, Chapter 15 (Ref. 7), assume that Engineered Safety Feature (ESF) systems are OPERABLE. The DC electrical power system provides normal and emergency DC electrical power for the emergency auxiliaries and control and switching during all MODES of operation.

(continued)

BASES

APPLICABLE SAFETY ANALYSES (continued)

The OPERABILITY of the DC sources is consistent with the initial assumptions of the accident analyses and is based upon meeting the design basis of the unit. This includes maintaining the DC sources OPERABLE during accident conditions in the event of:

a. An assumed loss of all offsite AC power or all onsite AC power; and

b. A worst case single failure.

The OPERABILITY of the EDG DC electrical power system ensures the EDG may perform its required safety function.

The DC sources satisfy Criterion 3 of 10 CFR 50.36(c)(2)(ii).

LCO

The DC electrical power subsystems, each subsystem consisting of two batteries, battery charger for each battery and the corresponding control equipment and interconnecting cabling supplying power to the associated bus within the train are required to be OPERABLE to ensure the availability of the required power to shut down the reactor and maintain it in a safe condition after an anticipated operational occurrence (AOO) or a postulated DBA. Loss of any train DC electrical power subsystem does not prevent the minimum safety function from being performed (Ref. 4).

The EDG DC electrical power system consists of the battery, battery charger, and interconnecting cabling to supply the required DC voltage to allow the associated EDG components to perform the required safety function.

An OPERABLE DC electrical power subsystem requires all required batteries and respective chargers to be operating and connected to the associated DC bus(es).

BASES

APPLICABILITY

The DC electrical power sources are required to be OPERABLE in MODES 1, 2, 3, and 4 to ensure safe unit operation and to ensure that:

a. Acceptable fuel design limits and reactor coolant pressure boundary limits are not exceeded as a result of AOOs or abnormal transients; and

b. Adequate core cooling is provided, and containment integrity and other vital functions are maintained in the event of a postulated DBA.

The EDG DC system is required to be OPERABLE in MODES 1, 2, 3, and 4 to ensure the OPERABILITY of the associated EDG in accordance with LCO 3.8.1. In MODES 5 or 6, the OPERABILITY requirements of the EDG DC system are determined by the EDGs that they support in accordance with LCO 3.8.2.

The DC electrical power requirements for MODES 5 and 6 are addressed in the Bases for LCO 3.8.5, "DC Sources—Shutdown."

ACTIONS

A.1

Condition A represents one train with a loss of ability to completely respond to an event, and a potential loss of ability to remain energized during normal operation. It is, therefore, imperative that the operator's attention focus on stabilizing the unit, minimizing the potential for complete loss of DC power to the affected train. The 2 hour limit is consistent with the allowed time for an inoperable DC distribution system train.

If one of the required LCO 3.8.4.a DC electrical power subsystems is inoperable (e.g., inoperable battery, inoperable battery charger(s), or inoperable battery charger and associated inoperable battery), the remaining LCO 3.8.4.a DC electrical power subsystem has the capacity to support a safe shutdown and to mitigate an accident condition. For the Station batteries, a spare battery charger may be substituted for the normal charger without entry into Condition A. Since a subsequent worst case single failure would, however, result in the complete loss of the remaining 125 VDC electrical power subsystems with attendant loss of ESF functions, continued power operation should not exceed 2 hours. The 2 hour Completion Time is based on

(continued)

BASES

ACTIONS

A.1 (continued)

Regulatory Guide 1.93 (Ref. 8) and reflects a reasonable time to assess unit status as a function of the inoperable DC electrical power subsystem and, if the DC electrical power subsystem is not restored to OPERABLE status, to prepare to effect an orderly and safe unit shutdown.

B.1 and B.2

If the inoperable DC electrical power subsystem cannot be restored to OPERABLE status within the required Completion Time, the unit must be brought to a MODE in which the LCO does not apply. To achieve this status, the unit must be brought to at least MODE 3 within 6 hours and to MODE 5 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging plant systems. The Completion Time to bring the unit to MODE 5 is consistent with the time required in Regulatory Guide 1.93 (Ref. 8).

C.1

Condition C represents the loss of the ability of the EDG DC system (e.g., inoperable battery charger or inoperable battery) to supply necessary power to the associated EDG. In this condition, the associated EDG is immediately declared inoperable and the associated Conditions or Required Actions of LCO 3.8.1 are followed.

D.1

Condition D represents the loss of one or more required LCO 3.8.4.c DC electrical power subsystem(s) needed to support the operation of required shared components on the other unit. SW, MCR/ESGR EVS, and Auxiliary Building central exhaust system are shared systems. In this condition, the associated required shared components are declared inoperable immediately. The associated Conditions or Required Actions of LCO 3.7.8, "Service Water System," LCO 3.7.10, "MCR/ESGR Emergency Ventilation Systems," and LCO 3.7.12, "Emergency Core Cooling System Pump Room Exhaust Air Cleanup System," are followed.

BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.4.1

For Station and EDG batteries, verifying battery terminal voltage while on float charge for the batteries helps to ensure the effectiveness of the charging system and the ability of the batteries to perform their intended function. Float charge is the condition in which the charger is supplying the continuous charge required to overcome the internal losses of a battery (or battery cell) and maintain the battery (or a battery cell) in a fully charged state. The voltage requirements are based on the nominal design voltage of the battery and are consistent with the initial voltages assumed in the battery sizing calculations. The 7 day Frequency is consistent with manufacturer recommendations and IEEE-450 (Ref. 9).

SR 3.8.4.2

Visual inspection of both Station and EDG batteries to detect corrosion of the battery cells and connections, or measurement of the resistance of each intercell, interrack, intertier, and terminal connection, provides an indication of physical damage or abnormal deterioration that could potentially degrade battery performance.

The presence of visible corrosion does not necessarily represent a failure of this SR provided visible corrosion is removed during performance of SR 3.8.4.4.

The Surveillance Frequency for these inspections, which can detect conditions that can cause power losses due to resistance heating, is 92 days. This Frequency is considered acceptable based on operating experience related to detecting corrosion trends.

SR 3.8.4.3

Visual inspection of the battery cells, cell plates, and battery racks provides an indication of physical damage or abnormal deterioration that could potentially degrade battery performance. The presence of physical damage or deterioration does not necessarily represent a failure of this SR, provided an evaluation determines that the physical damage or deterioration does not affect the OPERABILITY of the battery (its ability to perform its design function).

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.8.4.4 and SR 3.8.4.5

Station and EDG battery visual inspection and resistance measurements of intercell, interrack, intertier, and terminal connections provide an indication of physical damage or abnormal deterioration that could indicate degraded battery condition. The anticorrosion material is used to help ensure good electrical connections and to reduce terminal deterioration. The visual inspection for corrosion is not intended to require removal of and inspection under each terminal connection. The removal of visible corrosion is a preventive maintenance SR.

SR 3.8.4.6 and SR 3.8.4.7

SR 3.8.4.6 requires that each Station battery charger be capable of supplying ≥ 270 amps and ≥ 125 V for ≥ 4 hours. These requirements are based on the design capacity of the chargers (Ref. 4). According to Regulatory Guide 1.32 (Ref. 10), the battery charger supply is required to be based on the largest combined demands of the various steady state loads and the charging capacity to restore the battery from the design minimum charge state to the fully charged state, irrespective of the status of the unit during these demand occurrences. The minimum required amperes and duration ensures that these requirements can be satisfied.

SR 3.8.4.7 requires that each EDG battery charger be capable of supplying ≥ 10 amps and ≥ 125 V for ≥ 4 hours. These values are based on the design requirements of the charger.

The Surveillance Frequency for SR 3.8.4.6 is acceptable, given the unit conditions required to perform the test and the other administrative controls existing to ensure adequate charger performance during these 18 month intervals. In addition, this Frequency is intended to be consistent with expected fuel cycle lengths. The spare charger for the Station batteries is required to be tested to the same criteria as the normal charger if it is to be used as a substitute charger.

The Surveillance Frequency for SR 3.8.4.7 is acceptable given the EDG must not be required to be OPERABLE during the performance of the required test.

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.8.4.8

A Station battery service test is a special test of battery capability, as found, to satisfy the design requirements (battery duty cycle) of the DC electrical power system. The discharge rate and test length should correspond to the design duty cycle requirements as specified in Reference 4.

The Surveillance Frequency of 18 months is consistent with the recommendations of Regulatory Guide 1.32 (Ref. 10) and Regulatory Guide 1.129 (Ref. 11), which state that the battery service test should be performed during refueling operations or at some other outage, with intervals between tests, not to exceed 18 months.

This SR is modified by three Notes. Note 1 allows the performance of a modified performance discharge test in lieu of a service test.

A modified performance discharge test is a test of the battery capacity and its ability to provide a high rate, short duration load (usually the highest rate of the duty cycle). This will confirm the battery's ability to meet the critical period of the load duty cycle, in addition to determining its percentage of rated capacity. Initial conditions for the modified performance discharge test should be identical to those specified for a service test.

It may consist of just two rates; for instance, the one minute rate published for the battery or the largest current load of the duty cycle, followed by the test rate employed for the performance test, both of which envelope the duty cycle of the service test. Since the ampere-hours removed by a one minute discharge represents a very small portion of the battery capacity, the test rate can be changed to that for the performance test without compromising the results of the performance discharge test. The battery terminal voltage for the modified performance discharge test must remain above the minimum battery terminal voltage specified in the battery service test for the duration of time equal to that of the service test.

Note 2 allows the performance discharge test in lieu of the service test once per 60 months.

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.4.8 (continued)

The reason for Note 3 is that performing the Surveillance on the Station batteries would perturb the electrical distribution system and challenge safety systems. This restriction from normally performing the Surveillance in MODE 1, 2, 3, or 4 is further amplified to allow portions of the Surveillance to be performed for the purpose of reestablishing OPERABILITY (e.g., post work testing following corrective maintenance, corrective modification, deficient or incomplete surveillance testing, and other unanticipated OPERABILITY concerns) provided an assessment determines plant safety is maintained or enhanced. This assessment shall, as a minimum, consider the potential outcomes and transients associated with a failed partial Surveillance, a successful partial Surveillance, and a perturbation of the offsite or onsite system when they are tied together or operated independently for the partial Surveillance; as well as the operator procedures available to cope with these outcomes. These shall be measured against the avoided risk of the plant shutdown and startup to determine that plant safety is maintained or enhanced when portions of the Surveillance are performed in MODE 1, 2, 3, or 4. Risk insights or deterministic methods may be used for this assessment.

SR 3.8.4.9

A battery performance discharge test for Station and EDG batteries is a test of constant current capacity of a battery to detect any change in the capacity determined by the acceptance test. The test is intended to determine overall battery degradation due to age and usage.

A battery modified performance discharge test is described in the Bases for SR 3.8.4.8. Either the battery performance discharge test or the modified performance discharge test is acceptable for satisfying SR 3.8.4.9.

The acceptance criteria for this Surveillance are consistent with IEEE-450 (Ref. 9) and IEEE-485 (Ref. 5). These references recommend that the battery be replaced if its capacity is below 80% of the manufacturer's rating. A capacity of 80% shows that the battery rate of deterioration is increasing, even if there is ample capacity to meet the load requirements.

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BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.4.9 (continued)

The Surveillance Frequency for this test is normally 60 months. If the battery shows degradation, or if the battery has reached 85% of its expected life, the Surveillance Frequency is reduced to 18 months. Degradation is indicated, according to IEEE-450 (Ref. 9), when the battery capacity drops by more than 10% relative to its capacity on the previous performance test or when it is ≥ 10% below the manufacturer's rating. The 60 month Frequency is consistent with the recommendations in IEEE-450 (Ref. 9) and the 18 month Frequency is consistent with operating experience.

This SR is modified by a Note. The reason for the Note is that performing the Surveillance would perturb the electrical distribution system and challenge safety systems for the Station batteries. This restriction from normally performing the Surveillance in MODE 1, 2, 3, or 4 is further amplified to allow portions of the Surveillance to be performed for the purpose of reestablishing OPERABILITY (e.g., post work testing following corrective maintenance, corrective modification, deficient or incomplete surveillance testing, and other unanticipated OPERABILITY concerns) provided an assessment determines plant safety is maintained or enhanced. This assessment shall, as a minimum, consider the potential outcomes and transients associated with a failed partial Surveillance, a successful partial Surveillance, and a perturbation of the offsite or onsite system when they are tied together or operated independently for the partial Surveillance; as well as the operator procedures available to cope with these outcomes. These shall be measured against the avoided risk of the plant shutdown and startup to determine that plant safety is maintained or enhanced when portions of the Surveillance are performed in MODE 1, 2, 3, or 4. Risk insights or deterministic methods may be used for this assessment.

REFERENCES

1. UFSAR, Chapter 3.

2. Safety Guide 6, March 10, 1971.

3. IEEE-308-1971.

4. UFSAR, Chapter 8.

BASES

REFERENCES (continued)

5. IEEE-485-1983, June 1983.

6. UFSAR, Chapter 6.

7. UFSAR, Chapter 15.

8. Regulatory Guide 1.93, December 1974.

9. IEEE-450-1987.

10. Regulatory Guide 1.32, February 1977.

11. Regulatory Guide 1.129, December 1974.

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B 3.8 ELECTRICAL POWER SYSTEMS

B 3.8.5 DC Sources–Shutdown

BASES

BACKGROUND

A description of the DC sources is provided in the Bases for LCO 3.8.4, "DC Sources–Operating."

APPLICABLE SAFETY ANALYSES

The initial conditions of Design Basis Accident and transient analyses in the UFSAR, Chapter 6 (Ref. 1) and Chapter 15 (Ref. 2), assume that Engineered Safety Feature systems are OPERABLE. The DC electrical power system provides normal and emergency DC electrical power for the emergency auxiliaries and control and switching during all MODES of operation. The EDG DC system provides power for the required EDG as described in LCO 3.8.2, "AC Sources–Shutdown."

The OPERABILITY of the DC subsystems is consistent with the initial assumptions of the accident analyses and the requirements for the supported systems' OPERABILITY.

The OPERABILITY of the minimum DC electrical power sources during MODES 5 and 6 and during movement of recently irradiated fuel assemblies ensures that:

a. The unit can be maintained in the shutdown or refueling condition for extended periods;

b. Sufficient instrumentation and control capability is available for monitoring and maintaining the unit status; and

c. Adequate DC electrical power is provided to mitigate events postulated during shutdown, such as a fuel handling accident involving handling recently irradiated fuel. Due to radioactive decay, DC electrical power is only required to mitigate fuel handling accidents involving handling recently irradiated fuel. (i.e., fuel that has occupied part of a critical reactor core within a time frame established by analysis. The term recently is defined as all irradiated fuel assemblies, until analysis is performed to determine a specific time frame.)

BASES

APPLICABLE SAFETY ANALYSES (continued)

The DC sources satisfy Criterion 3 of 10 CFR 50.36(c)(2)(ii).

LCO

The DC electrical power subsystem(s), each subsystem consisting of two batteries, one battery charger per battery, and the corresponding control equipment and interconnecting cabling within the train, are required to be OPERABLE to support required trains of the distribution systems required OPERABLE by LCO 3.8.10, "Distribution Systems–Shutdown." The EDG DC system, consisting of a battery, battery charger, and the corresponding control equipment and interconnection cabling for the EDG, are required to be OPERABLE to support the EDG required by LCO 3.8.2, "AC Sources–Shutdown." This ensures the availability of sufficient DC electrical power sources to operate the unit in a safe manner and to mitigate the consequences of postulated events during shutdown (e.g., fuel handling accidents involving handling recently irradiated fuel).

APPLICABILITY

The DC electrical power sources and EDG DC system required to be OPERABLE in MODES 5 and 6, and during movement of recently irradiated fuel assemblies, provide assurance that:

a. Required features to provide adequate coolant inventory makeup are available for the recently irradiated fuel assemblies in the core;

b. Required features needed to mitigate a fuel handling accident involving handling recently irradiated fuel (i.e., fuel that has occupied part of a critical reactor core within a time frame established by analysis. The term recently is defined as all irradiated fuel assemblies, until analysis is performed to determine a specific time frame.) are available;

c. Required features necessary to mitigate the effects of events that can lead to core damage during shutdown are available; and

d. Instrumentation and control capability is available for monitoring and maintaining the unit in a cold shutdown condition or refueling condition.

BASES

APPLICABILITY (continued)

The DC electrical power and EDG DC system requirements for MODES 1, 2, 3, and 4 are covered in LCO 3.8.4.

ACTIONS

A.1, A.2.1, A.2.2, A.2.3, and A.2.4

The train with DC power available may be capable of supporting sufficient systems to allow continuation of CORE ALTERATIONS and recently irradiated fuel movement. By allowing the option to declare required features inoperable with the associated DC power source(s) inoperable, appropriate restrictions will be implemented in accordance with the affected required features LCO ACTIONS. In many instances, this option may involve undesired administrative efforts. Therefore, the allowance for sufficiently conservative actions is made (i.e., to suspend CORE ALTERATIONS, movement of recently irradiated fuel assemblies, and operations involving positive reactivity additions) that could result in loss of required SDM (MODE 5) or boron concentration (MODE 6). Suspending positive reactivity additions that could result in failure to meet the minimum SDM or boron concentration limit is required to assure continued safe operation. Introduction of coolant inventory must be from sources that have a boron concentration greater than what would be required in the RCS for minimum SDM or refueling boron concentration. This may result in an overall reduction in RCS boron concentration, but provides acceptable margin to maintaining subcritical operation. Introduction of temperature changes including temperature increases when operating with a positive MTC must also be evaluated to ensure they do not result in a loss of required SDM.

Suspension of these activities shall not preclude completion of actions to establish a safe conservative condition. These actions minimize probability of the occurrence of postulated events. It is further required to immediately initiate action to restore the required DC electrical power subsystems and to continue this action until restoration is accomplished in order to provide the necessary DC electrical power to the unit safety systems.

The Completion Time of immediately is consistent with the required times for actions requiring prompt attention. The restoration of the required DC electrical power subsystems should be completed as quickly as possible in order to minimize the time during which the unit safety systems may be without sufficient power.

BASES

ACTIONS (continued)

B.1

With the required EDG's DC system inoperable, the EDG is not OPERABLE and the applicable Conditions and Required Actions of LCO 3.8.2, "AC Sources–Shutdown," must be entered immediately.

SURVEILLANCE REQUIREMENTS

SR 3.8.5.1

SR 3.8.5.1 requires performance of all Surveillances required by SR 3.8.4.1 through SR 3.8.4.9. Therefore, see the corresponding Bases for LCO 3.8.4 for a discussion of each SR.

This SR is modified by a Note. The reason for the Note is to preclude requiring the required OPERABLE DC sources or EDG DC system from being discharged below their capability to provide the required power supply or otherwise rendered inoperable during the performance of SRs. It is the intent that these SRs must still be capable of being met, but actual performance is not required.

REFERENCES

1. UFSAR, Chapter 6.

2. UFSAR, Chapter 15.

B 3.8 ELECTRICAL POWER SYSTEMS

B 3.8.6 Battery Cell Parameters

BASES

BACKGROUND	This LCO delineates the limits on electrolyte temperature, level, float voltage, and specific gravity for the Station and EDG batteries. A discussion of these batteries and their OPERABILITY requirements is provided in the Bases for LCO 3.8.4, "DC Sources—Operating," and LCO 3.8.5, "DC Sources—Shutdown."
APPLICABLE SAFETY ANALYSES	The initial conditions of Design Basis Accident (DBA) and transient analyses in the UFSAR, Chapter 6 (Ref. 1) and Chapter 15 (Ref. 2), assume Engineered Safety Feature systems are OPERABLE. The DC electrical power system provides normal and emergency DC electrical power for the emergency auxiliaries, and control and switching during all MODES of operation. The EDG DC electrical power system consists of the battery, battery charger, and interconnecting cabling supplying power to the associated EDG components to supply the required DC voltage to allow the EDG to perform the required safety function. The OPERABILITY of the DC subsystems is consistent with the initial assumptions of the accident analyses and is based upon meeting the design basis of the unit. This includes maintaining at least one train of DC sources OPERABLE during accident conditions, in the event of: a. An assumed loss of all offsite AC power or all onsite AC power; and b. A worst case single failure. Battery cell parameters satisfy the Criterion 3 of 10 CFR 50.36(c)(2)(ii).
LCO	Battery cell parameters must remain within acceptable limits to ensure availability of the required DC power to shut down the reactor and maintain it in a safe condition after an anticipated operational occurrence or a postulated DBA. Electrolyte limits are conservatively established, allowing continued DC electrical system function even with Category A and B limits not met.

BASES

APPLICABILITY

The battery cell parameters are required solely for the support of the associated DC electrical power subsystem(s) and EDG DC system(s). Therefore, the battery is only required when the DC power source is required to be OPERABLE. Refer to the Applicability discussion in Bases for LCO 3.8.4 and LCO 3.8.5.

ACTIONS

A.1, A.2, and A.3

With one or more cells in one or more batteries not within limits (i.e., Category A limits not met, Category B limits not met, or Category A and B limits not met) but within the Category C limits specified in Table 3.8.6-1 in the accompanying LCO, the battery is degraded but there is still sufficient capacity to perform the intended function. Therefore, the affected battery is not required to be considered inoperable solely as a result of Category A or B limits not met and operation is permitted for a limited period.

The pilot cell electrolyte level and float voltage are required to be verified to meet the Category C limits within 1 hour (Required Action A.1). This check will provide a quick indication of the status of the remainder of the battery cells. One hour provides time to inspect the electrolyte level and to confirm the float voltage of the pilot cells. One hour is considered a reasonable amount of time to perform the required verification.

Verification that the Category C limits are met (Required Action A.2) provides assurance that during the time needed to restore the parameters to the Category A and B limits, the battery is still capable of performing its intended function. A period of 24 hours is allowed to complete the initial verification because specific gravity measurements must be obtained for each connected cell. Taking into consideration both the time required to perform the required verification and the assurance that the battery cell parameters are not severely degraded, this time is considered reasonable. The verification is repeated at 7 day intervals until the parameters are restored to Category A or B limits. This periodic verification is consistent with the normal Frequency of pilot cell Surveillances.

(continued)

BASES

ACTIONS

A.1, A.2, and A.3 (continued)

Continued operation is only permitted for 31 days before battery cell parameters must be restored to within Category A and B limits. With the consideration that, while battery capacity is degraded, sufficient capacity exists to perform the intended function and to allow time to fully restore the battery cell parameters to normal limits, this time is acceptable prior to declaring the battery inoperable.

B.1

With one or more batteries with one or more battery cell parameters outside the Category C limit for any connected cell, sufficient capacity to supply the maximum expected load requirement is not assured and the corresponding DC electrical power subsystem or EDG DC system must be declared inoperable. Additionally, other potentially extreme conditions, such as not completing the Required Actions of Condition A within the required Completion Time or average electrolyte temperature of representative cells falling below 60°F for the Station batteries, are also cause for immediately declaring the associated DC electrical power subsystem inoperable. Representative cells will consist of at least 10 cells.

SURVEILLANCE REQUIREMENTS

SR 3.8.6.1

This SR verifies that Category A battery cell parameters are consistent with IEEE-450 (Ref. 3), which recommends regular battery inspections (at least one per month) including voltage, specific gravity, and electrolyte level of pilot cells.

SR 3.8.6.2

The quarterly inspection of specific gravity and voltage is consistent with IEEE-450 (Ref. 3). In addition, within 24 hours of a battery discharge < 110 V or a battery overcharge > 150 V, the battery must be demonstrated to meet Category B limits. Transients, such as motor starting transients, which may momentarily cause battery voltage to drop to ≤110 V, do not constitute a battery discharge provided the battery terminal voltage and float current return to pre-transient values. This inspection is also

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.6.2 (continued)

consistent with IEEE-450 (Ref. 3), which recommends special inspections following a severe discharge or overcharge, to ensure that no significant degradation of the battery occurs as a consequence of such discharge or overcharge.

SR 3.8.6.3

This Surveillance verification that the average temperature of representative cells of the Station batteries is > 60°F, is consistent with a recommendation of IEEE-450 (Ref. 3), that states that the temperature of electrolytes in representative cells should be determined on a quarterly basis.

Lower than normal temperatures act to inhibit or reduce battery capacity. This SR ensures that the operating temperatures remain within an acceptable operating range. This limit is based on manufacturer recommendations.

Table 3.8.6-1

This table delineates the limits on electrolyte level, float voltage, and specific gravity for three different categories. The meaning of each category is discussed below.

Category A defines the normal parameter limit for each designated pilot cell in each battery. The cells selected as pilot cells are those whose level, voltage, and electrolyte specific gravity approximate the state of charge of the entire battery.

The Category A limits specified for electrolyte level are based on manufacturer recommendations and are consistent with the guidance in IEEE-450 (Ref. 3), with the extra ¼ inch allowance above the high water level indication for operating margin to account for temperatures and charge effects. In addition to this allowance, footnote a to Table 3.8.6-1 permits the electrolyte level to be above the specified maximum level during equalizing charge, provided it is not overflowing. These limits ensure that the plates suffer no physical damage, and that adequate electron transfer capability is maintained in the event of transient conditions. IEEE-450 (Ref. 3) recommends that electrolyte level readings should be made only after the battery has been at float charge for at least 72 hours.

(continued)

BASES

SURVEILLANCE REQUIREMENTS

Table 3.8.6-1 (continued)

The Category A limit specified for float voltage is ≥ 2.13 V per cell. This value is based on the recommendations of IEEE-450 (Ref. 3), which states that prolonged operation of cells < 2.13 V can reduce the life expectancy of cells.

The Category A limit specified for specific gravity for each pilot cell is ≥ 1.200 (0.015 below the manufacturer fully charged nominal specific gravity or a battery charging current that had stabilized at a low value). This value is characteristic of a charged cell with adequate capacity. According to IEEE-450 (Ref. 3), the specific gravity readings are based on a temperature of 77°F (25°C).

The specific gravity readings are corrected for actual electrolyte temperature and level. For each 3°F (1.67°C) above 77°F (25°C), 1 point (0.001) is added to the reading; 1 point is subtracted for each 3°F below 77°F. The specific gravity of the electrolyte in a cell increases with a loss of water due to electrolysis or evaporation.

Category B defines the normal parameter limits for each connected cell. The term "connected cell" excludes any battery cell that may be jumpered out.

The Category B limits specified for electrolyte level and float voltage are the same as those specified for Category A and have been discussed above. For any cell with float voltage below the limit and electrolyte temperature > 3°F from the average electrolyte temperature, correct the cell voltage for average electrolyte temperature. The Category B limit specified for specific gravity for each connected cell is ≥ 1.195 (0.020 below the manufacturer fully charged, nominal specific gravity) with the average of all connected cells > 1.205 (0.010 below the manufacturer fully charged, nominal specific gravity). These values are based on manufacturer's recommendations. The minimum specific gravity value required for each cell ensures that the effects of a highly charged or newly installed cell will not mask overall degradation of the battery.

Category C defines the limits for each connected cell. These values, although reduced, provide assurance that sufficient capacity exists to perform the intended function and maintain a margin of safety. When any battery parameter is

(continued)

BASES

SURVEILLANCE REQUIREMENTS

Table 3.8.6-1 (continued)

outside the Category C limits, the assurance of sufficient capacity described above no longer exists, and the battery must be declared inoperable.

The Category C limits specified for electrolyte level (above the top of the plates and not overflowing) ensure that the plates suffer no physical damage and maintain adequate electron transfer capability. The Category C limits for float voltage is based on IEEE-450 (Ref. 3), which states that a cell voltage of 2.07 V or below, under float conditions and not caused by elevated temperature of the cell, indicates internal cell problems and may require cell replacement.

The Category C limit of average specific gravity ≥ 1.195 is based on manufacturer recommendations (0.020 below the manufacturer recommended fully charged, nominal specific gravity). In addition to that limit, it is required that the specific gravity for each connected cell must be no less than 0.020 below the average of all connected cells. This limit ensures that the effect of a highly charged or new cell does not mask overall degradation of the battery.

The footnotes to Table 3.8.6-1 are applicable to Category A, B, and C specific gravity. Footnote (b) to Table 3.8.6-1 requires the above mentioned correction for electrolyte level and temperature, with the exception that level correction is not required when Station battery charging current is < 2 amps on float charge. This current provides, in general, an indication of overall battery condition.

Because of specific gravity gradients that are produced during the recharging process, delays of several days may occur while waiting for the specific gravity to stabilize. A stabilized charger current is an acceptable alternative to specific gravity measurement for determining the state of charge. This phenomenon is discussed in IEEE-450 (Ref. 3). Footnote (c) to Table 3.8.6-1 allows the float charge current to be used as an alternate to specific gravity for up to 7 days following a Station battery recharge. Within 7 days, each connected cell's specific gravity must be measured to confirm the state of charge. Following a minor battery recharge (such as equalizing charge that does not follow a deep discharge) specific gravity gradients are not significant, and confirming measurements may be made in less than 7 days.

BASES

REFERENCES

1. UFSAR, Chapter 6.

2. UFSAR, Chapter 15.

3. IEEE-450-1980.

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B 3.8 ELECTRICAL POWER SYSTEMS

B 3.8.7 Inverters–Operating

BASES

BACKGROUND

The inverters are the preferred source of power for the AC vital buses because of the stability and reliability they achieve. The function of the inverter is to provide AC electrical power to the vital buses. The inverters can be powered from a battery charger or from the station battery. The station battery provides an uninterruptible power source for the instrumentation and controls for the Reactor Trip System (RTS) and the Engineered Safety Feature Actuation System (ESFAS). Specific details on inverters and their operating characteristics are found in the UFSAR, Chapter 8 (Ref. 1).

APPLICABLE SAFETY ANALYSES

The initial conditions of Design Basis Accident (DBA) and transient analyses in the UFSAR, Chapter 6 (Ref. 2) and Chapter 15 (Ref. 3), assume Engineered Safety Feature systems are OPERABLE. The inverters are designed to provide the required capacity, capability, redundancy, and reliability to ensure the availability of necessary power to the RTS and ESFAS instrumentation and controls so that the fuel, Reactor Coolant System, and containment design limits are not exceeded. These limits are discussed in more detail in the Bases for Section 3.2, Power Distribution Limits; Section 3.4, Reactor Coolant System (RCS); and Section 3.6, Containment Systems.

The OPERABILITY of the inverters is consistent with the initial assumptions of the accident analyses and is based on meeting the design basis of the unit. This includes maintaining required AC vital buses OPERABLE during accident conditions in the event of:

a. An assumed loss of all offsite AC electrical power or all onsite AC electrical power; and

b. A worst case single failure.

Inverters are a part of the distribution system and, as such, satisfy Criterion 3 of 10 CFR 50.36(c)(2)(ii).

BASES

LCO

The inverters ensure the availability of AC electrical power for the systems instrumentation required to shut down the reactor and maintain it in a safe condition after an anticipated operational occurrence (AOO) or a postulated DBA.

Maintaining the required inverters OPERABLE ensures that the redundancy incorporated into the design of the RPS and ESFAS instrumentation and controls is maintained. The four inverters (two per train) ensure an uninterruptible supply of AC electrical power to the AC vital buses even if the 4.16 kV safety buses are de-energized.

OPERABLE inverters require the associated vital bus to be powered by the inverter with output voltage within tolerances, and power input to the inverter from a 125 VDC station battery. Alternatively, power supply may be from a battery charger as long as the station battery is available as the uninterruptible power supply.

This LCO is modified by a Note that allows one inverter to be disconnected from its associated battery for ≤24 hours, if the vital bus is powered from a constant voltage transformer and all other inverters are OPERABLE. This allows an equalizing charge to be placed on the associated battery. If the inverters were not disconnected, the resulting voltage condition might damage the inverters. These provisions minimize the loss of equipment that would occur in the event of a loss of offsite power. The 24 hour time period for the allowance minimizes the time during which a loss of offsite power could result in the loss of equipment energized from the affected AC vital bus while taking into consideration the time required to perform an equalizing charge on the battery bank.

The intent of this Note is to limit the number of inverters that may be disconnected. Only those inverters associated with the single battery undergoing an equalizing charge may be disconnected. All other inverters must be aligned to their associated batteries, regardless of the number of inverters or unit design.

BASES

APPLICABILITY

The inverters are required to be OPERABLE in MODES 1, 2, 3, and 4 to ensure that:

a. Acceptable fuel design limits and reactor coolant pressure boundary limits are not exceeded as a result of AOOs or abnormal transients; and

b. Adequate core cooling is provided, and containment OPERABILITY and other vital functions are maintained in the event of a postulated DBA.

Inverter requirements for MODES 5 and 6 are covered in the Bases for LCO 3.8.8, "Inverters–Shutdown."

ACTIONS

A.1

With a required inverter inoperable, its associated AC vital bus becomes inoperable until it is re-energized from its constant voltage source transformer.

For this reason a Note has been included in Condition A requiring the entry into the Conditions and Required Actions of LCO 3.8.9, "Distribution Systems–Operating." This ensures that the vital bus is re-energized within 2 hours.

Required Action A.1 allows 24 hours to fix the inoperable inverter and return it to service. The 24 hour limit is based upon engineering judgment, taking into consideration the time required to repair an inverter and the additional risk to which the unit is exposed because of the inverter inoperability. This has to be balanced against the risk of an immediate shutdown, along with the potential challenges to safety systems such a shutdown might entail. When the AC vital bus is powered from its constant voltage source, it is relying upon interruptible AC electrical power sources (offsite and onsite). The uninterruptible inverter source to the AC vital buses is the preferred source for powering instrumentation trip setpoint devices.

B.1 and B.2

If the inoperable devices or components cannot be restored to OPERABLE status within the required Completion Time, the unit must be brought to a MODE in which the LCO does not apply. To achieve this status, the unit must be brought to at

(continued)

BASES

ACTIONS

B.1 and B.2 (continued)

least MODE 3 within 6 hours and to MODE 5 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging unit systems.

SURVEILLANCE REQUIREMENTS

SR 3.8.7.1

This Surveillance verifies that the inverters are functioning properly with all required circuit breakers closed and AC vital buses energized from the inverter. The verification of proper voltage output ensures that the required power is readily available for the instrumentation of the RTS and ESFAS connected to the AC vital buses. The 7 day Frequency takes into account the redundant capability of the inverters and other indications available in the control room that alert the operator to inverter malfunctions.

REFERENCES

1. UFSAR, Chapter 8.

2. UFSAR, Chapter 6.

3. UFSAR, Chapter 15.

B 3.8 ELECTRICAL POWER SYSTEMS

B 3.8.8 Inverters–Shutdown

BASES

BACKGROUND

A description of the inverters is provided in the Bases for LCO 3.8.7, "Inverters–Operating."

APPLICABLE SAFETY ANALYSES

The initial conditions of Design Basis Accident (DBA) and transient analyses in the UFSAR, Chapter 6 (Ref. 1) and Chapter 15 (Ref. 2), assume Engineered Safety Feature systems are OPERABLE. The DC to AC inverters are designed to provide the required capacity, capability, redundancy, and reliability to ensure the availability of necessary power to the Reactor Trip System and Engineered Safety Features Actuation System instrumentation and controls so that the fuel, Reactor Coolant System, and containment design limits are not exceeded.

The OPERABILITY of the inverters is consistent with the initial assumptions of the accident analyses and the requirements for the supported systems' OPERABILITY.

The OPERABILITY of the minimum inverters to each AC vital bus during MODES 5 and 6 ensures that:

a. The unit can be maintained in the shutdown or refueling condition for extended periods;

b. Sufficient instrumentation and control capability is available for monitoring and maintaining the unit status; and

c. Adequate power is available to mitigate events postulated during shutdown, such as a fuel handling accident involving handling recently irradiated fuel. Due to radioactive decay, the inverter(s) are only required to mitigate fuel handling accidents involving handling recently irradiated fuel. (i.e., fuel that has occupied part of a critical core within a time frame established by analysis. The term recently is defined as all irradiated fuel assemblies, until analysis is performed to determine a specific time frame.)

BASES

APPLICABLE SAFETY ANALYSES (continued)

The inverters were previously identified as part of the distribution system and, as such, satisfy Criterion 3 of 10 CFR 50.36(c)(2)(ii).

LCO

The required inverter(s) ensure the availability of electrical power for the instrumentation for systems required to shut down the reactor and maintain it in a safe condition after an anticipated operational occurrence or a postulated DBA. The battery powered inverters provide uninterruptible supply of AC electrical power to the AC vital buses even if the 4.16 kV safety buses are de-energized. OPERABILITY of the inverters requires that the AC vital bus be powered by the inverter. This ensures the availability of sufficient inverter power sources to operate the unit in a safe manner and to mitigate the consequences of postulated events during shutdown (e.g., fuel handling accidents involving handling recently irradiated fuel).

APPLICABILITY

The inverters required to be OPERABLE in MODES 5 and 6 and during movement of recently irradiated fuel assemblies provide assurance that:

a. Systems to provide adequate coolant inventory makeup are available for the irradiated fuel in the core;

b. Systems needed to mitigate a fuel handling accident involving handling recently irradiated fuel (i.e., fuel that has occupied part of a critical core within a time frame established by analysis. The term recently is defined as all irradiated fuel assemblies, until analysis is performed to determine a specific time frame.) are available;

c. Systems necessary to mitigate the effects of events that can lead to core damage during shutdown are available; and

d. Instrumentation and control capability is available for monitoring and maintaining the unit in a cold shutdown condition or refueling condition.

Inverter requirements for MODES 1, 2, 3, and 4 are covered in LCO 3.8.7.

BASES

ACTIONS

A.1, A.2.1, A.2.2, A.2.3, and A.2.4

The required OPERABLE Inverters are capable of supporting sufficient required features to allow continuation of CORE ALTERATIONS, recently irradiated fuel movement, and operations with a potential for positive reactivity additions. By the allowance of the option to declare required features inoperable with the associated inverter(s) inoperable, appropriate restrictions will be implemented in accordance with the affected required features LCOs' Required Actions. In many instances, this option may involve undesired administrative efforts. Therefore, the allowance for sufficiently conservative actions is made (i.e., to suspend CORE ALTERATIONS, movement of recently irradiated fuel assemblies, and operations involving positive reactivity additions) that could result in loss of required SDM (MODE 5) or boron concentration (MODE 6). Suspending positive reactivity additions that could result in failure to meet the minimum SDM or boron concentration limit is required to assure continued safe operation. Introduction of coolant inventory must be from sources that have a boron concentration greater than what would be required in the RCS for minimum SDM or refueling boron concentration. This may result in an overall reduction in RCS boron concentration, but provides acceptable margin to maintaining subcritical operation. Introduction of temperature changes including temperature increases when operating with a positive MTC must also be evaluated to ensure they do not result in a loss of required SDM.

Suspension of these activities shall not preclude completion of actions to establish a safe conservative condition. These actions minimize the probability of the occurrence of postulated events. It is further required to immediately initiate action to restore the required inverters and to continue this action until restoration is accomplished in order to provide the necessary inverter power to the unit safety systems.

The Completion Time of immediately is consistent with the required times for actions requiring prompt attention. The restoration of the required inverters should be completed as quickly as possible in order to minimize the time the unit safety systems may be without power or powered from a constant voltage source transformer.

BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.8.1

This Surveillance verifies that the inverters are functioning properly with all required circuit breakers closed and AC vital buses energized from the inverter. The verification of proper voltage output ensures that the required power is readily available for the instrumentation connected to the AC vital buses. The 7 day Frequency takes into account the redundant capability of the inverters and other indications available in the control room that alert the operator to inverter malfunctions.

REFERENCES

1. UFSAR, Chapter 6.
2. UFSAR, Chapter 15.

B 3.8 ELECTRICAL POWER SYSTEMS

B 3.8.9 Distribution Systems–Operating

BASES

BACKGROUND

The onsite Class 1E AC, DC, and AC vital bus electrical power distribution systems are divided by train into two redundant and independent AC, DC, and AC vital bus electrical power distribution subsystems.

The AC electrical power subsystem for each train consists of a primary Engineered Safety Feature (ESF) 4.16 kV bus and secondary 480 V buses and load centers. Each 4.16 kV ESF bus has at least one separate and independent offsite source of power as well as a dedicated onsite emergency diesel generator (EDG) source. Each 4.16 kV ESF bus is normally connected to a preferred offsite source. If offsite sources are unavailable, the onsite EDG supplies power to the 4.16 kV ESF bus. Control power for the 4.16 kV breakers is supplied from the Class 1E batteries. Additional description of this system may be found in the Bases for LCO 3.8.1, "AC Sources–Operating," and the Bases for LCO 3.8.4, "DC Sources–Operating."

The secondary AC electrical power distribution subsystem for each train includes the safety related buses and load centers shown in Table B 3.8.9-1.

The 120 VAC vital buses are arranged in two load groups per train and are normally powered from the inverters. The alternate power supply for the vital buses are constant voltage source transformers powered from the same train as the associated inverter, and its use is governed by LCO 3.8.7, "Inverters–Operating." Each constant voltage source transformer is powered from a Class 1E AC bus.

There are two independent 125 VDC electrical power distribution subsystems for each train.

For the other unit, one AC and DC bus on that unit is needed to support operation of each required Service Water (SW) pump, Main Control Room (MCR)/Emergency Switchgear Room (ESGR) Emergency Ventilation System (EVS) fan, and Auxiliary Building central exhaust fan. SW, MCR/ESGR EVS, and Auxiliary Building central exhaust system are shared systems.

(continued)

BASES

BACKGROUND (continued)

The list of all required distribution buses is presented in Table B 3.8.9-1.

APPLICABLE SAFETY ANALYSES

The initial conditions of Design Basis Accident (DBA) and transient analyses in the UFSAR, Chapter 6 (Ref. 1), and in the UFSAR, Chapter 15 (Ref. 2), assume ESF systems are OPERABLE. The AC, DC, and AC vital bus electrical power distribution systems are designed to provide sufficient capacity, capability, redundancy, and reliability to ensure the availability of necessary power to ESF systems so that the fuel, Reactor Coolant System, and containment design limits are not exceeded. These limits are discussed in more detail in the Bases for Section 3.2, Power Distribution Limits; Section 3.4, Reactor Coolant System (RCS); and Section 3.6, Containment Systems.

The OPERABILITY of the AC, DC, and AC vital bus electrical power distribution systems is consistent with the initial assumptions of the accident analyses and is based upon meeting the design basis of the unit. This includes maintaining power distribution systems OPERABLE during accident conditions in the event of:

a. An assumed loss of all offsite power or all onsite AC electrical power; and

b. A worst case single failure.

The distribution systems satisfy Criterion 3 of 10 CFR 50.36(c)(2)(ii).

LCO

The required power distribution subsystems listed in Table B 3.8.9-1 ensure the availability of AC, DC, and AC vital bus electrical power for the systems required to shut down the reactor and maintain it in a safe condition after an anticipated operational occurrence (AOO) or a postulated DBA. The AC, DC, and AC vital bus electrical power distribution subsystems are required to be OPERABLE.

Maintaining the Train H and Train J AC, DC, and AC vital bus electrical power distribution subsystems OPERABLE ensures that the redundancy incorporated into the design of ESF is not defeated. Therefore, a single failure within any system or within the electrical power distribution subsystems will not prevent safe shutdown of the reactor.

(continued)

BASES

LCO (continued)

OPERABLE AC electrical power distribution subsystems require the associated buses and load centers to be energized to their proper voltages. OPERABLE DC electrical power distribution subsystems require the associated buses to be energized to their proper voltage from either the associated battery or charger. OPERABLE vital bus electrical power distribution subsystems require the associated buses to be energized to their proper voltage from the associated inverter via inverted DC voltage, or constant voltage transformer.

In addition, tie breakers between redundant safety related AC, DC, and AC vital bus power distribution subsystems, if they exist, must be open. This prevents any electrical malfunction in any power distribution subsystem from propagating to the redundant subsystem, that could cause the failure of a redundant subsystem and a loss of essential safety function(s). If any tie breakers are closed, the affected redundant electrical power distribution subsystems are considered inoperable. This applies to the onsite, safety related redundant electrical power distribution subsystems. It does not, however, preclude redundant Class 1E 4.16 kV buses from being powered from the same offsite circuit.

APPLICABILITY

The electrical power distribution subsystems are required to be OPERABLE in MODES 1, 2, 3, and 4 to ensure that:

a. Acceptable fuel design limits and reactor coolant pressure boundary limits are not exceeded as a result of AOOs or abnormal transients; and

b. Adequate core cooling is provided, and containment OPERABILITY and other vital functions are maintained in the event of a postulated DBA.

Electrical power distribution subsystem requirements for MODES 5 and 6 are covered in the Bases for LCO 3.8.10, "Distribution Systems–Shutdown."

ACTIONS

A.1

With one or more LCO 3.8.9.a AC electrical power distribution subsystem(s) inoperable, the minimum safety functions can still be accomplished, assuming no single

(continued)

BASES

ACTIONS

A.1 (continued)

failure, as long as one set of redundant required equipment (AC buses and load centers) supporting each safety function remains energized to their proper voltages. Redundant required equipment is listed in Table B 3.8.9-1. The overall reliability is reduced, however, because a single failure in the remaining power distribution subsystems could result in the minimum required ESF functions not being supported. Therefore, the required AC buses and load centers must be restored to OPERABLE status within 8 hours.

Condition A worst scenario is one train without AC power (i.e., no offsite power to the train and the associated EDG inoperable). In this Condition, the unit is more vulnerable to a complete loss of AC power. It is, therefore, imperative that the unit operator's attention be focused on minimizing the potential for loss of power to the remaining train by stabilizing the unit, and on restoring power to the affected train. The 8 hour time limit before requiring a unit shutdown in this Condition is acceptable because of:

a. The potential for decreased safety if the unit operator's attention is diverted from the evaluations and actions necessary to restore power to the affected train, to the actions associated with taking the unit to shutdown within this time limit; and

b. The potential for an event in conjunction with a single failure of a redundant component in the train with AC power.

The second Completion Time for Required Action A.1 establishes a limit on the maximum time allowed for any combination of required distribution subsystems to be inoperable during any single contiguous occurrence of failing to meet the LCO. If Condition A is entered while, for instance, a DC bus is inoperable and subsequently restored OPERABLE, the LCO may already have been not met for up to 2 hours. This could lead to a total of 10 hours, since initial failure of the LCO, to restore the AC distribution system. At this time, a DC circuit could again become inoperable, and AC distribution restored OPERABLE. This could continue indefinitely.

(continued)

BASES

ACTIONS

A.1 (continued)

The Completion Time allows for an exception to the normal "time zero" for beginning the allowed outage time "clock." This will result in establishing the "time zero" at the time the LCO was initially not met, instead of the time Condition A was entered. The 16 hour Completion Time is an acceptable limitation on this potential to fail to meet the LCO indefinitely.

Required Action A.1 is modified by a Note that requires the applicable Conditions and Required Actions of LCO 3.8.4, "DC Sources—Operating," to be entered for DC train(s) made inoperable power distribution subsystem(s). This is an exception to LCO 3.0.6 and ensures the proper actions are taken for these components. Inoperability of a distribution system can result in loss of charging power to batteries and eventual loss of DC power. This Note ensures that appropriate attention is given to restoring charging power to batteries, if necessary, after loss of distribution systems.

B.1

With one or more LCO 3.8.9.a AC vital buses inoperable and a loss of function has not yet occurred, the remaining OPERABLE AC vital buses are capable of supporting the minimum safety functions necessary to shut down the unit and maintain it in the safe shutdown condition. Overall reliability is reduced, however, since an additional single failure could result in the minimum required ESF functions not being supported. Therefore, the required AC vital bus must be restored to OPERABLE status within 2 hours by powering the bus from the associated inverter via inverted DC, or constant voltage transformer.

Condition B represents one or more AC vital buses without power; potentially both the DC source and the associated AC source are nonfunctioning. In this situation, the unit is significantly more vulnerable to a complete loss of all noninterruptible power. It is, therefore, imperative that the operator's attention focus on stabilizing the unit, minimizing the potential for loss of power to the remaining vital buses and restoring power to the affected vital bus.

(continued)

BASES

ACTIONS

B.1 (continued)

This 2 hour limit is more conservative than Completion Times allowed for the vast majority of components that are without adequate vital AC power. Taking exception to LCO 3.0.2 for components without adequate vital AC power, that would have the Required Action Completion Times shorter than 2 hours if declared inoperable, is acceptable because of:

a. The potential for decreased safety by requiring a change in unit conditions (i.e., requiring a shutdown) and not allowing stable operations to continue;

b. The potential for decreased safety by requiring entry into numerous applicable Conditions and Required Actions for components without adequate vital AC power and not providing sufficient time for the operators to perform the necessary evaluations and actions for restoring power to the affected train; and

c. The potential for an event in conjunction with a single failure of a redundant component.

The 2 hour Completion Time takes into account the importance to safety of restoring the AC vital bus to OPERABLE status, the redundant capability afforded by the other OPERABLE vital buses, and the low probability of a DBA occurring during this period.

The second Completion Time for Required Action B.1 establishes a limit on the maximum allowed for any combination of required distribution subsystems to be inoperable during any single contiguous occurrence of failing to meet the LCO. If Condition B is entered while, for instance, an AC bus is inoperable and subsequently returned OPERABLE, the LCO may already have been not met for up to 8 hours. This could lead to a total of 10 hours, since initial failure of the LCO, to restore the vital bus distribution system. At this time, an AC train could again become inoperable, and vital bus distribution restored OPERABLE. This could continue indefinitely.

This Completion Time allows for an exception to the normal "time zero" for beginning the allowed outage time "clock." This will result in establishing the "time zero" at the time the LCO was initially not met, instead of the time

(continued)

BASES

ACTIONS

B.1 (continued)

Condition B was entered. The 16 hour Completion Time is an acceptable limitation on this potential to fail to meet the LCO indefinitely.

C.1

With one or more LCO 3.8.9.a DC buses inoperable and a loss of function has not yet occurred, the remaining DC electrical power distribution subsystems are capable of supporting the minimum safety functions necessary to shut down the reactor and maintain it in a safe shutdown condition, assuming no single failure. The overall reliability is reduced, however, because a single failure in the remaining DC electrical power distribution subsystem could result in the minimum required ESF functions not being supported. Therefore, the DC bus(es) must be restored to OPERABLE status within 2 hours by powering the bus(es) from the associated battery or charger.

Condition C represents one or more DC buses without adequate DC power; potentially both with the battery significantly degraded and the associated charger nonfunctioning. In this situation, the unit is significantly more vulnerable to a complete loss of all DC power. It is, therefore, imperative that the operator's attention focus on stabilizing the unit, minimizing the potential for loss of power to the remaining trains and restoring power to the affected train.

This 2 hour limit is more conservative than Completion Times allowed for the vast majority of components that would be without power. Taking exception to LCO 3.0.2 for components without adequate DC power, which would have Required Action Completion Times shorter than 2 hours, is acceptable because of:

a. The potential for decreased safety by requiring a change in unit conditions (i.e., requiring a shutdown) while allowing stable operations to continue;

b. The potential for decreased safety by requiring entry into numerous applicable Conditions and Required Actions for components without DC power and not providing sufficient time for the operators to perform the necessary evaluations and actions for restoring power to the affected train; and

(continued)

BASES

ACTIONS

C.1 (continued)

c. The potential for an event in conjunction with a single failure of a redundant component.

The 2 hour Completion Time for DC buses is consistent with Regulatory Guide 1.93 (Ref. 3).

The second Completion Time for Required Action C.1 establishes a limit on the maximum time allowed for any combination of required distribution subsystems to be inoperable during any single contiguous occurrence of failing to meet the LCO. If Condition C is entered while, for instance, an AC bus is inoperable and subsequently returned OPERABLE, the LCO may already have been not met for up to 8 hours. This could lead to a total of 10 hours, since initial failure of the LCO, to restore the DC distribution system. At this time, an AC train could again become inoperable, and DC distribution restored OPERABLE. This could continue indefinitely.

This Completion Time allows for an exception to the normal "time zero" for beginning the allowed outage time "clock." This will result in establishing the "time zero" at the time the LCO was initially not met, instead of the time Condition C was entered. The 16 hour Completion Time is an acceptable limitation on this potential to fail to meet the LCO indefinitely.

D.1

With one or more required LCO 3.8.9.b AC electrical power distribution subsystem(s) inoperable, the shared component(s) on the other unit is not capable of operating. The bus is de-energized. In this condition, the associated shared component is declared inoperable immediately. SW, MCR/ESGR EVS, and Auxiliary Building central exhaust system are shared systems. The associated Conditions or Required Actions of LCO 3.7.8, "Service Water System," LCO 3.7.10, "MCR/ESGR Emergency Ventilation System," and LCO 3.7.12, "Emergency Core Cooling System Pump Room Exhaust Air Cleanup System," are followed.

BASES

ACTIONS (continued)

E.1

With one or more required LCO 3.8.9.b DC electrical power distribution subsystem(s) inoperable, the shared component(s) on the other unit is not capable of operating. In this condition, the associated shared component is declared inoperable immediately. SW, MCR/ESGR EVS, and Auxiliary Building central exhaust system are shared systems. The associated Conditions or Required Actions of LCO 3.7.8, 3.7.10, and 3.7.12 are followed.

F.1 and F.2

If the inoperable LCO 3.8.9.a distribution subsystem cannot be restored to OPERABLE status within the required Completion Time, the unit must be brought to a MODE in which the LCO does not apply. To achieve this status, the unit must be brought to at least MODE 3 within 6 hours and to MODE 5 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging unit systems.

G.1

Condition G corresponds to a level of degradation in the electrical power distribution system that causes a required safety function to be lost. When more than one inoperable LCO 3.8.9.a electrical power distribution subsystem results in the loss of a required function, the plant is in a condition outside the accident analysis. Therefore, no additional time is justified for continued operation. LCO 3.0.3 must be entered immediately to commence a controlled shutdown.

SURVEILLANCE REQUIREMENTS

SR 3.8.9.1

This Surveillance verifies that the required AC, DC, and AC vital bus electrical power distribution systems are functioning properly, with the correct circuit breaker alignment. The correct breaker alignment ensures the appropriate separation and independence of the electrical divisions is maintained, and the appropriate voltage is available to each required bus. The verification of proper voltage availability on the buses ensures that the required voltage is readily available for motive as well as control

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.9.1 (continued)

functions for critical system loads connected to these buses. The 7 day Frequency takes into account the redundant capability of the AC, DC, and AC vital bus electrical power distribution subsystems, and other indications available in the control room that alert the operator to subsystem malfunctions.

REFERENCES

1. UFSAR, Chapter 6.

2. UFSAR, Chapter 15.

3. Regulatory Guide 1.93, December 1974.

Table B 3.8.9-1 (page 1 of 1)
AC and DC Electrical Power Distribution Systems

TYPE	VOLTAGE	TRAIN H*		TRAIN J*	
		Unit 1	Unit 2	Unit 1	Unit 2
AC emergency buses	4160 V	ESF Bus		ESF Bus	
		1H	2H	1J	2J
	480 V	Load Centers		Load Centers	
		1H	2H	1J	2J
		1H1	2H1	1J1	2J1
DC buses	125 V	Bus 1-I	2-I	Bus 1-III	2-III
		Bus 1-II	2-II	Bus 1-IV	2-IV
AC vital buses	120 V	Bus 1-1	2-1	Bus 1-3	2-3
		Bus 1-2	2-2	Bus 1-4	2-4

* Each train of the AC and DC electrical power distribution systems is a subsystem.

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B 3.8 ELECTRICAL POWER SYSTEMS

B 3.8.10 Distribution Systems–Shutdown

BASES

BACKGROUND

A description of the AC, DC, and AC vital bus electrical power distribution systems is provided in the Bases for LCO 3.8.9, "Distribution Systems–Operating."

APPLICABLE SAFETY ANALYSES

The initial conditions of Design Basis Accident and transient analyses in the UFSAR, Chapter 6 (Ref. 1) and Chapter 15 (Ref. 2), assume Engineered Safety Feature (ESF) systems are OPERABLE. The AC, DC, and AC vital bus electrical power distribution systems are designed to provide sufficient capacity, capability, redundancy, and reliability to ensure the availability of necessary power to ESF systems so that the fuel, Reactor Coolant System, and containment design limits are not exceeded.

The OPERABILITY of the AC, DC, and AC vital bus electrical power distribution system is consistent with the initial assumptions of the accident analyses and the requirements for the supported systems' OPERABILITY.

The OPERABILITY of the minimum AC, DC, and AC vital bus electrical power distribution subsystems during MODES 5 and 6, and during movement of recently irradiated fuel assemblies ensures that:

a. The unit can be maintained in the shutdown or refueling condition for extended periods;

b. Sufficient instrumentation and control capability is available for monitoring and maintaining the unit status; and

c. Adequate power is provided to mitigate events postulated during shutdown, such as a fuel handling accident involving handling recently irradiated fuel. Due to radioactive decay, the AC and DC electrical power is only required to mitigate fuel handling accidents involving handling recently irradiated fuel. (i.e., fuel that has occupied part of a critical core within a time frame established by analysis. The term recently is defined as all irradiated fuel assemblies, until analysis is performed to determine a specific time frame.)

BASES

APPLICABLE SAFETY ANALYSES (continued)	The AC and DC electrical power distribution systems satisfy Criterion 3 of 10 CFR 50.36(c)(2)(ii).
LCO	Various combinations of subsystems, equipment, and components are required OPERABLE by other LCOs, depending on the specific unit condition. Implicit in those requirements is the required OPERABILITY of necessary support required features. This LCO explicitly requires energization of the portions of the electrical distribution system necessary to support OPERABILITY of required systems, equipment, and components–all specifically addressed in each LCO and implicitly required via the definition of OPERABILITY. Maintaining these portions of the distribution system energized ensures the availability of sufficient power to operate the unit in a safe manner to mitigate the consequences of postulated events during shutdown (e.g., fuel handling accidents involving handling recently irradiated fuel).
APPLICABILITY	The AC and DC electrical power distribution subsystems required to be OPERABLE in MODES 5 and 6, and during movement of recently irradiated fuel assemblies, provide assurance that: a. Systems to provide adequate coolant inventory makeup are available for the irradiated fuel in the core; b. Systems needed to mitigate a fuel handling accident involving handling recently irradiated fuel (i.e., fuel that has occupied part of a critical core within a time frame established by analysis. The term recently is defined as all irradiated fuel assemblies, until analysis is performed to determine a specific time frame.) are available; c. Systems necessary to mitigate the effects of events that can lead to core damage during shutdown are available; and d. Instrumentation and control capability is available for monitoring and maintaining the unit in a cold shutdown condition and refueling condition.

BASES

APPLICABILITY (continued)

The AC, DC, and AC vital bus electrical power distribution subsystems requirements for MODES 1, 2, 3, and 4 are covered in LCO 3.8.9.

ACTIONS

A.1, A.2.1, A.2.2, A.2.3, A.2.4, and A.2.5

Although redundant required features may require redundant trains of electrical power distribution subsystems to be OPERABLE, one OPERABLE distribution subsystem train may be capable of supporting sufficient required features to allow continuation of CORE ALTERATIONS and recently irradiated fuel movement. By allowing the option to declare required features associated with an inoperable distribution subsystem inoperable, appropriate restrictions are implemented in accordance with the affected distribution subsystem LCO's Required Actions. In many instances, this option may involve undesired administrative efforts. Therefore, the allowance for sufficiently conservative actions is made (i.e., to suspend CORE ALTERATIONS, movement of recently irradiated fuel assemblies, and operations involving positive reactivity additions) that could result in loss of required SDM (MODE 5) or boron concentration (MODE 6). Suspending positive reactivity additions that could result in failure to meet the minimum SDM or boron concentration limit is required to assure continued safe operation. Introduction of coolant inventory must be from sources that have a boron concentration greater than what would be required in the RCS for minimum SDM or refueling boron concentration. This may result in an overall reduction in RCS boron concentration, but provides acceptable margin to maintaining subcritical operation. Introduction of temperature changes including temperature increases when operating with a positive MTC must also be evaluated to ensure they do not result in a loss of required SDM.

Suspension of these activities does not preclude completion of actions to establish a safe conservative condition. These actions minimize the probability of the occurrence of postulated events. It is further required to immediately initiate action to restore the required AC and DC electrical power distribution subsystems and to continue this action until restoration is accomplished in order to provide the necessary power to the unit safety systems.

(continued)

BASES

ACTIONS

A.1, A.2.1, A.2.2, A.2.3, A.2.4, and A.2.5 (continued)

Notwithstanding performance of the above conservative Required Actions, a required residual heat removal (RHR) subsystem may be inoperable. In this case, Required Actions A.2.1 through A.2.4 do not adequately address the concerns relating to coolant circulation and heat removal. Pursuant to LCO 3.0.6, the RHR ACTIONS would not be entered. Therefore, Required Action A.2.5 is provided to direct declaring RHR inoperable, which results in taking the appropriate RHR actions.

The Completion Time of immediately is consistent with the required times for actions requiring prompt attention. The restoration of the required distribution subsystems should be completed as quickly as possible in order to minimize the time the unit safety systems may be without power.

SURVEILLANCE REQUIREMENTS

SR 3.8.10.1

This Surveillance verifies that the required AC, DC, and AC vital bus electrical power distribution subsystems are functioning properly, with all the buses energized. The verification of proper voltage availability on the buses ensures that the required power is readily available for motive as well as control functions for critical system loads connected to these buses. The 7 day Frequency takes into account the capability of the electrical power distribution subsystems, and other indications available in the control room that alert the operator to subsystem malfunctions.

REFERENCES

1. UFSAR, Chapter 6.

2. UFSAR, Chapter 15.

SECTION 3.8 - ELECTRICAL POWER SYSTEMS

IMPROVED STANDARD TECHNICAL SPECIFICATIONS

MARKUP AND JUSTIFICATION FOR DEVIATIONS

CTS

3.8 ELECTRICAL POWER SYSTEMS

3.8.1

3.8.1 AC Sources – Operating

3.8.1.1

LCO 3.8.1 The following AC electrical sources shall be OPERABLE:

a. Two qualified circuits between the offsite transmission network and the onsite Class 1E AC Electrical Power Distribution System: [and]

Emergency

b. Two diesel generators (DGs) capable of supplying the onsite Class 1E power distribution subsystem(s) and

Required

c. Automatic load sequencers for Train A and Train B]

sequencing timing relays

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

<INSERT>

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
LCO 3.8.1.a Action a A. One [required] offsite circuit inoperable.	A.1 Perform SR 3.8.1.1 for [required] OPERABLE offsite circuit(s)	1 hour AND Once per 8 hours thereafter
	AND	
New	A.2 Declare required feature(s) with no offsite power available inoperable when its redundant required feature(s) is inoperable.	24 hours from discovery of no offsite power to one train concurrent with inoperability of redundant required feature(s)
	AND	(continued)

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New

c. One qualified circuit between the offsite transmission network and the onsite Class 1E AC Electrical Power Distribution System and one EDG capable of supplying the onsite Class 1E AC power distribution subsystem on the other unit for each required shared component; and

CTS

ACTIONS

	CONDITION	REQUIRED ACTION		COMPLETION TIME	
Action a New	A. (continued)	A.3	Restore [required] offsite circuit to OPERABLE status.	72 hours AND 17 days from discovery of failure to meet LCO	1 6
Action b New	B. One [required] DG inoperable. LCO 3.8.1.b	B.1	Perform SR 3.8.1.1 for the required offsite circuit(s).	1 hour AND Once per 8 hours thereafter	2 1 12
		AND			
Action b		B.2	Declare required feature(s) supported by the inoperable DG inoperable when its required redundant feature(s) is inoperable.	4 hours from discovery of Condition B concurrent with inoperability of redundant required feature(s)	2
		AND			12
Action b		B.3.1	Determine OPERABLE DG(s) is not inoperable due to common cause failure. LCO 3.8.1.b	24 hours	2 1
		OR			
Action b		B.3.2	Perform SR 3.8.1.2 for OPERABLE DG(s). LCO 3.8.1.b	24 hours	2 1
		AND			12
Action b				(continued)	

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CTS ACTIONS

	CONDITION	REQUIRED ACTION	COMPLETION TIME
Action b	B. (continued)	B.4 Restore ~~[required]~~ E DG to OPERABLE status.	14 days ~~72 hours~~ 2 1 6 AND 17 ~~8~~ days from discovery of failure to meet LCO 6
New Action b			Action C INSERT 6 Actions D, E, F 12
New	6 LCO 3.8.1.a ~~8~~ 7. Two ~~[required]~~ offsite circuits inoperable.	6 ~~8~~ 7.1 Declare required feature(s) inoperable when its redundant required feature(s) is inoperable.	12 hours from discovery of Condition ~~8~~ 6 concurrent with inoperability of redundant required features 12
Action d		AND 6 ~~8~~ 7.2 Restore one ~~[required]~~ offsite circuit to OPERABLE status.	24 hours 1

(continued)

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	CONDITION	REQUIRED ACTION	COMPLETION TIME
Actions 3.8.1.1.b 3.8.1.1.b.1 3.8.1.1.b.2	C. ----------NOTE---------- Only applicable if either Alternate AC (AAC) diesel generator (DG) or EDG(s) on other unit is inoperable. ---------- One LCO 3.8.1.b EDG inoperable.	C.1 Restore inoperable AAC DG to OPERABLE status.	72 hours
		AND	
		C.2 Restore inoperable EDG(s) on other unit to OPERABLE status.	72 hours
New	D. ----------NOTE---------- Separate Condition entry is allowed for each offsite circuit. ---------- One or more required LCO 3.8.1.c offsite circuit(s) inoperable.	D.1 Perform SR 3.8.1.1 for OPERABLE LCO offsite circuit(s).	1 hour AND Once per 8 hours thereafter
		AND	
		D.2 Declare required feature(s) with no offsite power available inoperable when its redundant required feature(s) is inoperable.	24 hours from discovery of no offsite power to a train concurrent with inoperability of redundant required feature(s)
		AND	
		D.3 Declare associated shared component(s) inoperable.	72 hours

INSERT (continued)

CTS

	CONDITION	REQUIRED ACTION	COMPLETION TIME
New	E. One required LCO 3.8.1.c EDG inoperable.	E.1 Perform SR 3.8.1.1 for required offsite circuit(s). AND E.2 Declare required feature(s) supported by the inoperable EDG inoperable when its redundant required feature(s) is inoperable. AND E.3 Declare associated shared component(s) inoperable.	1 hour AND Once per 8 hours thereafter 4 hours from discovery of Condition E concurrent with inoperability of redundant required feature(s) 14 days
New	F. ----------NOTE---------- Only applicable if AAC DG or LCO 3.8.1.b EDG(s) is inoperable. ---------- One required LCO 3.8.1.c EDG inoperable.	F.1.1 Restore inoperable AAC DG to OPERABLE status. AND F.1.2 Restore inoperable LCO 3.8.1.b EDG(s) to OPERABLE status. OR F.2 Declare associated shared component(s) inoperable.	72 hours 72 hours 72 hours

CTS ACTIONS (continued)

	CONDITION	REQUIRED ACTION	COMPLETION TIME	
Action C	H LCO 3.8.1.a ~~D.~~ One ~~[required]~~ offsite circuit inoperable. AND LCO 3.8.1.b E ~~One [required]~~ DG inoperable.	----------NOTE---------- Enter applicable Conditions and Required Actions of LCO 3.8.9, "Distribution Systems—Operating," when Condition ~~D~~ H is entered with no AC power source to any train. ---------- H ~~D~~.1 Restore ~~[required]~~ offsite circuit to OPERABLE status. OR H ~~D~~.2 Restore ~~[required]~~ E DG to OPERABLE status.	 12 hours 12 hours	12 1 12 1 1 2
Action e	I LCO 3.8.1.b E ~~D.~~ Two ~~[required]~~ DGs inoperable.	I ~~D~~.1 Restore one E ~~[required]~~ DG to OPERABLE status.	2 hours	1 12

New

(continued)

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New

CONDITION	REQUIRED ACTION	COMPLETION TIME
J. Two required LCO 3.8.1.c EDGs inoperable.	J.1 Declare associated shared component(s) inoperable.	Immediately

CTS

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
K ~~F.~~ ~~----REVIEWER'S NOTE--- This Condition may be deleted if the unit design is such that any sequencer failure mode will only affect the ability of the associated DG to power its respective safety loads following a loss of offsite power independent of, or coincident with, a Design Basis Event. ----------~~	~~F.1~~ Restore ~~[required]~~ ~~[automatic load sequencer]~~ to OPERABLE status.	~~[12]~~ ~~hours~~ 12
New ~~One [required] [automatic load sequencer] inoperable~~		3
		INSERT 8
Actions a, b, c, d and e L ~~G.~~ Required Action and associated Completion Time of Condition A, B, C, ~~D, E, F, or F.~~ G, H, or I not met.	L ~~G.~~1 Be in MODE 3.	6 hours 12
	AND L ~~G.~~2 Be in MODE 5.	36 hours 12
New M ~~H.~~ ~~Three or more [required] AC sources inoperable.~~ of LCO 3.8.1.a and LCO 3.8.1.b	M ~~H.~~1 Enter LCO 3.0.3.	Immediately 12

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CONDITION	REQUIRED ACTION	COMPLETION TIME
K. ----------NOTE---------- Separate Condition entry is allowed for each sequencing timing relay. ---------- New	K.1 Enter appropriate Conditions and Required Actions for any component made inoperable by inoperable sequencing timing relay(s).	Immediately
One or more required sequencing timing relay(s) inoperable.	AND	
	K.2.1 Place the component(s) with the inoperable sequencing timing relay in a condition where it cannot be automatically loaded to associate emergency electrical bus.	Immediately
	OR	
	K.2.2 Declare the associated EDG inoperable.	Immediately

CTS

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE		FREQUENCY	
4.8.1.1.1 a	SR 3.8.1.1	Verify correct breaker alignment and indicated power availability for each required offsite circuit.	7 days	1
4.8.1.1.2 a.4	SR 3.8.1.2	.....NOTES..... 1. Performance of SR 3.8.1.7 satisfies this SR.		TSTF 253 2
		1 2 All DG starts may be preceded by an engine prelube period and followed by a warmup period prior to loading.		TSTF 253
		2 A modified DG start involving idling and gradual acceleration to synchronous speed may be used for this SR as recommended by the manufacturer. When modified start procedures are not used, the time, voltage, and frequency tolerances of SR 3.8.1.7 must be met.		1
		.....		2
		required Verify each DG starts from standby conditions and achieves steady state voltage ≥ 3740 V and ≤ 4580 V, and frequency ≥ 58.8 Hz and ≤ 61.2 Hz. (59.5 / 60.5)	31 days As specified in Table 3.8.1-1	TSTF-37 12 1

(continued)

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CTS

SURVEILLANCE REQUIREMENTS (continued)

	SURVEILLANCE		FREQUENCY	
4.8.1.1.2 a.4	SR 3.8.1.3	----------NOTES---------- 1. EDG loadings may include gradual loading as recommended by the manufacturer. 2. Momentary transients outside the load range do not invalidate this test. 3. This Surveillance shall be conducted on only one EDG at a time. 4. This SR shall be preceded by and immediately follow without shutdown a successful performance of SR 3.8.1.2 or SR 3.8.1.7. ----------		(2) (2)
		required Verify each EDG is synchronized and loaded and operates for ≥ 60 minutes at a load ≥ [4500] (2500) kW and ≤ [5000] (2600) kW.	~~As specified in Table 3.8.1-1~~ 31 days	(2) TSTF-37 (12) (1)
4.8.1.1.2 a.1	SR 3.8.1.4	required Verify each day tank [and engine mounted tank] contains ≥ [220] (450) gal of fuel oil.	31 days	(12) (1)
New	SR 3.8.1.5	Check for and remove accumulated water from each day tank [and engine mounted tank]. required	~~31~~ (92) days	(13) (1) (12)
4.8.1.1.2 a.3	SR 3.8.1.6	each required Verify the fuel oil transfer system pump operates to [automatically] transfer fuel oil from storage tank[s] to the day tank [and engine mounted tank].	~~92~~ days	(12) (1) (1)

(continued)

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CTS

SURVEILLANCE REQUIREMENTS (continued)

	SURVEILLANCE	FREQUENCY
4.8.1.1.2 c SR 3.8.1.7	----------NOTE---------- All DG starts may be preceded by an engine prelube period. ---------- Verify each DG starts from standby condition and achieves in ≤ [10] seconds, voltage ≥ [3740] V and ≤ [4580] V, and frequency ≥ [58.8] Hz and ≤ [61.2] Hz. (59.5) (60.5)	184 days
UNIT 1 4.8.1.1.1 b SR 3.8.1.8	----------NOTE---------- This Surveillance shall not be performed in MODE 1 or 2. However, credit may be taken for unplanned events that satisfy this SR. ---------- Verify [automatic and] manual transfer of AC power sources from the normal offsite circuit to each alternate required offsite circuit.	18 months

(continued)

required

ab ≤ 10 seconds, voltage ≥ 3960 V and frequency ≥ 59.5 Hz; and b steady state

TSTF 163

TSTF 8

This Surveillance is only applicable to Unit 1.

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CTS

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE	FREQUENCY
SR 3.8.1.9 ----------NOTES---------- 1. This Surveillance shall not be performed in MODE 1 or 2. However, credit may be taken for unplanned events that satisfy this SR. 2. If performed with the DG synchronized with offsite power, it shall be performed at a power factor ≤ 0.9. ---------- <INSERT> TSTF 276	
required Verify each DG rejects a load greater than or equal to its associated single largest post-accident load, and:	[18 months]
a. Following load rejection, the frequency is ≤ [63] Hz; 66	
b. Within 30 seconds following load rejection, the voltage is ≥ 3740 V and ≤ 4580 V; and	
c. Within 30 seconds following load rejection, the frequency is ≥ [58.8] Hz and ≤ [61.2] Hz. 59.5 60.5	
SR 3.8.1.10 ----------NOTE---------- This Surveillance shall not be performed in MODE 1 or 2. However, credit may be taken for unplanned events that satisfy this SR. ---------- Verify each DG operating at a power factor ≤ [0.9] does not trip and voltage is maintained ≤ [5000] V during and following a load rejection of ≥ [4500] kW and ≤ [5000] kW.	[18 months]

4.8.1.1.2 d.1

10 TSTF 8 1 2 1 2 1 12 1 1 1 1 9

(continued)

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However, if grid conditions do not permit, the power factor limit is not required to be met. Under this condition, the power factor shall be maintained as close to the limit as practicable.

CTS

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE	FREQUENCY
SR 3.8.1.1 ----------NOTES----------	
1. All DG starts may be preceded by an engine prelube period.	
2. This Surveillance shall not be performed in MODE 1, 2, 3, or 4. However, credit may be taken for unplanned events that satisfy this SR.	
Verify on an actual or simulated loss of offsite power signal:	18 months
a. De-energization of emergency buses;	
b. Load shedding from emergency buses;	
c. Each required DG auto-starts from standby condition and:	
1. energizes permanently connected loads in ≤ 10 seconds,	
2. energizes auto-connected shutdown loads through automatic load sequencer timing relays	
3. maintains steady state voltage ≥ 3740 V and ≤ 4580 V,	
4. maintains steady state frequency ≥ 58.8 Hz and ≤ 61.2 Hz, and	
5. supplies permanently connected and auto-connected shutdown loads for ≥ 5 minutes	

4.8.1.1.2 d.3

INSERT TSTF 283 TSTF 8

(continued)

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However, portions of the Surveillance may be performed to reestablish OPERABILITY provided an assessment determines the safety of the unit is maintained or enhanced.

CTS

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE	FREQUENCY
4.8.1.1.2 d.4 SR 3.8.1.12 ..... NOTES ..... 1. All DG starts may be preceded by prelube period. 2. This Surveillance shall not be performed in MODE 1 or 2. However, credit may be taken for unplanned events that satisfy this SR.	
Verify on an actual or simulated Engineered Safety Feature (ESF) actuation signal each DG auto-starts from standby condition and: LCO 3.8.1.b	[18 months]
a. In ≤ [100] seconds after auto-start and during tests, achieves voltage ≥ [3740] V and ≤ [4580] V.	
b. In ≤ [10] seconds after auto-start and during tests, achieves frequency ≥ [58.8] Hz and ≤ [61.2] Hz:	
c. Operates for ≥ 5 minutes;	
d. Permanently connected loads remain energized from the offsite power system; and	
e. Emergency loads are energized or auto-connected through the automatic load sequencer from the offsite power system.	

(continued)

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However, portions of the Surveillance may be performed to reestablish OPERABILITY provided an assessment determines the safety of the unit is maintained or enhanced.

CTS SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE	FREQUENCY
4.8.1.1.2 d.5.c) SR 3.8.1.12 ----------NOTE---------- This Surveillance shall not be performed in MODE 1 or 2. However, credit may be taken for unplanned events that satisfy this SR. ---------- Verify each DG's automatic trips are bypassed on actual or simulated loss of voltage signal on the emergency bus concurrent with an actual or simulated ESF actuation signal except: (required) (automatic start) a. Engine overspeed; and b. Generator differential current. c. [Low lube oil pressure;] d. [High crankcase pressure;] and e. [Start failure relay].	18 months

(continued)

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CTS

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE	FREQUENCY
4.8.1.1.2 d.6 SR 3.8.1.1 (3) ----------NOTES---------- 1. Momentary transients outside the load and power factor ranges do not invalidate this test.	
2. This Surveillance shall not be performed in MODE 1 or 2. However, credit may be taken for unplanned events that satisfy this SR.	<INSERT> TSTF 276
Verify each EDG operating at a power factor ≤ 0.9 operates for ≥ 24 hours: (required)	18 months
a. For ≥ 20 hours loaded ≥ 5250 kW and ≤ 5500 kW; and (2900, 3000)	
b. For the remaining hours of the test loaded ≥ 4500 kW and ≤ 5000 kW. (2500, 2600)	
4.8.1.1.2 d.10 SR 3.8.1.1 (4) ----------NOTES---------- 1. This Surveillance shall be performed within 5 minutes of shutting down the EDG after the EDG has operated ≥ 20 hours loaded ≥ 4500 kW and ≤ 5000 kW. (2500, 2600) (or after operating temperatures have stabilized) Momentary transients outside of load range do not invalidate this test.	
2. All EDG starts may be preceded by an engine prelube period.	
Verify each EDG starts and achieves, in ≤ 10 seconds, voltage ≥ 3740 V, and ≤ 4580 V and frequency ≥ 58.8 Hz and ≤ 61.2 Hz. (59.5, 60.5) (required)	18 months a. In ≤ 10 seconds, voltage ≥ 3960 V and frequency ≥ 59.5 Hz; and b. Steady state (TSTF 163)

(continued)

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If performed with EDG synchronized with offsite power, it shall be performed at a power factor ≤ 0.9. However, if grid conditions do not permit, the power factor limit is not required to be met. Under this condition, the power factor shall be maintained as close to the limit as practicable.

CTS

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE	FREQUENCY
4.8.1.1.2 d.8 SR 3.8.1.16 (5) ----------NOTE---------- This Surveillance shall ~~not be performed~~ Normally in MODE 1, 2, 3, or 4. ~~However, credit may be taken for unplanned events that satisfy this SR.~~ ----------	
required Verify each (E) DG:	(2) 18 months (1) (12)
a. Synchronizes with offsite power source while loaded with emergency loads upon a simulated restoration of offsite power;	
b. Transfers loads to offsite power source; and	
c. Returns to ready-to-load operation.	
~~SR 3.8.1.17 ----------NOTE---------- This Surveillance shall not be performed in MODE 1, 2, 3, or 4. However, credit may be taken for unplanned events that satisfy this SR. ----------~~	
~~Verify, with a DG operating in test mode and connected to its bus, an actual or simulated ESF actuation signal overrides the test mode by:~~	~~[18 months]~~ (4)
~~a. Returning DG to ready-to-load operation [; and~~	
~~b. Automatically energizing the emergency load from offsite power].~~	

(9) TSTF 283 INSERT TSTF 8

(continued)

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However, this Surveillance may be performed to reestablish OPERABILITY provided an assessment determines the safety of the unit is maintained or enhanced.

CTS

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE	FREQUENCY
4.8.1.1.2 d.2 SR 3.8.1.~~12~~ 6 ----------NOTE---------- This Surveillance shall ~~not~~ Normally be performed in MODE 1, 2, 3, or 4. ~~However, credit may be taken for unplanned events that satisfy this SR.~~ ---------- TSTF 283 INSERT 1 9 1 TSTF 8 8	TSTF-8
Verify ~~interval between each sequenced load block~~ the required sequencing timing relay is within ~~± 10% of design interval for each emergency [and shutdown] load sequencer~~ tolerance. 1 2 2	~~18 months~~
SR 3.8.1.~~19~~ 7 E ----------NOTES---------- 1. All DG starts may be preceded by an engine prelube period. 4 2 4.8.1.1.2 d.5.a&b	
2. This Surveillance shall ~~not~~ normally be performed in MODE 1, 2, 3, or 4. ~~However, credit may be taken for unplanned events that satisfy this SR.~~ ---------- INSERT 2 TSTF 283 TSTF 8	
Verify on an actual or simulated loss of offsite power signal in conjunction with an actual or simulated ESF actuation signal: 1	~~18 months~~
a. De-energization of emergency buses;	
b. Load shedding from emergency buses; and	
c. E DG auto-starts from standby condition and: 2 EACH LCO 3.8.1.b	
1. energizes permanently connected loads in ≤ ~~10~~ 10 seconds. 1	
	(continued)

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INSERT 1

However, this Surveillance may be performed to reestablish OPERABILITY provided an assessment determines the safety of the unit is maintained or enhanced.

INSERT 2

However, portions of the Surveillance may be performed to reestablish OPERABILITY provided an assessment determines the safety of the unit is maintained or enhanced.

CTS SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
SR 3.8.1.~~19~~ 17 (continued)	
2. energizes auto-connected emergency loads through load sequencer. ing timing relays	
3. achieves steady state voltage ≥ ~~[3740]~~ V and ≤ ~~[4580]~~ V.	
4. achieves steady state frequency ≥ ~~[58.8]~~ 59.5 Hz and ≤ ~~[61.2]~~ 60.5 Hz, and	
5. supplies permanently connected ~~[and auto-connected]~~ emergency loads for ≥ 5 minutes.	
4.8.1.1.2 e SR 3.8.1.~~20~~ 18 E ----------NOTE---------- All DG starts may be preceded by an engine prelube period. ----------	
3740 Verify when started E simultaneously from LCO 3.8.1.1 standby condition, each DG achieves, in ≤ ~~[10 seconds,]~~ voltage ≥ ~~[3744]~~ V and ≤ ~~[4576]~~ 4580 V, and frequency ≥ ~~[58.8]~~ 59.5 Hz and ≤ ~~[61.2]~~ 60.5 Hz.	10 years TSTF 163 a. In ≤ 10 seconds, voltage ≥ 3960 V and frequency ≥ 59.5 Hz; and b. Steady state

9
2
1
1
9
2
2
1

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Table 3.8.1-1 (page 1 of 1)
Diesel Generator Test Schedule

NUMBER OF FAILURES IN LAST 25 VALID TESTS[a]	FREQUENCY
≤ 3	31 days
≥ 4	7 days[b] (but no less than 24 hours)

a) Criteria for determining number of failures and valid tests shall be in accordance with Regulatory Position C.2.1 of Regulatory Guide 1.9, Revision 3, where the number of tests and failures is determined on a per DG basis.

b) This test frequency shall be maintained until seven consecutive failure free starts from standby conditions and load and run tests have been performed. This is consistent with Regulatory Position [ ], of Regulatory Guide 1.9, Revision 3. If, subsequent to the 7 failure free tests, 1 or more additional failures occur, such that there are again 4 or more failures in the last 25 tests, the testing interval shall again be reduced as noted above and maintained until 7 consecutive failure free tests have been performed.

[Note: If Revision 3 of Regulatory Guide 1.9 is not approved, the above table will be modified to be consistent with the existing version of Regulatory Guide 1.108, GL 84-15, or other approved version.]

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1. The brackets are removed and the proper plant specific information/value is provided.

2. Changes are made (additions, deletions, and/or changes) to the ISTS, which reflect the plant specific nomenclature, number, reference, system description, analysis, or licensing basis description. This change includes the diesel generator (DG) to emergency diesel generator (EDG), automatic load sequencer to sequencing timing relays, and Trains A and B to Trains H and J.

3. Editorial change made with the removal of the Reviewer's Note to be consistent with the ISTS Writers Guide.

4. The bracketed requirement ISTS SR 3.8.1.17 is deleted. This is acceptable because the North Anna electrical design does not incorporate an override from an actual or simulated ESF signal of the EDG operating in a test mode. The following requirements are renumbered, where applicable, to reflect this deletion.

5. ISTS SR 3.8.1.8 requires the automatic or manual transfer of the AC power sources from the normal offsite circuit to each alternate offsite circuit every 18 months. North Anna Unit 2 design does not include an alternate circuit from the offsite AC source as tested by SR 3.8.1.8. To perform this testing, H and J emergency buses would be tied electrically together with breaker 25H1. This alignment is not allowed by GDC 17 requirements in MODES 1, 2, 3, and 4. A Note that modifies ITS SR 3.8.1.8 and states, "The Surveillance is only applicable to Unit 1." This is acceptable because North Anna Unit 1 does have an alternate offsite circuit and the test can be performed and the test cannot be performed on Unit 2 without jeopardizing electrical independence.

6. ITS Action C is added to the ISTS and applies when an EDG is inoperable and the Alternate AC (AAC DG) or the opposite unit's EDG(s) is inoperable. This change is acceptable because it limits the Completion Time for ITS Action C with an inoperable EDG to 72 hours without both opposite unit EDGs and the AAC DG OPERABLE. CTS Action b.2 allows the removal of an EDG for a period up to 14 days provided the AAC DG and the opposite unit's EDGs are OPERABLE. ITS Required Action B.4 sets the Completion Time for an inoperable EDG to 14 days. This is acceptable because ITS Action C provides adequate remedial Required Actions and appropriate associated Completion Times. The 14-day allowance provided by ITS Action B, Required Actions A.3 and B.4 Completion Times are modified to allow 17 days from failure to meet the LCO from the ISTS requirement of 6 days. The ITS Actions following Action C are renumbered to reflect this addition.

7. CTS Surveillance Requirement 4.8.1.1.2.d.10 requires each EDG to be fast started within 5 minutes of shutting down from 2 hours of operation loaded between 2500 and 2600 kW or until the EDG obtains stable operating temperatures. ISTS SR 3.8.1.15 is modified to retain the allowance to operate an EDG until "operating temperatures have stabilized," in the ITS SR 3.8.1.14 Note 1. This change is acceptable because the function of the Note is

to ensure the EDG is at normal operating conditions before it is shutdown, and restarted within 10-seconds to the required voltage and frequency.

8. ISTS LCO part c, Action F and SR 3.8.1.18 are constructed for a load sequencer that coordinates supplying electrical power for a train of equipment. The assumed type of sequencer operates differently depending on the source of electrical power for the emergency bus (EDG or offsite circuit). Failure of the sequencer would affect all components powered by the emergency electrical bus. Therefore, a sequencer is typically allowed to be inoperable for only 12 hours, the same Completion Time allowed for a loss of an EDG concurrent with the loss of an offsite circuit. The North Anna electrical design does not utilizes this type of device, but uses individual sequencing timing relays for each component to be loaded onto an emergency bus. The components served by the sequencing timing relays are not dependent on the source of power supplying the emergency bus. The ITS is modified to reflect the North Anna design. An inoperable sequencing timing relay requires entry into the Condition K. ITS Required Action K.1 requires the affected system, subsystem, or component to be declared inoperable immediately, while Required Action K.2.1 requires the component be placed in a condition that inhibits the automatic loading to the emergency bus and K.2.2 allows the associated EDG to be declared inoperable. These Required Actions are appropriate to ensure the electrical bus is protected and degraded safety functions are tracked. ITS SR 3.8.1.16 verifies each sequenced load is within design tolerance for each sequencing timing relay every 18 months. This change is acceptable because a sequencing timing relay can affect an individual function and the emergency bus.

9. ISTS SR 3.8.1.10 requires verification every 18 months that each EDG will not trip and will maintain voltage within a maximum limit on a full load rejection test. A full load rejection test is not required by the CTS requirements, and is not included in the ITS requirements. Each EDG will continue to perform the largest post-accident load rejection test every 18 months. This change is acceptable because the North Anna electrical design utilizes a higher current trip on the EDG output breaker than from individual loads. The SRs following ISTS SR 3.8.1.10 are re-numbered to reflect this deletion.

10. Note 1 to ISTS SR 3.8.1.9 states that the SR shall not be performed in MODES 1 or 2. This Note has been deleted. The performance of ITS SR 3.8.1.9, load reject equal to the single largest post-accident load, is significantly less of a perturbation to the emergency buses being supplied by offsite power, than starting the same load under the same conditions. This change deletes the Note that requires the SR to be performed with the unit in MODE 3 or lower. This is acceptable because the required test performed in MODES 1 or 2 does not significantly perturbate the required electrical system.

11. ISTS SR 3.8.1.13 requires verification that the EDG automatic trips are by-passed on an actual or simulated signal ESF start. A Note to the SR specifies the test shall not be performed in MODES 1 or 2. ITS SR 3.8.1.12 verifies the EDG's trips, except for engine overspeed and generator differential current, are bypassed on an emergency start. This test may be performed during any MODE. This eliminates the ISTS Note requiring the

test to not be performed in MODES 1 or 2. This change is acceptable because the required test does not significantly perturbate the required electrical system.

12. CTS electrical source requirements for Service Water (SW) pumps, Main Control Room/Emergency Switchgear Room fans, and Auxiliary Building central exhaust fans (shared components) are incorporated into the ITS 3.8.1 requirements. The electrical requirements for a unit's shared functions may include EDG(s) and offsite circuit(s) of the other unit. CTS 3.7.1.4 requirements for shared components require both normal and emergency electrical power sources to be OPERABLE for the shared components to be considered OPERABLE. The translation of these requirement into the ITS format results in the modification of the ISTS LCO 3.8.1, Actions D, E, F, and J to require the all electrical sources needed to support the unit's required safety functions. The ITS electrical requirements for a unit are constructed to require all AC Sources, including the other unit's electrical sources, to be OPERABLE to support the required safety functions. With the addition of new Actions, the subsequent Actions are re-lettered. The word "required" is added to SRs 3.8.1.1 to 3.8.1.10 and SRs 3.8.1.12 to 3.8.1.16 to ensure the OPERABILITY of the other unit's AC sources for this unit for the support of the shared components. This change is acceptable because the CTS requirements are maintained in the ITS format.

13. ISTS SR 3.8.1.5 is added to the CTS. This SR requires a check for and removal of accumulated water from the EDG's day tank. The Frequency is 92 days. This Frequency is acceptable because it is the same as the frequency used to detect water in the underground fuel storage tanks (ITS SR 3.8.3.4). The underground fuel oil tanks supply fuel oil to the EDG day tanks. The 92-day Frequency has shown to be adequate for monitoring for water in the diesel fuel oil storage tanks.

14. ISTS SR 3.8.1.8 verifies the manual transfer of AC power sources from the normal offsite circuit to the alternate required offsite circuit. A Note modifies the SR and states, "This Surveillance shall not be performed in MODE 1 or 2." ITS SR 3.8.1.8 verifies that transfer of the emergency bus from the normal to the alternate source does not significantly disrupt the required electrical power distribution system. Therefore, the SR may be performed during the MODES 1, 2, 3, and 4 without significant perturbation of the emergency AC buses and the MODE restriction Note is deleted.

15. ISTS SR 3.8.1.14 verifies each DG operates for greater than 24 hours at various output levels. A Note modifies the SR and states, "This Surveillance shall not be performed in MODE 1 or 2." ITS SR 3.8.1.13 requires a 24-hour run to be conducted to ensure OPERABILITY of the EDG after major maintenance. This maintenance may be performed in MODES 1, 2, 3, and 4 with the 14-day allowance provided by Condition B. Therefore, it is essential to conduct the SR in these MODES and the Note for MODE restrictions is eliminated.

CTS

3.8 ELECTRICAL POWER SYSTEMS

3.8.1.2 3.8.2 AC Sources—Shutdown

LCO 3.8.2 The following AC electrical power sources shall be OPERABLE:

a. One qualified circuit between the offsite transmission network and the onsite Class 1E AC electrical power distribution subsystem(s) required by LCO 3.8.10, "Distribution Systems—Shutdown"; and

b. One diesel generator (E DG) capable of supplying one train of the onsite Class 1E AC electrical power distribution subsystem(s) required by LCO 3.8.10. (1)

APPLICABILITY: MODES 5 and 6. (recently)
During movement of irradiated fuel assemblies.

TSTF 51

ACTIONS

TSTF 36 (4)

CONDITION	REQUIRED ACTION	COMPLETION TIME
New Action b A. One required offsite circuit inoperable.	----------NOTE---------- Enter applicable Conditions and Required Actions of LCO 3.8.10, with one required train de-energized as a result of Condition A. ----------	
NEW	A.1 Declare affected required feature(s) with no offsite power available inoperable.	Immediately
	OR	
	A.2.1 Suspend CORE ALTERATIONS.	Immediately
	AND	
		(continued)

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ACTIONS

	CONDITION	REQUIRED ACTION	COMPLETION TIME	
Action b	A. (continued)	A.2.2 Suspend movement of recently irradiated fuel assemblies.	Immediately	TSTF 51
		AND		
		A.2.3 ~~Initiate action to suspend operations involving positive reactivity additions.~~ <INSERT>	Immediately	TSTF 286
		AND		
		A.2.4 Initiate action to restore required offsite power circuit to OPERABLE status.	Immediately	
Action b	B. One required (E) DG inoperable.	B.1 Suspend CORE ALTERATIONS.	Immediately	(1)
		AND		
		B.2 Suspend movement of recently irradiated fuel assemblies.	Immediately	TSTF 51
		AND		
		B.3 ~~Initiate action to suspend operations involving positive reactivity additions.~~ <INSERT>	Immediately	TSTF 286
		AND		
		B.4 Initiate action to restore required (E) DG to OPERABLE status.	Immediately	(1)

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Insert

Suspend operations involving positive reactivity additions that could result in loss of required SDM or boron concentration.

CTS

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE	FREQUENCY
4.8.1.2 SR 3.8.2.1	----------NOTE---------- The following SRs are not required to be performed: SR 3.8.1.3, SR 3.8.1.9, through ~~SR 3.8.1.11, SR 3.8.1.13 through~~ SR 3.8.1.15 SR 3.8.1.14 SR 3.8.1.16 ~~SR 3.8.1.18~~ and ~~SR 3.8.1.19~~. ----------	
	For AC sources required to be OPERABLE, the following SRs ~~of Specification 3.8.1, "AC Sources—Operating," except SR 3.8.1.8, SR 3.8.1.17, and SR 3.8.1.20,~~ are applicable. <INSERT>	In accordance with applicable SRs

(2)

TSTF (5) 300

(3)

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INSERT

SR 3.8.1.1	SR 3.8.1.5	SR 3.8.1.13
SR 3.8.1.2	SR 3.8.1.6	SR 3.8.1.14
SR 3.8.1.3	SR 3.8.1.7	SR 3.8.1.15
SR 3.8.1.4	SR 3.8.1.9	

1. Changes are made (additions, deletions, and/or changes) to the ISTS, which reflect the plant specific nomenclature, number, reference, system description, analysis, or licensing basis description.

2. The NOTE to ISTS SR 3.8.2.1 is modified to include a list of 3.8.1 SRs that are not applicable to ITS 3.8.2. The Note precludes the performance of the ITS SRs 3.8.1.3, 3.8.1.9, 3.8.1.13, 3.8.1.15 to ensure the one OPERABLE EDG is not made inoperable. Inoperability would occur if the EDG were paralleled with the offsite source. ITS SR 3.8.1.14 is only performed on the EDG within 5 minutes of shutting down the EDG after it has been fully loaded. Therefore, this SR is not required because the EDG is not required to be tested in this condition. This Note includes the concept allowed by TSTF-300. The ISTS allowance is modified for the specific SRs applicable to the North Anna design.

3. ISTS SR 3.8.2.1 is modified to require SRs of ITS 3.8.1 that are applicable for the EDG and offsite circuit required in MODES 5, 6, and during the movement of recently irradiated fuel assemblies. The EDG requirements in ITS SRs 3.8.1.11, 3.8.1.12, 3.8.1.16, and 3.8.1.17 require the ESF signal to actuate the start of the EDG or the train's sequencing timing relays for loading. In MODE 5 or 6 the instrumentation that provides these signals is not required to be OPERABLE and the function to start or load the EDG is also not required. ITS SR 3.8.1.10 requires a loss of offsite power signal, which is not required to be OPERABLE in MODE 5 or 6. Therefore, these SRs are not required to be included in ITS SR 3.8.2.1. ITS SR 3.8.1.18 requires that both EDGs be started simultaneously. Since only one EDG is required to be OPERABLE, two EDGs cannot be required to start at the same time. The offsite circuit requirement in ITS SR 3.8.1.8 requires the transfer from the normal to the alternate circuit. Since only one circuit is required to be OPERABLE, the transfer is not required to be performed to an inoperable circuit for Unit 1 and does not exist for Unit 2. The requirement is therefore not necessary and eliminated. The remaining SRs are listed in a column format.

4. ISTS Actions are modified by approved TSTF–36 that adds a Note which states, "LCO 3.0.3 is not applicable." The TSTF is not incorporated into the ITS 3.8.2 requirements. This is acceptable because LCO 3.8.2 is applies in MODES 5 and 6, and ITS LCO 3.0.3 states, "LCO 3.0.3 is only applicable in MODES 1, 2, 3, and 4." With the unit in MODES 1, 2, 3, and 4 and recently irradiated fuel being moved, the electrical requirements are contained within LCO 3.8.1, "AC Sources – Operating." Therefore, the addition of the Note is not required.

5. The concept of TSTF-300 is incorporated into SR 3.8.2.1 with the deletion of ISTS SRs 3.8.1.12 and 3.8.1.19 from the list of SRs that are applicable during MODES 5 and 6. With the deletion of these SRs from the SR list, the Note proposed by the TSTF is not required and is deleted. This is acceptable because the list of SRs from LCO 3.8.1 provides the necessary testing requirements to ensure the required EDG(s) are OPERABLE during shutdown.

CTS

3.8 ELECTRICAL POWER SYSTEMS

3.8.3 Diesel Fuel Oil, Lube Oil, and Starting Air

LCO 3.8.1.1 6.2

LCO 3.8.3 The stored diesel fuel oil, lube oil, and starting air subsystem shall be within limits for each required diesel generator (DG).

APPLICABILITY: When associated DG is required to be OPERABLE.

ACTIONS

NOTE
Separate Condition entry is allowed for each DG.

CONDITION	REQUIRED ACTION	COMPLETION TIME
Action f LCO 3.8.1.1 b.2 NEW — A. One or more DGs with fuel level < [33,000] gal and > [28,285] gal in storage tank. (45,000; 38,600; for reasons other than Condition A)	A.1 Restore fuel oil level to within limits.	48 hours
B. One or more DGs with lube oil inventory < [500] gal and > [425] gal.	B.1 Restore lube oil inventory to within limits.	48 hours
New — D. One or more DGs with stored fuel oil total particulates not within limit.	D.1 Restore fuel oil total particulates within limit.	7 days

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CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One fuel oil storage tank not within limits for performance of tank repair or inspection.	A.1 Verify replacement fuel oil is available.	Prior to removing tank from service
	AND	
	A.2 Verify remaining fuel oil storage tank contains ≥ 45,000 gal.	Once per 12 hours
	AND	
	A.2 Verify above ground fuel oil tank contains ≥ 100,000 gal.	Once per 12 hours
	AND	
	A.4 Restore fuel oil storage tank to within limits.	7 days
B. Required Action and associated Completion Time for Condition A not met.	B.1 Be in MODE 3.	6 hours
	AND	
	B.2 Be in MODE 5.	36 hours

CTS

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
New E D. One or more DGs with new fuel oil properties not within limits.	E D.1 Restore stored fuel oil properties to within limits.	30 days
F E. One or more DGs with starting air receiver pressure < [225] psig and ≥ [125] psig. (150) (175) New (The required)	F E.1 Restore starting air receiver pressure to ≥ [225] psig. (175)	48 hours
G F. Required Action and associated Completion Time not met. (for Conditions C, D, E, or F.) OR One or more DGs diesel fuel oil (lube oil) or starting air subsystem not within limits for reasons other than Condition (A, B) C, D, or E, F. New	G F.1 Declare associated DG inoperable.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
4.8.1.1.2 a.2 SR 3.8.3.1	Verify each fuel oil storage tank contains ≥ [33,000] gal of fuel. (45,000)	31 days

(continued)

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SURVEILLANCE REQUIREMENTS (continued)

	SURVEILLANCE	FREQUENCY
SR 3.8.3.2	Verify lubricating oil inventory is ≥ [500] gal.	31 days
New SR 3.8.3.2	Verify fuel oil properties of new and stored fuel oil are tested in accordance with, and maintained within the limits of, the Diesel Fuel Oil Testing Program.	In accordance with the Diesel Fuel Oil Testing Program
New SR 3.8.3.3	Verify each EDG air start receiver pressure is ≥ [225] 175 psig.	31 days
4.8.1.1.2 b SR 3.8.3.4	Check for and remove accumulated water from each stored fuel oil storage tank.	92 [31] days
SR 3.8.3.6	For each fuel oil storage tank: a. Drain the fuel oil; b. Remove the sediment; and c. Clean the tank.	10 years

TSTF 2

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JUSTIFICATION FOR DEVIATIONS
ITS 3.8.3 - DIESEL FUEL OIL AND STARTING AIR

1. The Lube Oil portion of ISTS 3.8.3 is not adopted. This change is acceptable because the Emergency Diesel Generators (EDGs) do not rely on a storage tank for make up to the lube oil system. Operating experience has shown that the EDGs have a very low rate of consumption of lube oil on the required 24-hour full load runs. Lube oil is made up to the engine's sump from 55 gallon barrels. An adequate reserve is maintained to support extended EDG runs. The deletion of the Lube Oil requirement causes the elimination of ISTS ACTION B and SR 3.8.3.2. The remaining ACTIONS and SRs have been renumbered.

2. Changes are made (additions, deletions, and/or changes) to the ISTS, which reflect the plant specific nomenclature, number, reference, system description, analysis, or licensing basis description. This includes the change of diesel generator (DG) to emergency diesel generator (EDG).

3. CTS 3.8.1.1 Action f is translated into the ITS format and presented in ITS Actions A and B. This allows the inoperability of one required underground fuel oil tank for required repairs or inspections. This change is acceptable because one of the underground tanks serves all of the EDGs' lead fuel oil transfer pumps and the other tank provides fuel oil for the EDGs' backup pumps. The lead pumps normally supply fuel oil to the EDG day tank and the backup pump only operate when the lead pumps cannot maintain the day tank required level. Tank repairs or inspections cannot be performed without requiring a two-unit outage or having an appropriate Action. The CTS allowance is therefore reasonable and included in the ITS Specifications. The subsequent Actions are renumbered.

4. The brackets are removed and the proper plant specific information/value is provided.

CTS

3.8 3.8 ELECTRICAL POWER SYSTEMS

3.8.2.3 3.8.4 DC Sources—Operating

4.8.1.1.3 LCO 3.8.2.3 New

LCO 3.8.4 The ~~Train A and Train B~~ following DC electrical power ~~subsystems~~ SOURCES shall be OPERABLE: (1)

INSERT 1 (1)

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

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
Action a — A. One LCO 3.8.4.a DC electrical power subsystem inoperable.	A.1 Restore DC electrical power subsystem to OPERABLE status.	2 hours (1)
Action a. — B. Required Action and Associated Completion Time for Condition A not met.	B.1 Be in MODE 3.	6 hours
	AND	
	B.2 Be in MODE 5.	36 hours (1)

New

INSERT 2 (1)

4.8.1.1.3

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
4.8.2.3.2 a.2 / 4.8.1.1.3a.2 — SR 3.8.4.1 Verify for each required station and EDG battery terminal voltage is ≥ 129 V on float charge.	7 days (6) (2)

(continued)

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INSERT 1

a. The Train H and Train J DC electrical power subsystems;

b. The Emergency Diesel Generator (EDG) DC systems for each required EDG; and

c. One DC electrical power subsystem on the other unit for each required shared component.

INSERT 2

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. ----------NOTE---------- Separate Condition entry is allowed for each EDG DC system. ---------- One or more EDG DC system(s) inoperable.	C.1 Enter applicable Conditions and Required Actions for associated EDG(s) made inoperable.	Immediately
D. ----------NOTE---------- Separate Condition entry is allowed for each DC subsystem. ---------- One or more required LCO 3.8.4.c DC electrical power subsystem(s) inoperable.	D.1 Declare associated shared component(s) inoperable.	Immediately

SURVEILLANCE REQUIREMENTS (continued)

	SURVEILLANCE	FREQUENCY	
4.8.2.3.2 b2 4.8.1.1.3 b2	For each required station and EDG battery, there is SR 3.8.4.2 Verify no visible corrosion at battery terminals and connectors. OR Verify battery connection resistance is ≤ ~~[1E-5 ohm]~~ 1.5E-4 ohm for inter-cell connections, ≤ ~~[1E-5 ohm]~~ 1.5E-4 ohm for inter-rack connections, ≤ ~~[1E-5 ohm]~~ 1.5E-4 ohm for inter-tier connections, and ≤ ~~[1E-5 ohm]~~ 1.5E-4 ohm for terminal connections.	92 days	(6) (5)
4.8.2.3.2 c1 4.8.1.1.3 c.1	For each required station and EDG SR 3.8.4.3 Verify battery cells, cell plates, and racks show no visual indication of physical damage or abnormal deterioration that could degrade battery performance	18 ~~[22]~~ months	(6) (5) TSTF 38
4.8.2.3.2 C.2 4.8.1.1.3 C.2	For each required station and EDG battery, SR 3.8.4.4 Remove visible terminal corrosion, verify battery cell to cell and terminal connections are clean and tight, and are coated with anti-corrosion material.	18 ~~[22]~~ months	(6) (5)
4.8.2.3.2 C.4 4.8.1.1.3 C.3	For each required station and EDG battery SR 3.8.4.5 Verify battery connection resistance is ≤ ~~[1E-5 ohm]~~ 1.5E-4 ohm for inter-cell connections, ≤ ~~[1E-5 ohm]~~ 1.5E-4 ohm for inter-rack connections, ≤ ~~[1E-5 ohm]~~ 1.5E-4 ohm for inter-tier connections, and ≤ ~~[1E-5 ohm]~~ 1.5E-4 ohm for terminal connections.	18 ~~[22]~~ months	(6) (5)

(continued)

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SURVEILLANCE REQUIREMENTS (continued)

	SURVEILLANCE	FREQUENCY
4.8.2.3.2.c.4	SR 3.8.4.6 ----------NOTE---------- This Surveillance shall not be performed in MODE 1, 2, 3, or 4. However, credit may be taken for unplanned events that satisfy this SR. ---------- Verify each (required station) battery charger supplies ≥ (400) amps at ≥ (125) V for ≥ (8) hours.	(18 months)
4.8.1.1.3 c.4	SR 3.8.4.7 (270) (4)	<INSERT 1>
New 4.8.2.3.2.e 4.8.2.3.2.f	SR 3.8.4.7 (8) ----------NOTES---------- 1. The modified performance discharge (9) test in SR 3.8.4.(8) may be performed in lieu of the service test in SR 3.8.4.(7) once per 60 months. (8) (2) (3) (2) This Surveillance shall not (normally) be performed in MODE 1, 2, 3, or 4. However, credit may be taken for unplanned events that satisfy this SR. ----------	<INSERT 2> <INSERT 3> (18 months)
4.8.2.3.2.d	(For each required station) Verify battery capacity is adequate to supply, and maintain in OPERABLE status, the required emergency loads for the design duty cycle when subjected to a battery service test.	(18 months)

(4) TSTF-8 (6) (5) (1) (6) (6) TSTF-360 (1) TSTF 283 TSTF 283 TSTF 8 (6) (5)

(continued)

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INSERT 1

SURVEILLANCE		FREQUENCY
SR 3.8.4.7	Verify each required EDG battery charger supplies ≥ 10 amps at ≥ 125 V for ≥ 4 hours.	18 months

INSERT 2

2. The performance discharge test in SR 3.8.4.9 may be performed in lieu of the service test in SR 3.8.4.8 once every 60 months.

INSERT 3

However, portions of the Surveillance may be performed to reestablish OPERABILITY provided an assessment determines the safety of the plant is maintained or enhanced.

CTS

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE	FREQUENCY
4.8.2.3.2 e,f 4.8.1.1.3 d,e SR 3.8.4.8 (9) for station batteries .....NOTE..... (normally) This Surveillance shall not be performed in MODE 1, 2, 3, or 4. However, credit may be taken for unplanned events that satisfy this SR.	<INSERT> TSTF 283 (b) (2) TSTF 8
for each required station and EOG Verify battery (1) capacity is ≥ 80% of the manufacturer's rating when subjected to a performance discharge test or a modified performance discharge test.	(b) 60 months (5) AND (18) months when battery shows degradation or has reached 85% of expected life (3) (5) with capacity < 100% of manufacturer's rating AND 24 months when battery has reached [85]% of the expected life with capacity ≥ 100% of manufacturer's rating (3)

Rev. 0

INSERT

However, portions of the Surveillance may be performed to reestablish OPERABILITY provided an assessment determines the safety of the plant is maintained or enhanced.

1. ISTS LCO 3.8.4 requires the A and B Trains of DC electrical subsystems to be OPERABLE. ITS LCO 3.8.4 requires the H and J Trains of DC electrical subsystems, the EDG DC systems, and one DC electrical power subsystem on the other unit for each required shared component to be OPERABLE. The modification of the LCO requires a modification of the ITS Condition B to reference Condition A. Conditions C and D are added for the EDG DC system(s) and the required DC electrical power subsystem(s) on the other unit. Condition C requires when the EDG DC system is inoperable, the applicable Conditions and Required Actions for the associated EDG be entered immediately. This is acceptable because the EDG cannot fulfill its safety function without the required DC system. Condition D requires the shared components powered from the other unit to be declared inoperable with the inoperability of the required DC subsystem(s). This is acceptable because the shared components could not be started without the associated DC subsystem. This requirement is derived from CTS LCO 3.7.4.1. The requirements of CTS 3.7.4.1, CTS 3.8.2.3 and CTS 4.8.1.1.3 are merged into ITS LCO 3.8.4.

2. Changes are made (additions, deletions, and/or changes) to the ISTS, which reflect the plant specific nomenclature, number, reference, system description, analysis, or licensing basis description.

3. ITS SR 3.8.4.9 Frequency requirements are changed from the ISTS for SR 3.8.4.8. The 12 month second frequency is changed to the CTS requirement of 18 months. The CTS states that when the battery shows degradation or reaches 85 % of expected life, the required testing shall be performed every 18 months. This is acceptable because operating history has shown that the surveillance performed at this Frequency normally passes the testing requirements. The third frequency is deleted because it is not needed. No matter what the capacity of the battery, a discharge test will be required every 18 months.

4. A Note that states, "This Surveillance shall not be performed in MODE 1, 2, 3, or 4," modifies ISTS SR 3.8.4.6. This Note is not required for NAPS because there is a spare battery charger installed to allow testing in MODES 1, 2, 3, and 4. The spare battery charger supplies the required loads without any perturbation of the electrical system or challenge to the safety system. Therefore, the normal battery charger may be tested without MODE restrictions.

5. The brackets are removed and the proper plant specific information/value is provided.

6. ITS SRs 3.8.4.1 to 3.8.4.5 and 3.8.4.9 are modified to require the SRs to include both the station and EDG batteries. ISTS SR 3.8.4.6 is applicable to the station battery chargers. ITS SR 3.8.4.7 is added to require the EDG battery charger be tested at the specified amperage and voltage, and to provide these variables for a specified period of time as performed every 18 months. ISTS SR 3.8.4.7 is relabeled to ITS SR 3.8.4.8 and only applies to the station batteries. ISTS 3.8.4.8 is relabeled to ITS SR 3.8.4.9. ITS SRs

3.8.4.1 through SR 3.8.4.9 are modified with the word, "required." This is acceptable because each SR may be applicable to each EDG DC system or DC subsystem on this unit for the various functions and the other unit for the shared components.

7. ISTS SR 3.9.4.7 becomes ITS 3.8.4.8 and is modified by Note 2 that allows the performance discharge test in SR 3.8.4.9 to be performed in lieu of the service test in SR 3.8.4.8 once every 60 months. This is acceptable because the CTS Surveillance Requirement 4.8.2.3.2.f allows the substitution of this requirement at the specified time interval.

CTS

3.8 ELECTRICAL POWER SYSTEMS

3.8.5 DC Sources—Shutdown

LCO 3.8.2.2

LCO 3.8.5 DC electrical power subsystem(s) shall be OPERABLE to support the DC electrical power distribution subsystem(s) required by LCO 3.8.10, "Distribution Systems—Shutdown," and EDG DC System shall be OPERABLE for the EDG required by LCO 3.8.2, "AC Sources - Shutdown." (5) (1)

APPLICABILITY: MODES 5 and 6,
During movement of recently irradiated fuel assemblies.

TSTF 51
TSTF 204 (4)
TSTF 36 (3)

ACTIONS

	CONDITION	REQUIRED ACTION	COMPLETION TIME
New	A. One or more required DC electrical power subsystems inoperable.	A.1.1 Declare affected required feature(s) inoperable.	Immediately
		OR	
Action		A.2.1 Suspend CORE ALTERATIONS.	Immediately
		AND	
Action		A.2.2 Suspend movement of recently irradiated fuel assemblies.	Immediately TSTF 51
		AND	
Action		A.2.3 ~~Initiate action to suspend operations involving positive reactivity additions.~~ <INSERT>	Immediately TSTF 286
		AND	
			(continued)

Rev. 0

INSERT

Suspend operations involving positive reactivity additions that could result in loss of required SDM or boron concentration.

CTS

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
Action A. (continued)	A.2.4 Initiate action to restore required DC electrical power subsystems to OPERABLE status.	Immediately

<INSERT> (1)

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE	FREQUENCY
4.8.2.1.2 4.8.1.1.3 SR 3.8.5.1	----------NOTE---------- The following SRs are not required to be performed: ~~SR 3.8.4.6~~, SR 3.8.4.7, and SR 3.8.4.8, SR 3.8.4.9 ----------	SR 3.8.4.4 (2)
	For DC sources required to be OPERABLE, the following SRs are applicable: SR 3.8.4.1 SR 3.8.4.4 SR 3.8.4.7 SR 3.8.4.2 SR 3.8.4.5 SR 3.8.4.8. SR 3.8.4.3 SR 3.8.4.6 SR 3.8.4.9	In accordance with applicable SRs (2)

Rev. 0

INSERT

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. Required EDG DC system inoperable.	B.1 Enter applicable Conditions and Required Actions for associated EDG made inoperable.	Immediately

1. ITS LCO 3.8.4 DC Sources – Operating includes the EDG DC system. In accordance with that requirement, ISTS 3.8.5 is modified to include the EDG DC system. This requires the modification of the LCO, Condition, and the Surveillance Requirement. This is acceptable because the EDG DC system must be OPERABLE to support the required EDG is these MODES of operation.

2. ISTS SR 3.8.5.1 is modified to reflect changes in ITS LCO 3.8.4 SRs. This change includes the exclusion of ITS SR 3.8.4.4. These changes are acceptable because the SRs specified have the potential to cause the OPERABLE battery to become inoperable.

3. ISTS Actions are modified by approved TSTF–36 that adds a Note which states, "LCO 3.0.3 is not applicable." The TSTF is not incorporated into the ITS 3.8.5 requirements. This is acceptable because LCO 3.8.5 is applicable in MODES 5 and 6, and ITS LCO 3.0.3 states, "LCO 3.0.3 is only applicable in MODES 1, 2, 3, and 4." With the unit in MODES 1, 2, 3, and 4 and recently irradiated fuel being moved, the electrical requirements are contained within LCO 3.8.4, "DC Sources – Operating." Therefore, the addition of the Note is not required.

4. Approved TSTF-204 modifies ISTS 3.8.5 LCO and Action by adding brackets to the Specifications and Bases. The ISTS contains the correct number of DC electrical power subsystems for North Anna, therefore, TSTF-204 is not needed and is not incorporated.

5. This is an editorial change for clarity, for consistency with the Improved Technical Specifications Writer's Guide, or for consistency with similar statements in the other ITS Specifications.

CTS

3.8 ELECTRICAL POWER SYSTEMS

New 3.8.6 Battery Cell Parameters

NEW LCO 3.8.6 Battery cell parameters for Train A and Train B batteries shall be within the limits of Table 3.8.6-1. <INSERT> TSTF 278 (1)

new APPLICABILITY: When associated DC electrical power subsystem(s) or EDG DC system(s) are required to be OPERABLE. (1)

ACTIONS

new

NOTE
Separate Condition entry is allowed for each battery.

CONDITION	REQUIRED ACTION	COMPLETION TIME
new A. One or more Station or EDG batteries with one or more battery cell parameters not within Category A or B limits. Table 3.8.6-1	A.1 Verify pilot cell (1) electrolyte level and float voltage meet Table 3.8.6-1 Category C limits.	1 hour (1)
	AND	TSTF 278
	A.2 Verify battery cell parameters meet Table 3.8.6-1 Category C limits.	24 hours AND Once per 7 days thereafter
	AND	
	A.3 Restore battery cell parameters to Category A and B limits (or) Table 3.8.6-1.	31 days TSTF 278

(continued)

Rev. 0

INSERT

for the following batteries shall be within limits:

a. The Train H and Train J DC electrical power subsystems;

b. The Emergency Diesel Generator (EDG) DC systems for each required EDG; and

c. One DC electrical power subsystem on the other unit for each required shared component.

CTS

ACTIONS (continued)

	CONDITION	REQUIRED ACTION	COMPLETION TIME	
New	B. Required Action and associated Completion Time of Condition A not met.	B.1 Declare associated battery inoperable.	Immediately	
	OR			
New	One or more Station batteries with average electrolyte temperature of the representative cells < 60°F.			1
	OR			2
New	One or more Station or EDG batteries with one or more battery cell parameters not within Category C values. Table 3.8.6-1			1

TSTF 278

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE		FREQUENCY	
4.8.2.3.2a 4.9.1.1.3a	SR 3.8.6.1	Verify for each required Station and EDG battery cell parameters meet Table 3.8.6-1 Category A limits.	7 days	1

(continued)

Rev. 0

CTS

SURVEILLANCE REQUIREMENTS (continued)

	SURVEILLANCE		FREQUENCY	
4.8.2.3.2 b 4.8.1.1.3 b.	SR 3.8.6.2	Verify battery cell parameters meet Table 3.8.6-1 Category B limits. For each required station and EOG	92 days AND Once within 24 hours after a battery discharge < 110 V AND Once within 24 hours after a battery overcharge > 150 V	1 3 3
4.8.2.3.2 b.1 4.8.1.1.3 b.1				
4.8.2.3.2b3	SR 3.8.6.3	Verify average electrolyte temperature of representative cells is ≥ 60°F. for each required station battery	92 days	3 1

Rev. 0

CTS

Table 4.8-3

Table 3.8.6-1 (page 1 of 1)
Battery Cell Parameters Requirements

PARAMETER	CATEGORY A: LIMITS FOR EACH DESIGNATED PILOT CELL	CATEGORY B: LIMITS FOR EACH CONNECTED CELL	CATEGORY C: ALLOWABLE LIMITS FOR EACH CONNECTED CELL
Electrolyte Level	> Minimum level indication mark, and ≤ ¼ inch above maximum level indication mark[a]	> Minimum level indication mark, and ≤ ¼ inch above maximum level indication mark[a]	Above top of plates, and not overflowing
Float Voltage	≥ 2.13 V	≥ 2.13 V	> 2.07 V
Specific Gravity[b][c]	≥ 1.200	≥ 1.195 AND Average of all connected cells > 1.205	Not more than 0.020 below average of all connected cells AND Average of all connected cells ≥ 1.195

New

(a) It is acceptable for the electrolyte level to temporarily increase above the specified maximum during equalizing charges provided it is not overflowing.

(a)(b) (b) Corrected for electrolyte (for station batteries) temperature and level. Level correction is not required, however, when battery charging is < 2 amps when on float charge.

(b)(2) (c) (station batteries only:) A battery charging current of < 2 amps when on float charge is acceptable for meeting specific gravity limits following a battery recharge, for a maximum of 7 days. When charging current is used to satisfy specific gravity requirements, specific gravity of each connected cell shall be measured prior to expiration of the 7 day allowance.

Rev. 0

1. ITS LCO 3.8.4 requires A and B Trains of DC electrical subsystems, the EDG DC systems, and the DC electrical power subsystem on the other unit for each required SW pump that are required to be OPERABLE. This includes the Station and EDG batteries on either unit that are required. ISTS LCO 3.8.6 is modified to include the station and EDG batteries in the requirements for ITS LCO 3.8.6, "Battery Cell Parameters." This change modifies the LCO, Applicability Actions, and Surveillance Requirements of the specification. This change is acceptable because the Train H and J DC subsystems do not supply the EDG DC system and the EDG batteries are separate and independent from the station batteries. The EDG batteries must be OPERABLE for the EDG DC system to be OPERABLE. Condition B, the second requirement, SR 3.8.6.3, and Note (b) and (c) to Table 3.8.6.1 are modified to reflect that the requirements are only applicable to the station batteries. The station and EDG battery requirements of the CTS are merged into ITS LCO 3.8.4 with this change. The Station batteries on the other unit that are needed to support required SW pumps are also required to be OPERABLE and are also included. SRs 3.8.6.1, 3.8.6.2, and 3.8.6.3 are modified with the words, "each required" to include the other unit's Station or EDG batteries. These changes are acceptable because the modification to the ISTS corresponds to the CTS requirements and plant design.

2. Changes are made (additions, deletions, and/or changes) to the ISTS which reflect the plant specific nomenclature, number, reference, system description, analysis, or licensing basis description.

3. The brackets have been removed and the proper plant specific information/value has been provided.

CTS

3.8 ELECTRICAL POWER SYSTEMS

3.8.7 Inverters—Operating

3.8.2.1 LCO 3.8.7 The ~~[required]~~ Train ~~A~~ H and Train ~~B~~ J inverters shall be OPERABLE. 1 2

* Note to LCO requirements

~~----------NOTE----------~~
~~One ~~[two]~~ inverter ~~[s]~~ may be disconnected from ~~[its ~~[their]~~~~ associated DC bus for ≤ 24 hours to perform an equalizing charge on ~~[its ~~[their]~~~~ associated ~~[common]~~ battery, provided:~~

~~a. The associated AC vital bus ~~[es]~~ ~~[is ~~[are]~~~~ energized from ~~[its ~~[their]~~~~ ~~[Class 1E]~~ constant voltage source transformers ~~[inverter using internal AC source]~~; and~~

~~b. All other AC vital buses are energized from their associated OPERABLE inverters.~~
~~----------~~ 3

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

ACTIONS

	CONDITION	REQUIRED ACTION	COMPLETION TIME
Action C New	A. One ~~[required]~~ inverter inoperable.	A.1 ---------NOTE-------- Enter applicable Conditions and Required Actions of LCO 3.8.9, "Distribution Systems - Operating" with any vital bus de-energized. ----------	2
Action C		Restore inverter to OPERABLE status.	24 hours

(continued)

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CTS

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
Action C B. Required Action and associated Completion Time not met.	B.1 Be in MODE 3.	6 hours
	AND	
	B.2 Be in MODE 5.	36 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
4.8.2.1 SR 3.8.7.1	Verify correct inverter voltage, [frequency,] and alignment to required AC vital buses.	7 days (3)

Rev.0

1. Changes are made (additions, deletions, and/or changes) to the ISTS which reflect the plant specific nomenclature, number, reference, system description, analysis, or licensing basis description.

2. The word "required" is deleted from ISTS LCO 3.8.7 and Action A. This is acceptable because there are no spare H or J train inverters and all inverters are specified in the LCO.

3. The brackets are removed and the proper plant specific information/value is provided.

CTS

3.8 ELECTRICAL POWER SYSTEMS

3.8.8 Inverters—Shutdown

3.8.2.2 LCO 3.8.8 Inverter(s) shall be OPERABLE to support the onsite Class 1E AC vital bus electrical power distribution subsystem(s) required by LCO 3.8.10, "Distribution Systems—Shutdown." (4)

APPLICABILITY: MODES 5 and 6,
During movement of recently irradiated fuel assemblies. TSTF (2) 36 TSTF 51

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
New A. One or more ~~required~~ inverters inoperable.	A.1 Declare affected required feature(s) inoperable.	Immediately TSTF 204 (3) (1)
	OR	
Action	A.2.1 Suspend CORE ALTERATIONS.	Immediately
	AND	
	A.2.2 Suspend movement of recently irradiated fuel assemblies.	Immediately TSTF 51
	AND	
New	A.2.3 ~~Initiate action to suspend operations involving positive reactivity additions.~~ INSERT 226	Immediately TSTF
	AND	
		(continued)

Rev. 0

INSERT

Suspend operations involving positive reactivity additions that could result in loss of required SDM or boron concentration.

CTS

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
Action A. (continued)	A.2.4 Initiate action to restore required inverters to OPERABLE status.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.8.8.2.1 SR 3.8.8.1	Verify correct inverter voltage, [frequency,] and alignments to required AC vital buses.	7 days

1

Rev. 0

1. The brackets have been removed and the proper plant specific information/value has been provided.

2. ISTS Actions are modified by approved TSTF–36 that adds a Note which states, "LCO 3.0.3 is not applicable." The TSTF is not incorporated into the ITS 3.8.8 requirements. This is acceptable because LCO 3.8.2 is applies in MODES 5 and 6, and ITS LCO 3.0.3 states, "LCO 3.0.3 is only applicable in MODES 1, 2, 3, and 4." With the unit in MODES 1, 2, 3, and 4 and recently irradiated fuel being moved, the electrical requirements are contained within LCO 3.8.7, "Inverters – Operating." Therefore, the addition of the Note is not required.

3. TSTF–204 adds bracketed requirements to ISTS 3.8.8. This TSTF is not incorporated into the ITS 3.8.8 requirements. This is acceptable because NUREG-1431 provides adequate requirements to ensure the minimum inverter(s) remains OPERABLE during shutdown conditions to support required safety functions.

4. This is an editorial change for clarity, for consistency with the Improved Technical Specifications Writer's Guide, or for consistency with similar statements in the other ITS Bases.

CTS

3.8 ELECTRICAL POWER SYSTEMS

3.8.9 Distribution Systems—Operating

3.8.2.1
3.8.2.3

LCO 3.8.9 The following Train A and Train B AC, DC, and AC vital bus electrical ~~power~~ distribution subsystems shall be OPERABLE: (3) (1)

a.

New b. INSERT PROPOSED LCO.b <INSERT 1> (3)

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

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME	
LCO 3.8.9.a A. One or more AC electrical power distribution subsystem(s) inoperable.	A.1 Restore AC electrical power distribution subsystem(s) to OPERABLE status.	8 hours AND 16 hours from discovery of failure to meet LCO	TSTF16 <Insert 2> (3) TSTF16 (4)
LCO 3.8.9.a B. One or more AC vital bus(es) inoperable.	B.1 Restore AC vital bus subsystem(s) to OPERABLE status.	2 hours AND 16 hours from discovery of failure to meet LCO	(3) TSTF16 (4)
LCO 3.8.9.a C. One or more DC electrical power distribution subsystem(s) inoperable.	C.1 Restore DC electrical power distribution subsystem(s) to OPERABLE status.	2 hours AND 16 hours from discovery of failure to meet LCO	(3) TSTF16 (4)

3.8.2.1 Action a

3.8.2.1 Action b

3.8.2.3 Action a

New (continued) <INSERT 3> (3)

Rev. 0

INSERT 1

b. One AC and DC bus on the other unit for each required shared component.

INSERT 2

CONDITION	REQUIRED ACTION	COMPLETION TIME
A.	----------NOTE---------- Enter applicable Conditions and Required Actions of LCO 3.8.4, "DC Sources-Operating," for DC train(s) made inoperable by inoperable distribution subsystem(s). ----------	

INSERT 3

CONDITION	REQUIRED ACTION	COMPLETION TIME
D. ----------NOTE---------- Separate Condition entry is allowed for each AC subsystem. ---------- One or more required LCO 3.8.9.b AC electrical power distribution subsystem(s) inoperable.	D.1 Declare associated shared component(s) inoperable.	Immediately

INSERT 3 (Continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
E. ----------NOTE---------- Separate Condition entry is allowed for each DC subsystem. ---------- One or more required LCO 3.8.9.b DC electrical power distribution subsystem(s) inoperable.	E.1 Declare associated shared component(s) inoperable.	Immediately

CTS

ACTIONS (continued)

	CONDITION	REQUIRED ACTION	COMPLETION TIME	
3.8.2.1 Action a & b 3.8.2.3 Action a	F D. Required Action and associated Completion Time not met. Condition A, B, or C	F D.1 Be in MODE 3.	6 hours	3
		AND		
		F D.2 Be in MODE 5.	36 hours	3
New	G E. LCO 3.8.9.a Two trains with inoperable or more distribution subsystems that result in a loss of safety function.	G E.1 Enter LCO 3.0.3.	Immediately	3 TSTF-16

electrical power

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE		FREQUENCY	
4.8.2.1 4.8.2.3.1	SR 3.8.9.1	Verify correct breaker alignments and voltage to required AC, DC, and AC vital bus electrical power distribution subsystems.	7 days	2

Rev. 0

1. The proper plant specific information/nomenclature/value is provided.

2. The brackets are removed and the proper plant specific information/value is provided.

3. ITS LCO 3.8.9 LCO and Actions are modified for the required electrical power distribution system on the other unit for each required shared component that is required to be OPERABLE for this unit. This includes the distribution systems on either unit that are required for the support of the shared components for the AC and the DC distribution systems. The AC and DC distribution systems on the other unit required for the support of the shared components may be entered for each inoperable distribution system. This changes the LCO by adding part b and the Actions by adding D and E. This change is acceptable because the modification to the ISTS corresponds to the CTS requirements and plant design.

4. Editorial change made to TSTF–16 for enhanced clarity or to be consistent with the ISTS Writers Guide.

CTS

3.8 ELECTRICAL POWER SYSTEMS

3.8.10 Distribution Systems—Shutdown

3.8.2.2 LCO 3.8.10 The necessary portion of AC, DC, and AC vital bus electrical power distribution subsystems shall be OPERABLE to support equipment required to be OPERABLE.

APPLICABILITY: MODES 5 and 6,
During movement of recently irradiated fuel assemblies.

TSTF 51

ACTIONS

TSTF 36 (1)

	CONDITION	REQUIRED ACTION	COMPLETION TIME
New	A. One or more required AC, DC, or AC vital bus electrical power distribution subsystems inoperable.	A.1 Declare associated supported required feature(s) inoperable.	Immediately
		OR	
Action		A.2.1 Suspend CORE ALTERATIONS.	Immediately
		AND	
	recently	A.2.2 Suspend movement of irradiated fuel assemblies.	Immediately TSTF 51
		AND	
New		A.2.3 ~~Initiate action to suspend operations involving positive reactivity additions.~~ <INSERT>	Immediately TSTF 286
		AND	
			(continued)

INSERT

Suspend operations involving positive reactivity additions that could result in loss of required SDM or boron concentration.

CTS

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. (continued)	A.2.4 Initiate actions to restore required AC, DC, and AC vital bus electrical power distribution subsystems to OPERABLE status.	Immediately
	AND	
	A.2.5 Declare associated required residual heat removal subsystem(s) inoperable and not in operation.	Immediately

Action

new

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.8.10.1	Verify correct breaker alignments and voltage to required AC, DC, and AC vital bus electrical power distribution subsystems.	7 days

SR 4.8.2.2.1

Rev. 0

1. ISTS Actions are modified by approved TSTF–36 that adds a Note which states, "LCO 3.0.3 is not applicable." The TSTF is not incorporated into the ITS 3.8.5 requirements. This is acceptable because LCO 3.8.10 is applies in MODES 5 and 6, and ITS LCO 3.0.3 states, "LCO 3.0.3 is only applicable in MODES 1, 2, 3, and 4." With the unit in MODES 1, 2, 3, and 4 and recently irradiated fuel being moved, the electrical requirements are contained within LCO 3.8.9, "Distribution Systems – Operating." Therefore, the addition of the Note is not required.

SECTION 3.8 - ELECTRICAL POWER SYSTEMS

IMPROVED STANDARD TECHNICAL SPECIFICATIONS BASES

MARKUP AND JUSTIFICATION FOR DEVIATIONS

B 3.8 ELECTRICAL POWER SYSTEMS

B 3.8.1 AC Sources—Operating

BASES

BACKGROUND

The unit Class 1E AC Electrical Power Distribution System AC sources consist of the offsite power sources (preferred power sources, normal and alternate(s)), and the onsite standby power sources (Train A and Train B diesel generators (DGs)). As required by 10 CFR 50, Appendix A, GDC 17 (Ref. 1), the design of the AC electrical power system provides independence and redundancy to ensure an available source of power to the Engineered Safety Feature (ESF) systems.

The onsite Class 1E AC Distribution System is divided into redundant load groups (trains) so that the loss of any one group does not prevent the minimum safety functions from being performed. Each train has connections to two preferred offsite power sources and a single DG.

Offsite power is supplied to the unit switchyard from the transmission network by [two] transmission lines. From the switchyard, two electrically and physically separated circuits provide AC power, through [step down] station auxiliary transformers, to the 4.16 kV ESF buses. A detailed description of the offsite power network and the circuits to the Class 1E ESF buses is found in the FSAR, Chapter 8 (Ref. 2).

An offsite circuit consists of all breakers, transformers, switches, interrupting devices, cabling, and controls required to transmit power from the offsite transmission network to the onsite Class 1E ESF bus(es).

Certain required unit loads are returned to service in a predetermined sequence in order to prevent overloading the transformer supplying offsite power to the onsite Class 1E Distribution System. Within [1] minute after the initiating signal is received, all automatic and permanently connected loads needed to recover the unit or maintain it in a safe condition are returned to service via the load sequencer.

The onsite standby power source for each 4.16 kV ESF bus is a dedicated DG. DGs [11] and [12] are dedicated to ESF buses [11] and [12], respectively. A DG starts

(continued)

Rev. 0

INSERT 1

Additionally, the unit's electrical sources must include electrical sources from the other unit that are required to support the Service Water (SW), Main Control Room (MCR)/Emergency Switchgear Room (ESGR) Emergency Ventilation System (EVS), or Auxiliary Building central exhaust system safety functions. This requirement could include both of the other unit's offsite circuits and EDGs for this unit.

INSERT 2

permanently connected loads and all automatically connected loads, via the load sequencing timing relays, needed to recover the unit or maintain it in a safe condition are energized.

BASES

BACKGROUND (continued)

automatically on a safety injection (SI) signal (i.e., low pressurizer pressure or high containment pressure signals) or on an ESF bus degraded voltage or undervoltage signal (refer to LCO 3.3.5, "Loss of Power (LOP) Diesel Generator (DG) Start Instrumentation"). After the DG has started, it will automatically tie to its respective bus after offsite power is tripped as a consequence of ESF bus undervoltage or degraded voltage, independent of or coincident with an SI signal. The DGs will also start and operate in the standby mode without tying to the ESF bus on an SI signal alone. Following the trip of offsite power, [a sequencer] an undervoltage signal strips nonpermanent loads from the ESF bus. When the DG is tied to the ESF bus, loads are then sequentially connected to the respective ESF bus by the automatic load sequencer. The sequencing logic controls the permissive and starting signals to motor breakers to prevent overloading the DG by automatic load application.

In the event of a loss of preferred power, the ESF electrical loads are automatically connected to the DGs in sufficient time to provide for safe reactor shutdown and to mitigate the consequences of a Design Basis Accident (DBA) such as a loss of coolant accident (LOCA).

Certain required unit loads are returned to service in a predetermined sequence in order to prevent overloading the DG in the process. Within [1] minute after the initiating signal is received, all loads needed to recover the unit or maintain it in a safe condition are returned to service.

Ratings for Train A and Train B DGs satisfy the requirements of Regulatory Guide 1.9 (Ref. 3). The continuous service rating of each DG is [7000] kW with [10%] overload permissible for up to 2 hours in any 24 hour period. The ESF loads that are powered from the 4.16 kV ESF buses are listed in Reference 2.

APPLICABLE SAFETY ANALYSES

The initial conditions of DBA and transient analyses in the FSAR, Chapter 6 (Ref. 4) and Chapter 15 (Ref. 5), assume ESF systems are OPERABLE. The AC electrical power sources are designed to provide sufficient capacity, capability, redundancy, and reliability to ensure the availability of necessary power to ESF systems so that the fuel, Reactor Coolant System (RCS), and containment design limits are not

(continued)

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BASES

APPLICABLE SAFETY ANALYSES (continued)

exceeded. These limits are discussed in more detail in the Bases for Section 3.2, Power Distribution Limits; Section 3.4, Reactor Coolant System (RCS); and Section 3.6, Containment Systems.

The OPERABILITY of the AC electrical power sources is consistent with the initial assumptions of the Accident analyses and is based upon meeting the design basis of the unit. This results in maintaining at least one train of the onsite or offsite AC sources OPERABLE during Accident conditions in the event of:

a. An assumed loss of all offsite power or all onsite AC power; and

b. A worst case single failure.

The AC sources satisfy Criterion 3 of NRC Policy Statement. 10 CFR 50.36(c)(2)(ii) 3

LCO

Two qualified circuits between the offsite transmission network and the onsite Class 1E Electrical Power System and separate and independent DGs for each train ensure availability of the required power to shut down the reactor and maintain it in a safe shutdown condition after an anticipated operational occurrence (AOO) or a postulated DBA. E 1 6

Qualified offsite circuits are those that are described in the FSAR and are part of the licensing basis for the unit. 1

In addition, one required automatic load sequencer per train must be OPERABLE. the 1 2 ing timing relays

Each offsite circuit must be capable of maintaining rated frequency and voltage, and accepting required loads during an accident, while connected to the ESF buses. <INSERT> 1

[Offsite circuit #1 consists of Safeguards Transformer B, which is supplied from Switchyard Bus B, and is fed through breaker 52-3 powering the ESF transformer XNB01, which in turn, powers the #1 ESF bus through its normal feeder breaker. Offsite circuit #2 consists of the Startup Transformer, which is normally fed from the Switchyard] 2

(continued)

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INSERT

Offsite circuits consist of the 34.5 kV buses supplying the Reserve Station Service Transformer(s) (RSST) which feed the transfer buses. The D, E, and F transfer buses supply the onsite electrical power to the four emergency buses for the two units. Unit 1 emergency bus H is fed through the F transfer bus from the C RSST that is supplied from 34.5 kV bus #3. Unit 1 emergency bus J is fed through the D transfer bus from the A RSST that is fed from 34.5 kV bus #4. Unit 1 station service bus 1B can be an alternate feed for Unit 1 H emergency bus, while Unit 1 J emergency bus may be fed from Unit 2 station service bus 2B. Unit 2 emergency bus H is fed through the E transfer bus from the B RSST and it is fed from 34.5 kV bus #4. Unit 2 emergency bus J is fed through the F transfer bus from the C RSST that is fed from 34.5 kV bus #3. This arrangement provides a separation of the offsite circuits by one 34.5 kV (bus #4) supplying the A and B RSSTs and the other offsite circuit being supplied from 34.5 kV (bus #3) supplying the C RSST. Specific breaker nomenclature for individual circuits may be obtained from drawings in the UFSAR Chapter 8 (Ref. 2).

BASES

LCO (continued)

[Bus A, and is fed through breaker PA 0201, powering the ESF transformer, which, in turn, powers the #2 ESF bus through its normal feeder breaker.]

Each DG must be capable of starting, accelerating to rated speed and voltage, and connecting to its respective ESF bus on detection of bus undervoltage. This will be accomplished within 0100 seconds. Each DG must also be capable of accepting required loads within the assumed loading sequence intervals, and continue to operate until offsite power can be restored to the ESF buses. These capabilities are required to be met from a variety of initial conditions such as DG in standby with the engine hot and DG in standby with the engine at ambient conditions. Additional DG capabilities must be demonstrated to meet required Surveillances, e.g., capability of the DG to revert to standby status on an ECCS signal while operating in parallel test mode.

or degraded voltage

Proper sequencing of loads, [including tripping of nonessential loads,] is a required function for DG OPERABILITY.

<INSERT>

The AC sources in one train must be separate and independent (to the extent possible) of the AC sources in the other train. For the DGs, separation and independence are complete.

For the offsite AC sources, separation and independence are to the extent practical. A circuit may be connected to more than one ESF bus, with fast transfer capability to the other circuit OPERABLE, and not violate separation criteria. A circuit that is not connected to an ESF bus is required to have OPERABLE fast transfer interlock mechanisms to at least two ESF buses to support OPERABILITY of that circuit.

APPLICABILITY

The AC sources [and sequencers] are required to be OPERABLE in MODES 1, 2, 3, and 4 to ensure that:

ing timing relays

a. Acceptable fuel design limits and reactor coolant pressure boundary limits are not exceeded as a result of AOOs or abnormal transients; and

(continued)

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INSERT

The other unit's offsite circuit(s) and EDG(s) are required to be OPERABLE to support the SW, MCR/ESGR ventilation, and Auxiliary Building central exhaust functions needed for this unit. These Functions share components, pumps or fans, which are electrically powered from both units.

BASES

APPLICABILITY (continued)

b. Adequate core cooling is provided and containment OPERABILITY and other vital functions are maintained in the event of a postulated DBA.

The AC power requirements for MODES 5 and 6 are covered in LCO 3.8.2, "AC Sources—Shutdown."

ACTIONS

A.1

To ensure a highly reliable power source remains with one offsite circuit inoperable, it is necessary to verify the OPERABILITY of the remaining required offsite circuit on a more frequent basis. Since the Required Action only specifies "perform," a failure of SR 3.8.1.1 acceptance criteria does not result in a Required Action not met. However, if a second required circuit fails SR 3.8.1.1, the second offsite circuit is inoperable, and Condition ~~E~~ 6, for two offsite circuits inoperable, is entered. 5

Reviewer's Note: The turbine driven auxiliary feedwater pump is only required to be considered a redundant required feature, and, therefore, required to be determined OPERABLE by this Required Action, if the design is such that the remaining OPERABLE motor or turbine driven auxiliary feedwater pump(s) is not by itself capable (without any reliance on the motor driven auxiliary feedwater pump powered by the emergency bus associated with the inoperable diesel generator) of providing 100% of the auxiliary feedwater flow assumed in the safety analysis. 4

A.2

Required Action A.2, which only applies if the train cannot be powered from an offsite source, is intended to provide assurance that an event coincident with a single failure of the associated DG will not result in a complete loss of safety function of critical redundant required features. These features are powered from the redundant AC electrical power train. This includes motor driven auxiliary feedwater pumps. Single train systems, such as turbine driven auxiliary feedwater pumps, may not be included. E 1 1

(continued)

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BASES

ACTIONS

A.2 (continued)

The Completion Time for Required Action A.2 is intended to allow the operator time to evaluate and repair any discovered inoperabilities. This Completion Time also allows for an exception to the normal "time zero" for beginning the allowed outage time "clock." In this Required Action, the Completion Time only begins on discovery that both:

a. The train has no offsite power supplying its loads; and

b. A required feature on the other train is inoperable.

If at any time during the existence of Condition A (one offsite circuit inoperable) a redundant required feature subsequently becomes inoperable, this Completion Time begins to be tracked.

Discovering no offsite power to one train of the onsite Class 1E Electrical Power Distribution System coincident with one or more inoperable required support or supported features, or both, that are associated with the other train that has offsite power, results in starting the Completion Times for the Required Action. Twenty-four hours is acceptable because it minimizes risk while allowing time for restoration before subjecting the unit to transients associated with shutdown.

The remaining OPERABLE offsite circuit and DGs are adequate to supply electrical power to Train A and Train B of the onsite Class 1E Distribution System. The 24 hour Completion Time takes into account the component OPERABILITY of the redundant counterpart to the inoperable required feature. Additionally, the 24-hour Completion Time takes into account the capacity and capability of the remaining AC sources, a reasonable time for repairs, and the low probability of a DBA occurring during this period.

A.3

According to Regulatory Guide 1.93 (Ref. 6), operation may continue in Condition A for a period that should not exceed 72 hours. With one offsite circuit inoperable, the reliability of the offsite system is degraded, and the

(continued)

BASES

ACTIONS

A.3 (continued)

potential for a loss of offsite power is increased, with attendant potential for a challenge to the unit safety systems. In this Condition, however, the remaining OPERABLE offsite circuit and DGs are adequate to supply electrical power to the onsite Class 1E Distribution System.

The 72 hour Completion Time takes into account the capacity and capability of the remaining AC sources, a reasonable time for repairs, and the low probability of a DBA occurring during this period.

The second Completion Time for Required Action A.3 establishes a limit on the maximum time allowed for any combination of required AC power sources to be inoperable during any single contiguous occurrence of failing to meet the LCO. If Condition A is entered while, for instance, a DG is inoperable and that DG is subsequently returned OPERABLE, the LCO may already have been not met for up to 72 hours. This could lead to a total of 144 hours, since initial failure to meet the LCO, to restore the offsite circuit. At this time, a DG could again become inoperable, the circuit restored OPERABLE, and an additional 72 hours (for a total of 8 days) allowed prior to complete restoration of the LCO. The 6 day Completion Time provides a limit on the time allowed in a specified condition after discovery of failure to meet the LCO. This limit is considered reasonable for situations in which Conditions A and B are entered concurrently. The "AND" connector between the 72 hour and 6 day Completion Times means that both Completion Times apply simultaneously, and the more restrictive Completion Time must be met.

14days
E
an
14days
31
17days
17

As in Required Action A.2, the Completion Time allows for an exception to the normal "time zero" for beginning the allowed outage time "clock." This will result in establishing the "time zero" at the time that the LCO was initially not met, instead of at the time Condition A was entered.

<INSERT>

B.1

To ensure a highly reliable power source remains with an inoperable DG, it is necessary to verify the availability of

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INSERT

Condition B is entered for an inoperable EDG and requires the OPERABILITY of additional electrical sources for the allowed Completion Time of 14 days. The additional electrical sources required to be OPERABLE are the Alternate AC (AAC) diesel generator (DG) (Station Black Out (SBO) diesel generator), and both EDGs of the other unit. If any of these additional sources are inoperable at the time an EDG becomes inoperable, or become inoperable with an EDG in Condition B, Condition C must also be entered for the inoperable EDG.

BASES

ACTIONS

B.1 (continued)

the offsite circuits on a more frequent basis. Since the Required Action only specifies "perform," a failure of SR 3.8.1.1 acceptance criteria does not result in a Required Action being not met. However, if a circuit fails to pass SR 3.8.1.1, it is inoperable. Upon offsite circuit inoperability, additional Conditions and Required Actions must then be entered.

Reviewer's Note: The turbine driven auxiliary feedwater pump is only required to be considered a redundant required feature, and, therefore, required to be determined OPERABLE by this Required Action, if the design is such that the remaining OPERABLE motor or turbine driven auxiliary feedwater pump(s) is not by itself capable (without any reliance on the motor driven auxiliary feedwater pump powered by the emergency bus associated with the inoperable diesel generator) of providing 100% of the auxiliary feedwater flow assumed in the safety analysis.

B.2

Required Action B.2 is intended to provide assurance that a loss of offsite power, during the period that a DG is inoperable, does not result in a complete loss of safety function of critical systems. These features are designed with redundant safety related trains. This includes motor driven auxiliary feedwater pumps. Single train systems, such as turbine driven auxiliary feedwater pumps, are not included. Redundant required feature failures consist of inoperable features associated with a train, redundant to the train that has an inoperable DG.

The Completion Time for Required Action B.2 is intended to allow the operator time to evaluate and repair any discovered inoperabilities. This Completion Time also allows for an exception to the normal "time zero" for beginning the allowed outage time "clock." In this Required Action, the Completion Time only begins on discovery that both:

(continued)

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BASES

ACTIONS

B.2 (continued)

a. An inoperable DG exists; and

b. A required feature on the other train (Train A or Train B) is inoperable.

If at any time during the existence of this Condition (one DG inoperable) a required feature subsequently becomes inoperable, this Completion Time would begin to be tracked.

Discovering one required DG inoperable coincident with one or more inoperable required support or supported features, or both, that are associated with the OPERABLE DG, results in starting the Completion Time for the Required Action. Four hours from the discovery of these events existing concurrently is acceptable because it minimizes risk while allowing time for restoration before subjecting the unit to transients associated with shutdown.

In this Condition, the remaining OPERABLE DG and offsite circuits are adequate to supply electrical power to the onsite Class 1E Distribution System. Thus, on a component basis, single failure protection for the required feature's function may have been lost; however, function has not been lost. The 4 hour Completion Time takes into account the OPERABILITY of the redundant counterpart to the inoperable required feature. Additionally, the 4 hour Completion Time takes into account the capacity and capability of the remaining AC sources, a reasonable time for repairs, and the low probability of a DBA occurring during this period.

B.3.1 and B.3.2

Required Action B.3.1 provides an allowance to avoid unnecessary testing of OPERABLE DG(s). If it can be determined that the cause of the inoperable DG does not exist on the OPERABLE DG, SR 3.8.1.2 does not have to be performed. If the cause of inoperability exists on other DG(s), the other DG(s) would be declared inoperable upon discovery and Condition D of LCO 3.8.1 would be entered. Once the failure is repaired, the common cause failure no longer exists, and Required Action B.3.1 is satisfied. If the cause of the initial inoperable DG cannot be confirmed not to exist on the remaining DG(s), performance of

(continued)

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BASES

ACTIONS

B.3.1 and B.3.2 (continued)

SR 3.8.1.2 suffices to provide assurance of continued OPERABILITY of that DG.

In the event the inoperable DG is restored to OPERABLE status prior to completing either B.3.1 or B.3.2, the plant corrective action program will continue to evaluate the common cause possibility. This continued evaluation, however, is no longer under the 24 hour constraint imposed while in Condition B. (including the other unit's EDGs.)

According to Generic Letter 84-15 (Ref. 7), 24 hours is reasonable to confirm that the OPERABLE DG is not affected by the same problem as the inoperable DG.

B.4

According to Regulatory Guide 1.93 (Ref. 6), operation may continue in Condition B for a period that should not exceed 72 hours.

In Condition B, the remaining OPERABLE DG and offsite circuits are adequate to supply electrical power to the onsite Class 1E Distribution System. The 72 hour Completion Time takes into account the capacity and capability of the remaining AC sources, a reasonable time for repairs, and the low probability of a DBA occurring during this period. (AAC DG, and the other unit's EDGs) (14 days)

The second Completion Time for Required Action B.4 establishes a limit on the maximum time allowed for any combination of required AC power sources to be inoperable during any single contiguous occurrence of failing to meet the LCO. If Condition B is entered while, for instance, an offsite circuit is inoperable and that circuit is subsequently restored OPERABLE, the LCO may already have been not met for up to 72 hours. This could lead to a total of 144 hours, since initial failure to meet the LCO, to restore the DG. At this time, an offsite circuit could again become inoperable, the DG restored OPERABLE, and an additional 72 hours (for a total of 8 days) allowed prior to complete restoration of the LCO. The 8 day Completion Time provides a limit on time allowed in a specified condition after discovery of failure to meet the LCO. This limit is considered reasonable for situations in which Conditions A (17 days) (20) (17)

(continued)

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BASES

ACTIONS

B.4 (continued)

and B are entered concurrently. The "AND" connector between the 72 hour and 8 day Completion Times means that both Completion Times apply simultaneously, and the more restrictive Completion Time must be met.

14 day 17 5

As in Required Action B.2, the Completion Time allows for an exception to the normal "time zero" for beginning the allowed time "clock." This will result in establishing the "time zero" at the time that the LCO was initially not met, instead of at the time Condition B was entered.

Actions C, D, E, F

<INSERT> 5

G 5

C.1 and C.2

Required Action C.1, which applies when two offsite circuits are inoperable, is intended to provide assurance that an event with a coincident single failure will not result in a complete loss of redundant required safety functions. The Completion Time for this failure of redundant required features is reduced to 12 hours from that allowed for one train without offsite power (Required Action A.2). The rationale for the reduction to 12 hours is that Regulatory Guide 1.93 (Ref. 6) allows a Completion Time of 24 hours for two required offsite circuits inoperable, based upon the assumption that two complete safety trains are OPERABLE. When a concurrent redundant required feature failure exists, this assumption is not the case, and a shorter Completion Time of 12 hours is appropriate. These features are powered from redundant AC safety trains. ~~This includes motor driven auxiliary feedwater pumps. Single train features, such as turbine driven auxiliary pumps, are not included in the list.~~ 1

The Completion Time for Required Action C.1 is intended to allow the operator time to evaluate and repair any discovered inoperabilities. This Completion Time also allows for an exception to the normal "time zero" for beginning the allowed outage time "clock." In this Required Action the Completion Time only begins on discovery that both: 6 5

a. All required offsite circuits are inoperable; and

b. A required feature is inoperable.

(continued)

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INSERT

C.1 and C.2

To ensure a highly reliable electrical power source remains available when one EDG is inoperable, Condition C is established to monitor the OPERABILITY of the AAC DG and the other unit's EDGs. Condition B is entered any time an EDG becomes inoperable and the Required Actions and Completion Times are followed. Concurrently, if the AAC DG or one or more of the other unit's EDG(s) is inoperable, or become inoperable, in addition to the Required Actions of Condition B, Required Actions C.1 and C.2 limit the time the EDG may be out of service to 72 hours. If the AAC DG or the other unit's EDG(s) is inoperable when the EDG becomes inoperable, the allowed outage time (AOT) is limited to 72 hours, unless the AAC DG and the other unit's EDG(s) are returned to OPERABLE status. If during the 72 hour Completion Time of C.1 or C.2, the AAC DG and the other unit's EDG(s) are return to OPERABLE status, Condition C is exited and AOT is restricted by the Completion Time tracked in Condition B. If the AAC DG or one or more of the other unit's EDG(s) becomes inoperable at sometime after the initial EDG inoperability, Condition C requires the restoration of the AAC DG and the other unit's EDG(s) within 72 hours or Condition L is required to be entered.

The 72 hour Completion Time is considered reasonable and takes into account the assumption in the probabilistic safety analysis (PSA) for potential core damage frequency.

D.1, D.2, and D.3

Condition D is modified by a Note indicating that separate Condition entry is allowed for each offsite circuit on the other unit that provides electrical power to required shared components.

To provide the necessary electrical power for the SW, MCR/ESGR EVS, and Auxiliary Building central exhaust functions for a unit, AC electrical sources of both units may be required to be OPERABLE. Action D is entered for one or more inoperable offsite circuit(s) on the other unit that is necessary to support required shared components. These shared components are the SW pump(s), MCR/ESGR fan(s), and Auxiliary Building central exhaust fan(s). Required Action D.1 verifies the OPERABILITY of the remaining required offsite sources within an hour of the inoperability and every 8 hours thereafter. Since the Required Action only specifies "perform," a failure of the SR 3.8.1.1 acceptance criteria does not result in a Required Action not met.

The Completion Time for Required Action D.2 is intended to allow the operator time to evaluate and repair any discovered inoperabilities.

This Completion Time also allows for an exception to the normal "time zero" for beginning the allowed outage time "clock." In this Required Action, the Completion Time only begins on discovery that both:

a. The required shared component has no offsite power; and

b. More than one shared component is inoperable.

INSERT (continued)

If at any time during the existence of Condition D (one offsite circuit inoperable on the other unit needed to supply electrical power for a required shared component) another required shared component in the same system subsequently becomes inoperable, this Completion Time begins to be tracked.

Discovering no offsite power on the other unit that supports a required shared component and an additional required shared component in the same system inoperable, results in starting the Completion Times for the Required Action. Twenty-four hours is acceptable because it minimizes risk while allowing time for restoration before subjecting the unit to transients associated with shutdown.

The remaining OPERABLE offsite circuits and EDGs that power the required shared components are adequate to support the SW, MCR/ESGR EVS, and Auxiliary Building central exhaust system Functions. The 24 hour Completion Time takes into account the component OPERABILITY of the remaining shared component(s), a reasonable time for repairs, and the low probability of a DBA occurring during this period.

Operation may continue in Condition D for a period of 72 hours. With one offsite circuit inoperable on the other unit supplying electrical power to a required shared component, the reliability of the SW, MCR/ESGR EVS, and Auxiliary Building

central exhaust system Functions are degraded. The potential for the loss of offsite power to the other required shared components is increased, with the attendant potential for a challenge to SW, MCR/ESGR EVS, and Auxiliary Building central exhaust system Functions.

The required offsite circuit must be returned to OPERABLE status within 72 hours, or the support function for the associated shared component is considered inoperable. At that time, the required shared component must be declared inoperable and the appropriate Conditions of the LCO 3.7.8, "Service Water System," LCO 3.7.10, "MCR/ESGR Emergency Ventilation System," and LCO 3.7.12, "Emergency Core Cooling System (ECCS) Pump Room Exhaust Air Cleanup System," must be entered. The 72 hour Completion Time takes into account the capacity and capability of the remaining AC sources providing electrical power to the required shared components, a reasonable time for repairs and the low probability of a DBA occurring during this period of time.

E.1, E.2, and E.3

To ensure a highly reliable power source remains with an inoperable EDG, it is necessary to verify the availability of the required offsite circuits on a more frequent basis. Since the Required Action only specifies "perform," a failure of SR 3.8.1.1 acceptance criteria does not result in a Required Action being not met. Required Action E.1 verifies the OPERABILITY of the required offsite sources within an hour of the inoperability and every 8 hours thereafter. However, if a circuit fails to pass SR 3.8.1.1, it is inoperable. Upon offsite circuit inoperability, additional Conditions and Required Actions must be entered.

INSERT (continued)

Required Action E.2 is intended to provide assurance that a loss of offsite power, during the period that an EDG is inoperable, does not result in a complete loss of the SW, MCR/ESGR EVS, or Auxiliary Building central exhaust system
Functions.

The Completion Time for Required Action E.2 is intended to allow the operator time to evaluate and repair any discovered inoperabilities. This Completion Time also allows for an exception to the normal "time zero" for beginning the allowed outage time "clock." In this Required Action, the Completion Time only begins on discovery that both:

a. The required shared component with an inoperable EDG; and

b. More than one shared component in the same system is inoperable.

If at any time during the existence of Condition E (one EDG inoperable on the other unit needed to supply electrical power for a required shared component) another required shared component subsequently becomes inoperable, this Completion Time begins to be tracked.

Discovering an EDG on the other unit that supports a required shared component and an additional required shared component inoperable, results in starting the Completion Times for the
Required Action. Four hours is acceptable because it minimizes risk while allowing time for restoration before subjecting the unit to transients associated with shutdown.

The remaining OPERABLE offsite circuits and EDGs that power the required shared components are adequate to support the SW, MCR/ESGR EVS, or Auxiliary Building central exhaust system Functions. The 4 hour Completion Time takes into account the component OPERABILITY of the remaining shared component(s), a reasonable time for repairs, and the low probability of a DBA occurring during this period.

Operation may continue in Condition E for a period of 14 days. With one EDG inoperable on the other unit supplying electrical power to a required shared component, the reliability of the respective Function is degraded. The potential for the loss of EDGs to the other required shared components is increased, with the attendant potential for a challenge to respective Function.

The required EDG must be returned to OPERABLE status within 14 days, or the support function for the associated shared component is considered inoperable. At that time, the required shared component must be declared inoperable and the appropriate Conditions of the LCOs 3.7.8, 3.7.10, and 3.7.12 must be entered. The 14 day Completion Time takes into account the capacity and capability of the remaining AC sources providing electrical power to the required shared components, a reasonable time for repairs and the low probability of a DBA occurring during this period of time.

INSERT (continued)

F.1 and F.2

To ensure a highly reliable electrical power source remains available when one EDG is inoperable that is required to support a required shared component on the other unit, Condition F is established to monitor the OPERABILITY of the AAC DG and the LCO 3.8.1.b EDGs. Condition F is entered any time an EDG that is required to support a required shared component that receives its electrical power from the other unit becomes inoperable and the Required Actions and Completion Times are followed. Concurrently, if the AAC DG or one or more of this unit's EDG(s) is inoperable, or become inoperable, in addition to the Required Actions of Condition E, Required Actions F.1 and F.2 limit the time the EDG may be out of service to 72 hours. If the AAC DG or this unit's EDG(s) is inoperable when the other unit's EDG becomes inoperable, the AOT is limited to 72 hours, unless the AAC DG and this unit's EDG(s) are returned to OPERABLE status. If during the 72 hour Completion Time of F.1 or F.2, the AAC DG and this unit's EDG are return to OPERABLE status, Condition F is exited and AOT is restricted by the Completion Time tracked in Condition E. If the AAC DG or one or more of this unit's EDG(s) becomes inoperable at sometime after the initial EDG inoperability, Condition F requires the restoration of the AAC DG and this unit's EDG(s) within 72 hours or the supported shared component must be declared inoperable and LCOs 3.7.8, 3.7.10, and 3.7.12 provides the appropriate restrictions.

The 72 hour Completion Time is considered reasonable and takes into account the assumption in the probabilistic safety analysis (PSA) for potential core damage frequency.

BASES

ACTIONS

G ~~D~~.1 and ~~D~~.2 (continued)

If at any time during the existence of Condition ~~D~~ C (two offsite circuits inoperable) a required feature becomes inoperable, this Completion Time begins to be tracked. 5

According to Regulatory Guide 1.93 (Ref. 6), operation may continue in Condition ~~D~~ G for a period that should not exceed 24 hours. This level of degradation means that the offsite electrical power system does not have the capability to effect a safe shutdown and to mitigate the effects of an accident; however, the onsite AC sources have not been degraded. This level of degradation generally corresponds to a total loss of the immediately accessible offsite power sources. 5

Because of the normally high availability of the offsite sources, this level of degradation may appear to be more severe than other combinations of two AC sources inoperable that involve one or more DGs inoperable. However, two factors tend to decrease the severity of this level of degradation: 1

a. The configuration of the redundant AC electrical power system that remains available is not susceptible to a single bus or switching failure; and

b. The time required to detect and restore an unavailable offsite power source is generally much less than that required to detect and restore an unavailable onsite AC source.

With both of the required offsite circuits inoperable, sufficient onsite AC sources are available to maintain the unit in a safe shutdown condition in the event of a DBA or transient. In fact, a simultaneous loss of offsite AC sources, a LOCA, and a worst case single failure were postulated as a part of the design basis in the safety analysis. Thus, the 24 hour Completion Time provides a period of time to effect restoration of one of the offsite circuits commensurate with the importance of maintaining an AC electrical power system capable of meeting its design criteria.

According to Reference 6, with the available offsite AC sources, two less than required by the LCO, operation may

(continued)

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BASES

ACTIONS

G ~~D~~.1 and ~~D~~.2 (continued)

continue for 24 hours. If two offsite sources are restored within 24 hours, unrestricted operation may continue. If only one offsite source is restored within 24 hours, power operation continues in accordance with Condition A.

H ~~D~~.1 and ~~D~~.2

Pursuant to LCO 3.0.6, the Distribution System ACTIONS would not be entered even if all AC sources to it were inoperable, resulting in de-energization. Therefore, the Required Actions of Condition ~~D~~ are modified by a Note to indicate that when Condition ~~D~~ is entered with no AC source to any train, the Conditions and Required Actions for LCO 3.8.9, "Distribution Systems—Operating," must be immediately entered. This allows Condition ~~D~~ to provide requirements for the loss of one offsite circuit and one DG, without regard to whether a train is de-energized. LCO 3.8.9 provides the appropriate restrictions for a de-energized train.

According to Regulatory Guide 1.93 (Ref. 6), operation may continue in Condition ~~D~~ H for a period that should not exceed 12 hours.

In Condition ~~D~~ H, individual redundancy is lost in both the offsite electrical power system and the onsite AC electrical power system. Since power system redundancy is provided by two diverse sources of power, however, the reliability of the power systems in this Condition may appear higher than that in Condition ~~C~~ G (loss of both required offsite circuits). This difference in reliability is offset by the susceptibility of this power system configuration to a single bus or switching failure. The 12 hour Completion Time takes into account the capacity and capability of the remaining AC sources, a reasonable time for repairs, and the low probability of a DBA occurring during this period.

I ~~D~~.1

With Train ~~A~~ H and Train ~~B~~ J DGs inoperable, there are no remaining standby AC sources. Thus, with an assumed loss of offsite electrical power, insufficient standby AC sources

(continued)

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BASES

ACTIONS I 1 (continued) 5

are available to power the minimum required ESF functions. Since the offsite electrical power system is the only source of AC power for this level of degradation, the risk associated with continued operation for a very short time could be less than that associated with an immediate controlled shutdown (the immediate shutdown could cause grid instability, which could result in a total loss of AC power). Since any inadvertent generator trip could also result in a total loss of offsite AC power, however, the time allowed for continued operation is severely restricted. The intent here is to avoid the risk associated with an immediate controlled shutdown and to minimize the risk associated with this level of degradation.

According to Reference 6, with both E DGs inoperable, operation may continue for a period that should not exceed 2 hours. 1

Action J
Action K

<INSERT> 5

~~The sequencer(s) is an essential support system to [both the offsite circuit and the DG associated with a given ESF bus]. [Furthermore, the sequencer is on the primary success path for most major AC electrically powered safety systems powered from the associated ESF bus.] Therefore, loss of an [ESF bus sequencer] affects every major ESF system in the [division]. The [12] hour Completion Time provides a period of time to correct the problem commensurate with the importance of maintaining sequencer OPERABILITY. This time period also ensures that the probability of an accident (requiring sequencer OPERABILITY) occurring during periods when the sequencer is inoperable is minimal.~~ 4

~~This Condition is preceded by a Note that allows the Condition to be deleted if the unit design is such that any sequencer failure mode will only affect the ability of the associated DG to power its respective safety loads under any conditions. Implicit in this Note is the concept that the Condition must be retained if any sequencer failure mode results in the inability to start all or part of the safety loads when required, regardless of power availability, or results in overloading the offsite power circuit to a safety bus during an event and thereby causes its failure. Also~~

(continued)

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INSERT

J.1

With two LCO 3.8.1.c required EDGs inoperable, as many as two required shared and potentially required components have no remaining standby AC sources. Thus, with an assumed loss of offsite power condition, the required shared components powered from the other unit would be significantly degraded.
Therefore, the required shared component would immediately declared inoperable and LCOs 3.7.8, 3.7.10, and 3.7.12 would provide the appropriate restrictions.

K.1 and K.2

Condition K is modified by a Note indicating that separate Condition entry is allowed for each inoperable sequencing timing relay.

Condition K is entered any time a required sequencing timing relay (STR) becomes inoperable. Required Action K.1 directs the entry into the Required Actions and Completion Times associated for the individual component served by the inoperable relay. The instrumentation signals that provide the actuation are governed by LCO 3.3.2, "Engineered Safety Features Actuation System Instrumentation" for safety injection (SI), Containment Spray (Containment Depressurization Actuation (CDA)) and LCO 3.3.5, "Loss of Power (LOP) Emergency Diesel Generator (EDG) Start Instrumentation" for the LOP.

The STRs provide a time delay for the individual component to close its breaker to the associated emergency electrical bus. Each component is sequenced onto the emergency bus by an initiating signal. Required Action K.2.1 provides for the immediate isolation of the component(s) ability to automatically load on an emergency bus with an inoperable STR. This provides an assurance that the component will not be loaded onto an emergency bus at an incorrect time. Improper loading sequence may cause the emergency bus to become inoperable rendering a component with an inoperable STR incapable of load to the emergency bus prevents a possible overload condition. Required Action K.2.2 provides an alternative option for isolating the component with an inoperable STR from the emergency bus by allowing the associated EDG to be declared inoperable.

BASES

ACTIONS

F.1 (continued)

implicit in the Note, is that the Condition is not applicable to any train that does not have a sequencer.

G.1 and G.2

If the inoperable AC electric power sources cannot be restored to OPERABLE status within the required Completion Time, the unit must be brought to a MODE in which the LCO does not apply. To achieve this status, the unit must be brought to at least MODE 3 within 6 hours and to MODE 5 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging plant systems.

H.1

Condition H corresponds to a level of degradation in which all redundancy in the AC electrical power supplies has been lost. At this severely degraded level, any further losses in the AC electrical power system will cause a loss of function. Therefore, no additional time is justified for continued operation. The unit is required by LCO 3.0.3 to commence a controlled shutdown.

SURVEILLANCE REQUIREMENTS

The AC sources are designed to permit inspection and testing of all important areas and features, especially those that have a standby function, in accordance with 10 CFR 50, Appendix A, GDC 18 (Ref. 8). Periodic component tests are supplemented by extensive functional tests during refueling outages (under simulated accident conditions). The SRs for demonstrating the OPERABILITY of the DGs are in accordance with the recommendations of Regulatory Guide 1.9 (Ref. 3), Regulatory Guide 1.108 (Ref. 9), and Regulatory Guide 1.137 (Ref. 10), as addressed in the YFSAR.

Where the SRs discussed herein specify voltage and frequency tolerances, the following is applicable. The minimum steady state output voltage of 3740 V is 90% of the nominal 4160 V output voltage. This value, which is specified in

(continued)

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BASES

SURVEILLANCE REQUIREMENTS (continued)

ANSI C84.1 (Ref. 10), allows for voltage drop to the terminals of 4000 V motors whose minimum operating voltage is specified as 90% or 3600 V. It also allows for voltage drops to motors and other equipment down through the 120 V level where minimum operating voltage is also usually specified as 90% of name plate rating. The specified maximum steady state output voltage of 4580 V is equal to the maximum operating voltage specified for 4000 V motors. It ensures that for a lightly loaded distribution system, the voltage at the terminals of 4000 V motors is no more than the maximum rated operating voltages. The specified minimum and maximum frequencies of the DG are 59.5 Hz and 60.5 Hz, respectively. These values are equal to ± 2% of the 60 Hz nominal frequency and are derived from the recommendations given in Regulatory Guide 1.9 (Ref. 3). (E) < ± 1%

safety analysis assumptions for operation of ECCS pump criteria

SR 3.8.1.1

This SR ensures proper circuit continuity for the offsite AC electrical power supply to the onsite distribution network and availability of offsite AC electrical power. The breaker alignment verifies that each breaker is in its correct position to ensure that distribution buses and loads are connected to their preferred or alternate power source, and that appropriate independence of offsite circuits is maintained. The 7 day Frequency is adequate since breaker position is not likely to change without the operator being aware of it and because its status is displayed in the control room.

SR 3.8.1.2 and SR 3.8.1.7

These SRs help to ensure the availability of the standby electrical power supply to mitigate DBAs and transients and to maintain the unit in a safe shutdown condition.

To minimize the wear on moving parts that do not get lubricated when the engine is not running, these SRs are modified by a Note (Note 2 for SR 3.8.1.2) to indicate that all DG starts for these Surveillances may be preceded by an engine prelube period and followed by a warmup period prior to loading. (E) TSTF 253

For the purposes of SR 3.8.1.2 and SR 3.8.1.7 testing, the DGs are started from standby conditions. Standby conditions (E)

(continued)

P211.0

BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.1.2 and SR 3.8.1.7 (continued)

for a DG mean that the diesel engine coolant and oil are being continuously circulated and temperature is being maintained consistent with manufacturer recommendations.

In order to reduce stress and wear on diesel engines, some manufacturers recommend a modified start in which the starting speed of DGs is limited, warmup is limited to this lower speed, and the DGs are gradually accelerated to synchronous speed prior to loading. These start procedures are the intent of Note 2, which is only applicable when such modified start procedures are recommended by the manufacturer.

SR 3.8.1.7 requires that, at a 184 day Frequency, the DG starts from standby conditions and achieves required voltage and frequency within 10 seconds. The 10 second start requirement supports the assumptions of the design basis LOCA analysis in the FSAR, Chapter 15 (Ref. 5).

The 10 second start requirement is not applicable to SR 3.8.1.2 (see Note 2) when a modified start procedure as described above is used. If a modified start is not used, the 10 second start requirement of SR 3.8.1.7 applies.

Since SR 3.8.1.7 requires a 10 second start, it is more restrictive than SR 3.8.1.2, and it may be performed in lieu of SR 3.8.1.2. This is the intent of Note 1 of SR 3.8.1.2.

The 31 day Frequency for SR 3.8.1.2 (see Table 3.8.1-1, "Diesel Generator Test Schedule," in the accompanying LCO) is consistent with Regulatory Guide 1.9 (Ref. 3). The 184 day Frequency for SR 3.8.1.7 is a reduction in cold testing consistent with Generic Letter 84-15 (Ref. 7). These Frequencies provide adequate assurance of DG OPERABILITY, while minimizing degradation resulting from testing.

SR 3.8.1.3

This Surveillance verifies that the DGs are capable of synchronizing with the offsite electrical system and accepting loads greater than or equal to the equivalent of the maximum expected accident loads. A minimum run time of 90% to 100% of continuous rating (2500 to 2600 kW).

(continued)

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In addition to the SR requirements, the time for the EDG to reach steady state operation, unless the modified EDG start method is employed, is periodically monitored and the trend evaluated to identify degradation of governor and voltage regulator performance.

BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.1.3 (continued)

60 minutes is required to stabilize engine temperatures, while minimizing the time that the DG is connected to the offsite source. (E) (1)

Although no power factor requirements are established by (E) this SR, the DG is normally operated at a power factor between 0.8 lagging and 1.0. The 0.8 value is the design rating of the machine, while the 1.0 is an operational limitation to ensure circulating currents are minimized. The load band is provided to avoid routine (E) overloading of the DG. Routine overloading may result in more frequent teardown inspections in accordance with vendor recommendations in order to maintain DG OPERABILITY. (E) (1) (2) (2) (1)

The 31 day Frequency for this Surveillance (Table 3.8.1-1) is consistent with Regulatory Guide 1.9 (Ref. 3). acceptable based on operating experience (1) TSTF 37

This SR is modified by four Notes. Note 1 indicates that diesel engine runs for this Surveillance may include gradual loading, as recommended by the manufacturer, so that mechanical stress and wear on the diesel engine are minimized. Note 2 states that momentary transients, because of changing bus loads, do not invalidate this test. Similarly, momentary power factor transients above the limit do not invalidate the test. Note 3 indicates that this Surveillance should be conducted on only one DG at a time in (E) (1) order to avoid common cause failures that might result from offsite circuit or grid perturbations. Note 4 stipulates a prerequisite requirement for performance of this SR. A (E) successful DG start must precede this test to credit satisfactory performance. (1)

SR 3.8.1.4

This SR provides verification that the level of fuel oil in the day tank (and engine mounted tank) is at or above the level at which fuel oil is automatically added. The level is expressed as an equivalent volume in gallons, and is selected to ensure adequate fuel oil for a minimum of 1 hour (E) of DG operation at full load plus 10%. (2) (1)

The 31 day Frequency is adequate to assure that a sufficient supply of fuel oil is available, since low level alarms are

(continued)

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BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.1.4 (continued)

provided and facility operators would be aware of any large uses of fuel oil during this period.

SR 3.8.1.5

Microbiological fouling is a major cause of fuel oil degradation. There are numerous bacteria that can grow in fuel oil and cause fouling, but all must have a water environment in order to survive. Removal of water from the fuel oil day [and engine mounted] tanks once every [31] days eliminates the necessary environment for bacterial survival. This is the most effective means of controlling microbiological fouling. In addition, it eliminates the potential for water entrainment in the fuel oil during DG operation. Water may come from any of several sources, including condensation, ground water, rain water, contaminated fuel oil, and breakdown of the fuel oil by bacteria. Frequent checking for and removal of accumulated water minimizes fouling and provides data regarding the watertight integrity of the fuel oil system. The Surveillance Frequencies are established by Regulatory Guide 1.137 (Ref. 10). This SR is for preventative maintenance. The presence of water does not necessarily represent failure of this SR, provided the accumulated water is removed during the performance of this Surveillance.

consistent with the recommendations of

SR 3.8.1.6

This Surveillance demonstrates that each required fuel oil transfer pump operates and transfers fuel oil from its associated storage tank to its associated day tank. This is required to support continuous operation of standby power sources. This Surveillance provides assurance that the fuel oil transfer pump is OPERABLE, the fuel oil piping system is intact, the fuel delivery piping is not obstructed, and the controls and control systems for automatic fuel transfer systems are OPERABLE.

[The Frequency for this SR is variable, depending on individual system design, with up to a [92] day interval. The [92]-day Frequency corresponds to the testing requirements for pumps as contained in the ASME Code.]

(continued)

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BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.1.6 (continued)

Section XI (Ref. 10) of the ASME Code, however, the design of the fuel transfer systems is such that pumps operate automatically or must be started manually in order to maintain an adequate volume of fuel oil in the day (and engine mounted) tanks during or following DG testing. In such a case, a 31 day Frequency is appropriate. Since proper operation of fuel transfer systems is an inherent part of DG OPERABILITY, the Frequency of this SR should be modified to reflect individual designs and

SR 3.8.1.7

See SR 3.8.1.2.

SR 3.8.1.8

Transfer of each 4.16 kV ESF bus power supply from the normal offsite circuit to the alternate offsite circuit demonstrates the OPERABILITY of the alternate circuit distribution network to power the shutdown loads. The 18 month Frequency of the Surveillance is based on engineering judgment, taking into consideration the unit conditions required to perform the Surveillance, and is intended to be consistent with expected fuel cycle lengths. Operating experience has shown that these components usually pass the SR when performed at the 18 month Frequency. Therefore, the Frequency was concluded to be acceptable from a reliability standpoint.

for Unit 1 only

<INSERT>

This SR is modified by a Note. The reason for the Note is that, during operation with the reactor critical, performance of this SR could cause perturbations to the electrical distribution systems that could challenge continued steady state operation and, as a result, unit safety systems. Credit may be taken for unplanned events that satisfy this SR.

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SR 3.8.1.9

Each DG is provided with an engine overspeed trip to prevent damage to the engine. Recovery from the transient caused by the loss of a large load could cause diesel engine

(continued)

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that states that the SR is applicable to Unit 1 only. The SR is not applicable to Unit 2 because it does not have an alternate offsite feed for the emergency buses.

BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.1.9 (continued)

overspeed, which, if excessive, might result in a trip of the engine. This Surveillance demonstrates the DG load response characteristics and capability to reject the largest single load without exceeding predetermined voltage and frequency and while maintaining a specified margin to the overspeed trip. For this unit, the single load for each DG and its horsepower rating is as follows: This Surveillance may be accomplished by:

a. Tripping the DG output breaker with the DG carrying greater than or equal to its associated single largest post-accident load while paralleled to offsite power, or while solely supplying the bus; or

b. Tripping its associated single largest post-accident load with the DG solely supplying the bus.

As required by IEEE-308 (Ref. 12), the load rejection test is acceptable if the increase in diesel speed does not exceed 75% of the difference between synchronous speed and the overspeed trip setpoint, or 15% above synchronous speed, whichever is lower.

The time, voltage, and frequency tolerances specified in this SR are derived from Regulatory Guide 1.9 (Ref. 3) recommendations for response during load sequence intervals. The 3 seconds specified is equal to 60% of a typical 5 second load sequence interval associated with sequencing of the largest load. The voltage and frequency specified are consistent with the design range of the equipment powered by the DG. SR 3.8.1.9.a corresponds to the maximum frequency excursion, while SR 3.8.1.9.b and SR 3.8.1.9.c are steady state voltage and frequency values to which the system must recover following load rejection. The 18 month Frequency is consistent with the recommendation of Regulatory Guide 1.108 (Ref. 9).

This SR is modified by two Notes. The reason for Note 1 is that during operation with the reactor critical, performance of this SR could cause perturbations to the electrical distribution systems that could challenge continued steady state operation and, as a result, unit safety systems. Credit may be taken for unplanned events that satisfy this SR. In order to ensure that the DG is tested under load

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(continued)

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The Note ensures that the EDG is tested under load conditions that are as close to design basis conditions as possible. When synchronized with offsite power, testing should be performed at a power factor of ≤0.9. This power factor is representative of the actual inductive loading an EDG would see under design basis accident conditions. Under certain conditions, however, the Note allows the surveillance to be conducted at a power factor other than ≤0.9. These conditions occur when grid voltage is high, and the additional field excitation needed to get the power factor to ≤0.9 results in voltages on the emergency busses that are too high. Under these conditions, the power factor should be maintained as close as practicable to 0.9 while still maintaining acceptable voltage limits on the emergency busses. In other circumstances, the grid voltage may be such that the EDG excitation levels needed to obtain a power factor of 0.9 may not cause unacceptable voltages on the emergency busses, but the excitation levels are in excess of those recommended for the EDG. In such cases, the power factor shall be maintained as close as practicable to 0.9 without exceeding the EDG excitation limits.

BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.1.9 (continued)

conditions that are as close to design basis conditions as possible. Note 2 requires that, if synchronized to offsite power, testing must be performed using a power factor ≤ [0.9]. This power factor is chosen to be representative of the actual design basis inductive loading that the DG would experience.

TSTF 276

Reviewer's Note: The above MODE restrictions may be deleted if it can be demonstrated to the staff, on a plant specific basis, that performing the SR with the reactor in any of the restricted MODES can satisfy the following criteria, as applicable:

a. Performance of the SR will not render any safety system or component inoperable;

b. Performance of the SR will not cause perturbations to any of the electrical distribution systems that could result in a challenge to steady state operation or to plant safety systems; and

c. Performance of the SR, or failure of the SR, will not cause, or result in, an AOO with attendant challenge to plant safety systems.

4

SR 3.8.1.10

This Surveillance demonstrates the DG capability to reject a full load without overspeed tripping or exceeding the predetermined voltage limits. The DG full load rejection may occur because of a system fault or inadvertent breaker tripping. This Surveillance ensures proper engine generator load response under the simulated test conditions. This test simulates the loss of the total connected load that the DG experiences following a full load rejection and verifies that the DG does not trip upon loss of the load. These acceptance criteria provide for DG damage protection. While the DG is not expected to experience this transient during an event and continues to be available, this response ensures that the DG is not degraded for future application, including reconnection to the bus if the trip initiator can be corrected or isolated.

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(continued)

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BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.1.10 (continued)

In order to ensure that the DG is tested under load conditions that are as close to design basis conditions as possible, testing must be performed using a power factor ≤ [0.9]. This power factor is chosen to be representative of the actual design basis inductive loading that the DG would experience.

The [18 month] Frequency is consistent with the recommendation of Regulatory Guide 1.108 (Ref. 9) and is intended to be consistent with expected fuel cycle lengths.

This SR has been modified by a Note. The reason for the Note is that during operation with the reactor critical, performance of this SR could cause perturbation to the electrical distribution systems that could challenge continued steady state operation and, as a result, unit safety systems. Credit may be taken for unplanned events that satisfy this SR. 5

[Reviewer's Note: The above MODE restrictions may be deleted if it can be demonstrated to the staff, on a plant specific basis, that performing the SR with the reactor in any of the restricted MODES can satisfy the following criteria, as applicable:

a. Performance of the SR will not render any safety system or component inoperable;

b. Performance of the SR will not cause perturbations to any of the electrical distribution systems that could result in a challenge to steady state operation or to plant safety systems; and

c. Performance of the SR, or failure of the SR, will not cause, or result in, an AOO with attendant challenge to plant safety systems.]

SR 3.8.1.11 0 5

~~As required by~~ Regulatory Guide 1.108 (Ref. 8), 9
paragraph 2.a.(1), this Surveillance demonstrates the as designed operation of the standby power sources during loss of the offsite source. This test verifies all actions 1

Consistent with the recommendations of

(continued)

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SURVEILLANCE REQUIREMENTS

SR 3.8.1.10 (continued)

encountered from the loss of offsite power, including shedding of the nonessential loads and energization of the emergency buses and respective loads from the DG. It further demonstrates the capability of the DG to automatically achieve the required voltage and frequency within the specified time.

The DG autostart time of 10 seconds is derived from requirements of the accident analysis to respond to a design basis large break LOCA. The Surveillance should be continued for a minimum of 5 minutes in order to demonstrate that all starting transients have decayed and stability is achieved.

The requirement to verify the connection and power supply of permanent and autoconnected loads is intended to satisfactorily show the relationship of these loads to the DG loading logic. In certain circumstances, many of these loads cannot actually be connected or loaded without undue hardship or potential for undesired operation. For instance, Emergency Core Cooling Systems (ECCS) injection valves are not desired to be stroked open, or high pressure injection systems are not capable of being operated at full flow, or residual heat removal (RHR) systems performing a decay heat removal function are not desired to be realigned to the ECCS mode of operation. In lieu of actual demonstration of connection and loading of loads, testing that adequately shows the capability of the DG systems to perform these functions is acceptable. This testing may include any series of sequential, overlapping, or total steps so that the entire connection and loading sequence is verified.

The Frequency of 18 months is consistent with the recommendations of Regulatory Guide 1.108 (Ref. 8), paragraph 2.a.(1), takes into consideration unit conditions required to perform the Surveillance, and is intended to be consistent with expected fuel cycle lengths.

This SR is modified by two Notes. The reason for Note 1 is to minimize wear and tear on the DGs during testing. For the purpose of this testing, the DGs must be started from standby conditions, that is, with the engine coolant and oil continuously circulated, as required, and temperature maintained

(continued)

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BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.1.10 (continued)

consistent with manufacturer recommendations. The reason for Note 2 is that performing the Surveillance would remove a required offsite circuit from service, perturb the electrical distribution system, and challenge safety systems. ~~Credit may be taken for unplanned events that satisfy this SR.~~ TSTF-8 TSTF-283 INSERT

SR 3.8.1.12

This Surveillance demonstrates that the DG automatically starts and achieves the required voltage and frequency within the specified time (10 seconds) from the design basis actuation signal (LOCA signal) and operates for ≥ 5 minutes. The 5 minute period provides sufficient time to demonstrate stability. SR 3.8.1.12.d and SR 3.8.1.12.e ensure that permanently connected loads and emergency loads are energized from the offsite electrical power system on an ESF signal without loss of offsite power.

The requirement to verify the connection of permanent and autoconnected loads is intended to satisfactorily show the relationship of these loads to the DG loading logic. In certain circumstances, many of these loads cannot actually be connected or loaded without undue hardship or potential for undesired operation. For instance, ECCS injection valves are not desired to be stroked open, or high pressure injection systems are not capable of being operated at full flow, ~~or RHR systems performing a decay heat removal function are not desired to be realigned to the ECCS mode of operation.~~ In lieu of actual demonstration of connection and loading of loads, testing that adequately shows the capability of the DG system to perform these functions is acceptable. This testing may include any series of sequential, overlapping, or total steps so that the entire connection and loading sequence is verified.

The Frequency of 18 months takes into consideration unit conditions required to perform the Surveillance and is intended to be consistent with the expected fuel cycle lengths. Operating experience has shown that these components usually pass the SR when performed at the 18 month Frequency. Therefore, the Frequency was concluded to be acceptable from a reliability standpoint.

(continued)

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This restriction from normally performing the Surveillance in MODE 1, 2, 3, or 4 is further amplified to allow portions of the Surveillance to be performed for the purpose of reestablishing OPERABILITY (e.g., post work testing following corrective maintenance, corrective modification, deficient or incomplete surveillance testing, and other unanticipated OPERABILITY concerns) provided an assessment determines unit safety is maintained or enhanced. This assessment shall, as a minimum, consider the potential outcomes and transients associated with a failed partial Surveillance, a successful partial Surveillance, and a perturbation of the offsite or onsite system when they are tied together or operated independently for the partial Surveillance; as well as the operator procedures available to cope with these outcomes. These shall be measured against the avoided risk of the unit shutdown and startup to determine that unit safety is maintained or enhanced when portions of the Surveillance are performed in MODE 1, 2, 3, or 4. Risk insights or deterministic methods may be used for this assessment.

BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.1.12 (continued)

This SR is modified by two Notes. The reason for Note 1 is to minimize wear and tear on the DGs during testing. For the purpose of this testing, the DGs must be started from standby conditions, that is, with the engine coolant and oil continuously circulated and temperature maintained consistent with manufacturer recommendations. The reason for Note 2 is that during operation with the reactor critical, performance of this Surveillance could cause perturbations to the electrical distribution systems that could challenge continued steady state operation and, as a result, unit safety systems. Credit may be taken for unplanned events that satisfy this SR.

TSTF-8

SR 3.8.1.13

This Surveillance demonstrates that DG noncritical protective functions (e.g., high jacket water temperature) are bypassed on a loss of voltage signal concurrent with an ESF actuation test signal, and critical protective functions (engine overspeed, generator differential current, low lube oil pressure, high crankcase pressure, and start failure relay) trip the DG to avert substantial damage to the DG unit. The noncritical trips are bypassed during DBAs and provide an alarm on an abnormal engine condition. This alarm provides the operator with sufficient time to react appropriately. The DG availability to mitigate the DBA is more critical than protecting the engine against minor problems that are not immediately detrimental to emergency operation of the DG.

The 18 month Frequency is based on engineering judgment, taking into consideration unit conditions required to perform the Surveillance, and is intended to be consistent with expected fuel cycle lengths. Operating experience has shown that these components usually pass the SR when performed at the 18-month Frequency. Therefore, the Frequency was concluded to be acceptable from a reliability standpoint.

The SR is modified by a Note. The reason for the Note is that performing the Surveillance would remove a required DG from service. Credit may be taken for unplanned events that satisfy this SR.

TSTF 8

(continued)

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This restriction from normally performing the Surveillance in MODE 1 or 2 is further amplified to allow portions of the Surveillance to be performed for the purpose of reestablishing OPERABILITY (e.g., post work testing following corrective maintenance, corrective modification, deficient or incomplete surveillance testing, and other unanticipated OPERABILITY concerns) provided an assessment determines unit safety is maintained or enhanced. This assessment shall, as a minimum, consider the potential outcomes and transients associated with a failed partial Surveillance, a successful partial Surveillance, and a perturbation of the offsite or onsite system when they are tied together or operated independently for the partial Surveillance; as well as the operator procedures available to cope with these outcomes. These shall be measured against the avoided risk of the unit shutdown and startup to determine that unit safety is maintained or enhanced when portions of the Surveillance are performed in MODE 1 or 2. Risk insights or deterministic methods may be used for this assessment.

INSERT 2

on actual or simulated signals from an ESF actuation, a loss of voltage, or a loss of voltage signal concurrent with an ESF actuation

BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.1.13 (continued)

Reviewer's Note: The above MODE restrictions may be deleted if it can be demonstrated to the staff, on a plant specific basis, that performing the SR with the reactor in any of the restricted MODES can satisfy the following criteria, as applicable:

a. Performance of the SR will not render any safety system or component inoperable;

b. Performance of the SR will not cause perturbations to any of the electrical distribution systems that could result in a challenge to steady state operation or to plant safety systems; and

c. Performance of the SR, or failure of the SR, will not cause, or result in, an AOO with attendant challenge to plant safety systems.

SR 3.8.1.14

Regulatory Guide 1.108 (Ref. 9), paragraph 2.a.(3), requires demonstration once per 18 months that the DGs can start and run continuously at full load capability for an interval of not less than 24 hours, ≥ 22 hours of which is at a load equivalent to 110% of the continuous duty rating and the remainder of the time at a load equivalent to the continuous duty rating of the DG. The DG starts for this Surveillance can be performed either from standby or hot conditions. The provisions for prelubricating and warmup, discussed in SR 3.8.1.2, and for gradual loading, discussed in SR 3.8.1.3, are applicable to this SR.

In order to ensure that the DG is tested under load conditions that are as close to design conditions as possible, testing must be performed using a power factor of ≤ [0.9]. This power factor is chosen to be representative of the actual design basis inductive loading that the DG would experience. The load band is provided to avoid routine overloading of the DG. Routine overloading may result in more frequent teardown inspections in accordance with vendor recommendations in order to maintain DG OPERABILITY.

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SURVEILLANCE REQUIREMENTS

SR 3.8.1.14 (continued)

The 18-month Frequency is consistent with the recommendations of Regulatory Guide 1.108 (Ref. 8), paragraph 2.a.(3), takes into consideration unit conditions required to perform the Surveillance, and is intended to be consistent with expected fuel cycle lengths.

This Surveillance is modified by two Notes. Note 1 states that momentary transients due to changing bus loads do not invalidate this test. Similarly, momentary power factor transients above the power factor limit will not invalidate the test. The reason for Note 2 is that during operation with the reactor critical, performance of this Surveillance could cause perturbations to the electrical distribution systems that could challenge continued steady state operation and, as a result, unit safety systems. Credit may be taken for unplanned events that satisfy this SR.

<INSERT 1> TSTF 276

TSTF 8

SR 3.8.1.15

This Surveillance demonstrates that the diesel engine can restart from a hot condition, such as subsequent to shutdown from normal Surveillances, and achieve the required voltage and frequency within 10 seconds. The 10 second time is derived from the requirements of the accident analysis to respond to a design basis large break LOCA. The 18 month Frequency is consistent with the recommendations of Regulatory Guide 1.108 (Ref. 8), paragraph 2.a.(5).

This SR is modified by two Notes. Note 1 ensures that the test is performed with the diesel sufficiently hot. The load band is provided to avoid routine overloading of the DG. Routine overloads may result in more frequent teardown inspections in accordance with vendor recommendations in order to maintain DG OPERABILITY. The requirement that the diesel has operated for at least 2 hours at full load conditions prior to performance of this Surveillance is based on manufacturer recommendations for achieving hot conditions. Momentary transients due to changing bus loads do not invalidate this test. Note 2 allows all DG starts to be preceded by an engine prelube period to minimize wear and tear on the diesel during testing.

<INSERT 2>

(continued)

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INSERT 1

Note 2 ensures that the EDG is tested under load conditions that are as close to design basis conditions as possible. When synchronized with offsite power, testing should be performed at a power factor of ≤0.9. This power factor is representative of the actual inductive loading an EDG would see under design basis accident conditions. Under certain conditions, however, Note 2 allows the surveillance to be conducted at a power factor other than ≤0.9. These conditions occur when grid voltage is high, and the additional field excitation needed to get the power factor to ≤0.9 results in voltages on the emergency busses that are too high. Under these conditions, the power factor should be maintained as close as practicable to 0.9 while still maintaining acceptable voltage limits on the emergency busses. In other circumstances, the grid voltage may be such that the EDG excitation levels needed to obtain a power factor of 0.9 may not cause unacceptable voltages on the emergency busses, but the excitation levels are in excess of those recommended for the EDG. In such cases, the power factor shall be maintained as close as practicable to 0.9 without exceeding the EDG excitation limits.

INSERT 2

, or after operating temperatures reach a stabilized state,

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.8.1.16

As required by Regulatory Guide 1.108 (Ref. 8), paragraph 2.a.(6), this Surveillance ensures that the manual synchronization and automatic load transfer from the DG to the offsite source can be made and the DG can be returned to ready to load status when offsite power is restored. It also ensures that the autostart logic is reset to allow the DG to reload if a subsequent loss of offsite power occurs. The DG is considered to be in ready to load status when the DG is at rated speed and voltage, the output breaker is open and can receive an autoclose signal on bus undervoltage, and the load sequencing timers are reset.

The Frequency of 18 months is consistent with the recommendations of Regulatory Guide 1.108 (Ref. 8), paragraph 2.a.(6), and takes into consideration unit conditions required to perform the Surveillance.

This SR is modified by a Note. The reason for the Note is that performing the Surveillance would remove a required offsite circuit from service, perturb the electrical distribution system, and challenge safety systems. Credit may be taken for unplanned events that satisfy this SR.

SR 3.8.1.17

Demonstration of the test mode override ensures that the DG availability under accident conditions will not be compromised as the result of testing and the DG will automatically reset to ready to load operation if a LOCA actuation signal is received during operation in the test mode. Ready to load operation is defined as the DG running at rated speed and voltage with the DG output breaker open. These provisions for automatic switchover are required by IEEE-308 (Ref. 13), paragraph 6.2.6(2).

The requirement to automatically energize the emergency loads with offsite power is essentially identical to that of SR 3.8.1.12. The intent in the requirement associated with SR 3.8.1.17.b is to show that the emergency loading was not affected by the DG operation in test mode. In lieu of actual demonstration of connection and loading of loads, testing that adequately shows the capability of the emergency loads to perform these functions is acceptable.

(continued)

Rev. 0

INSERT 1

EDG loading of the emergency bus is limited to normally energized loads.

INSERT 2

This restriction from normally performing the Surveillance in MODE 1, 2, 3, or 4 is further amplified to allow the Surveillance to be performed for the purpose of reestablishing OPERABILITY (e.g., post work testing following corrective maintenance, corrective modification, deficient or incomplete surveillance testing, and other unanticipated OPERABILITY concerns) provided an assessment determines unit safety is maintained or enhanced. This assessment shall, as a minimum, consider the potential outcomes and transients associated with a failed Surveillance, a successful Surveillance, and a perturbation of the offsite or onsite system when they are tied together or operated independently for the Surveillance; as well as the operator procedures available to cope with these outcomes. These shall be measured against the avoided risk of the unit shutdown and startup to determine that unit safety is maintained or enhanced when the Surveillance are performed in MODE 1, 2, 3, or 4. Risk insights or deterministic methods may be used for this assessment.

BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.1.17 (continued)

This testing may include any series of sequential, overlapping, or total steps so that the entire connection and loading sequence is verified.

The [18 month] Frequency is consistent with the recommendations of Regulatory Guide 1.108 (Ref. 9), paragraph 2.a.(8), takes into consideration unit conditions required to perform the Surveillance, and is intended to be consistent with expected fuel cycle lengths.

This SR is modified by a Note. The reason for the Note is that performing the Surveillance would remove a required offsite circuit from service, perturb the electrical distribution system, and challenge safety systems. Credit may be taken for unplanned events that satisfy this SR.

SR 3.8.1.18

Under accident [and loss of offsite power] conditions loads are sequentially connected to the bus by the [automatic load sequencer]. The sequencing [logic] controls the permissive and starting signals to motor breakers to prevent overloading of the DGs due to high motor starting currents. The [10%] load sequence time interval tolerance ensures that sufficient time exists for the DG to restore frequency and voltage prior to applying the next load and that safety analysis assumptions regarding ESF equipment time delays are not violated. Reference 2 provides a summary of the automatic loading of ESF buses.

The Frequency of [18 months] is consistent with the recommendations of Regulatory Guide 1.108 (Ref. 9), paragraph 2.a.(2), takes into consideration unit conditions required to perform the Surveillance, and is intended to be consistent with expected fuel cycle lengths.

This SR is modified by a Note. The reason for the Note is that performing the Surveillance would remove a required offsite circuit from service, perturb the electrical distribution system, and challenge safety systems. Credit may be taken for unplanned events that satisfy this SR.

(continued)

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INSERT 1

, listed in the Technical Requirements Manual (Ref. 12)

INSERT 2

This restriction from normally performing the Surveillance in MODE 1, 2, 3, or 4 is further amplified to allow the Surveillance to be performed for the purpose of reestablishing OPERABILITY (e.g., post work testing following corrective maintenance, corrective modification, deficient or incomplete surveillance testing, and other unanticipated OPERABILITY concerns) provided an assessment determines unit safety is maintained or enhanced. This assessment shall, as a minimum, consider the potential outcomes and transients associated with a failed Surveillance, a successful Surveillance, and a perturbation of the offsite or onsite system when they are tied together or operated independently for the Surveillance; as well as the operator procedures available to cope with these outcomes. These shall be measured against the avoided risk of the unit shutdown and startup to determine that unit safety is maintained or enhanced when the Surveillance are performed in MODE 1, 2, 3, or 4. Risk insights or deterministic methods may be used for this assessment.

BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.1.18 (continued)

Reviewer's Note: The above MODE restrictions may be deleted if it can be demonstrated to the staff, on a plant specific basis, that performing the SR with the reactor in any of the restricted MODES can satisfy the following criteria, as applicable:

a. Performance of the SR will not render any safety system or component inoperable;

b. Performance of the SR will not cause perturbations to any of the electrical distribution systems that could result in a challenge to steady state operation or to plant safety systems; and

c. Performance of the SR, or failure of the SR, will not cause, or result in, an AOO with attendant challenge to plant safety systems.

SR 3.8.1.19

In the event of a DBA coincident with a loss of offsite power, the DGs are required to supply the necessary power to ESF systems so that the fuel, RCS, and containment design limits are not exceeded.

This Surveillance demonstrates the DG operation, as discussed in the Bases for SR 3.8.1.10, during a loss of offsite power actuation test signal in conjunction with an ESF actuation signal. In lieu of actual demonstration of connection and loading of loads, testing that adequately shows the capability of the DG system to perform these functions is acceptable. This testing may include any series of sequential, overlapping, or total steps so that the entire connection and loading sequence is verified.

The Frequency of [18 months] takes into consideration unit conditions required to perform the Surveillance and is intended to be consistent with an expected fuel cycle length of [18 months].

This SR is modified by two Notes. The reason for Note 1 is to minimize wear and tear on the DGs during testing. For

(continued)

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BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.1.10 (continued)

the purpose of this testing, the DGs must be started from standby conditions, that is, with the engine coolant and oil continuously circulated and temperature maintained consistent with manufacturer recommendations for DGs. The reason for Note 2 is that the performance of the Surveillance would remove a required offsite circuit from service, perturb the electrical distribution system, and challenge safety systems. Credit may be taken for unplanned events that satisfy this SR.

<INSERT> TSTF 283 TSTF 8

SR 3.8.1.20

This Surveillance demonstrates that the DG starting independence has not been compromised. Also, this Surveillance demonstrates that each engine can achieve proper speed within the specified time when the DGs are started simultaneously.

The 10 year Frequency is consistent with the recommendations of Regulatory Guide 1.108 (Ref. 8).

This SR is modified by a Note. The reason for the Note is to minimize wear on the DG during testing. For the purpose of this testing, the DGs must be started from standby conditions, that is, with the engine coolant and oil continuously circulated and temperature maintained consistent with manufacturer recommendations.

Diesel Generator Test Schedule

The DG test schedule (Table 3.8.1-1) implements the recommendations of Revision 3 to Regulatory Guide 1.9 (Ref. 3). The purpose of this test schedule is to provide timely test data to establish a confidence level associated with the goal to maintain DG reliability > 0.95 per demand.

According to Regulatory Guide 1.9, Revision 3 (Ref. 3), each DG should be tested at least once every 31 days. Whenever a DG has experienced 4 or more valid failures in the last 25 valid tests, the maximum time between tests is reduced to 7 days. Four failures in 25 valid tests is a failure rate of 0.16, or the threshold of acceptable DG performance, and

TSTF 37

(continued)

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This restriction from normally performing the Surveillance in MODE 1, 2, 3, or 4 is further amplified to allow portions of the Surveillance to be performed for the purpose of reestablishing OPERABILITY (e.g., post work testing following corrective maintenance, corrective modification, deficient or incomplete surveillance testing, and other unanticipated OPERABILITY concerns) provided an assessment determines unit safety is maintained or enhanced. This assessment shall, as a minimum, consider the potential outcomes and transients associated with a failed partial Surveillance, a successful partial Surveillance, and a perturbation of the offsite or onsite system when they are tied together or operated independently for the partial Surveillance; as well as the operator procedures available to cope with these outcomes. These shall be measured against the avoided risk of the unit shutdown and startup to determine that unit safety is maintained or enhanced when portions of the Surveillance are performed in MODE 1, 2, 3, or 4. Risk insights or deterministic methods may be used for this assessment.

BASES

SURVEILLANCE REQUIREMENTS

Diesel Generator Test Schedule (continued)

hence may be an early indication of the degradation of DG reliability. When considered in the light of a long history of tests, however, 4 failures in the last 25 valid tests may only be a statistically probable distribution of random events. Increasing the test Frequency will allow for a more timely accumulation of additional test data upon which to base judgment of the reliability of the DG. The increased test Frequency must be maintained until seven consecutive, failure free tests have been performed.

The Frequency for accelerated testing is 7 days, but no less than 24 hours. Tests conducted at intervals of less than 24 hours may be credited for compliance with Required Actions. However, for the purpose of re-establishing the normal 31-day Frequency, a successful test at an interval of less than 24 hours should be considered an invalid test and not count towards the 7 consecutive failure free starts, and the consecutive test count is not reset.

TSTF 37

A test interval in excess of 7 days (or 31 days, as appropriate) constitutes a failure to meet the SRs, and results in the associated DG being declared inoperable. It does not, however, constitute a valid test or failure of the DG, and any consecutive test count is not reset.

REFERENCES

1. 10 CFR 50, Appendix A, GDC 17. UFSAR, Chapter 3. (9)
2. UFSAR, Chapter 8. March 1971 (2) (1)
3. Safety Regulatory Guide 1.9, Rev. 3, [date]. (1) TSTF 37
4. UFSAR, Chapter 6. (1) (2)
5. UFSAR, Chapter 15. (1) (2)
6. Regulatory Guide 1.93, Rev. 0, December 1974.
7. Generic Letter 84-15, "Proposed Staff Actions to Improve and Maintain Diesel Generator Reliability," July 2, 1984.
8. 10 CFR 50, Appendix A, GDC 18. (9)

(continued)

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BASES

REFERENCES (continued)

8 9. Regulatory Guide 1.108, Rev. 1, August 1977. (9)

9 ~~10~~. Regulatory Guide 1.137, Rev. ~~[1], [date]~~. 1, October 1979 (2) (9)

10 ~~11~~. ASME, Boiler and Pressure Vessel Code, Section XI. (1) (9)

11 12. IEEE Standard 308-197~~8~~. (1) (1) (9)

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1. Changes are made (additions, deletions, and/or changes) to the ISTS, which reflect the plant specific nomenclature, number, reference, system description, analysis, or licensing basis description.

2. The brackets have been removed and the proper plant specific information/value has been provided.

3. The criteria of the NRC Final Policy Statement on Technical Specifications Improvements have been included in 10 CFR 50.36(c)(2)(ii). Therefore, references in the ISTS Bases to the NRC Final Policy Statement are revised in the ITS Bases to reference 10 CFR 50.36.

4. This bracketed requirement, information, or Reviewer's Note is deleted because it is not applicable. The following requirements are renumbered, where applicable, to reflect this deletion.

5. Changes are made to reflect those changes made to the ISTS. The following requirements are renumbered or revised, where applicable, to reflect the changes.

6. Information or requirements have been moved from the CTS Specifications to the ITS Bases.

7. This is an editorial change for clarity, for consistency with the Improved Technical Specifications Writer's Guide, or for consistency with similar statements in the other ITS Bases.

8. Not used.

9. North Anna Units 1 and 2 were designed and constructed on the basis of the proposed General Design Criteria, published in 1966. Since February 20, 1971, when the General Design Criteria for Nuclear Power Plants, Appendix A to 10 CFR Part 50, were published, the Company attempted to comply with the intent of the newer criteria to the extent practical, recognizing previous design commitments. The NRC's Safety Evaluation Report for North Anna Units 1 and 2 reviewed the plant against 10 CFR Part 50, Appendix A and concluded that the facility design conforms to the intent of the newer criteria. The North Anna UFSAR contains discussions comparing the design of the plant to the 10 CFR 50, Appendix A, General Design Criteria. Bases references to the 10 CFR 50, Appendix A criteria have been replaced with references to the appropriate section of the UFSAR.

10. TSTF 283 modifies the Bases section of ITS SRs 3.8.1.10, 3.8.1.15, 3.8.1.16, and 3.8.1.17. The TSTF states that each SR testing requirement is not normally performed in MODE 1 or 2. These SRs are not allowed to be performed in MODE 1, 2, 3, or 4. Therefore, the TSTF for the Bases for these SRs are changed to reflect the correct MODE requirements.

B 3.8 ELECTRICAL POWER SYSTEMS

B 3.8.2 AC Sources—Shutdown

BASES

BACKGROUND

A description of the AC sources is provided in the Bases for LCO 3.8.1, "AC Sources—Operating."

APPLICABLE SAFETY ANALYSES

The OPERABILITY of the minimum AC sources during MODES 5 and 6 and during movement of recently irradiated fuel assemblies ensures that: TSTF 51

a. The unit can be maintained in the shutdown or refueling condition for extended periods;

b. Sufficient instrumentation and control capability is available for monitoring and maintaining the unit status; and

c. Adequate AC electrical power is provided to mitigate events postulated during shutdown, such as a fuel handling accident. <INSERT> TSTF 51 (6)

In general, when the unit is shut down, the Technical Specifications requirements ensure that the unit has the capability to mitigate the consequences of postulated accidents. However, assuming a single failure and concurrent loss of all offsite or all onsite power is not required. The rationale for this is based on the fact that many Design Basis Accidents (DBAs) that are analyzed in MODES 1, 2, 3, and 4 have no specific analyses in MODES 5 and 6. Worst case bounding events are deemed not credible in MODES 5 and 6 because the energy contained within the reactor pressure boundary, reactor coolant temperature and pressure, and the corresponding stresses result in the probabilities of occurrence being significantly reduced or eliminated, and in minimal consequences. These deviations from DBA analysis assumptions and design requirements during shutdown conditions are allowed by the LCO for required systems.

During MODES 1, 2, 3, and 4, various deviations from the analysis assumptions and design requirements are allowed

(continued)

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involving handling recently irradiated fuel. Due to radioactive decay, AC electrical power is only required to mitigate fuel handling accidents involving handling recently irradiated fuel. (i.e., fuel that has occupied part of a critical reactor core within a time frame established by analysis. The term recently is defined as all irradiated fuel assemblies, until analysis is performed to determine a specific time frame.)

BASES

APPLICABLE SAFETY ANALYSES (continued)

within the Required Actions. This allowance is in recognition that certain testing and maintenance activities must be conducted provided an acceptable level of risk is not exceeded. During MODES 5 and 6, performance of a significant number of required testing and maintenance activities is also required. In MODES 5 and 6, the activities are generally planned and administratively controlled. Relaxations from MODE 1, 2, 3, and 4 LCO requirements are acceptable during shutdown modes based on:

a. The fact that time in an outage is limited. This is a risk prudent goal as well as a utility economic consideration.

b. Requiring appropriate compensatory measures for certain conditions. These may include administrative controls, reliance on systems that do not necessarily meet typical design requirements applied to systems credited in operating MODE analyses, or both.

c. Prudent utility consideration of the risk associated with multiple activities that could affect multiple systems.

d. Maintaining, to the extent practical, the ability to perform required functions (even if not meeting MODE 1, 2, 3, and 4 OPERABILITY requirements) with systems assumed to function during an event.

In the event of an accident during shutdown, this LCO ensures the capability to support systems necessary to avoid immediate difficulty, assuming either a loss of all offsite power or a loss of all onsite emergency diesel generator (DG) power. (E) (2) (1)

The AC sources satisfy Criterion 3 of the NRC Policy Statement. (E) 10 CFR 50.36 (c)(2)(ii)

LCO

One offsite circuit capable of supplying the onsite Class 1E power distribution subsystem(s) of LCO 3.8.10, "Distribution Systems—Shutdown," ensures that all required loads are powered from offsite power. An OPERABLE DG, associated with the distribution system train required to be OPERABLE by LCO 3.8.10, ensures a diverse power source is available to (E) (2)

(continued)

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BASES

LCO (continued)

provide electrical power support, assuming a loss of the offsite circuit. Together, OPERABILITY of the required offsite circuit and DG ensures the availability of sufficient AC sources to operate the unit in a safe manner and to mitigate the consequences of postulated events during shutdown (e.g., fuel handling accidents). (E) (2)

(involving handling recently irradiated fuel) TSTF 51

~~The qualified offsite circuit must be capable of maintaining rated frequency and voltage, and accepting required loads during an accident, while connected to the Engineered Safety Feature (ESF) bus(es). Qualified offsite circuits are those that are described in the FSAR and are part of the licensing basis for the unit.~~ (2)

~~Offsite circuit #1 consists of Safeguards Transformer B, which is supplied from Switchyard Bus B, and is fed through breaker 52-3 powering the ESF transformer XNB01, which, in turn, powers the #1 ESF bus through its normal feeder breaker. The second offsite circuit consists of the Startup Transformer, which is normally fed from the Switchyard Bus A, and is fed through breaker PA 0201 powering the ESF transformer, which, in turn, powers the #2 ESF bus through its normal feeder breaker.~~ <INSERT> (3)

~~The DG must be capable of starting, accelerating to rated speed and voltage, and connecting to its respective ESF bus on detection of bus undervoltage. This sequence must be accomplished within [10] seconds. The DG must be capable of accepting required loads within the assumed loading sequence intervals, and continue to operate until offsite power can be restored to the ESF buses. These capabilities are required to be met from a variety of initial conditions such as DG in standby with the engine hot and DG in standby at ambient conditions.~~ (2)

~~Proper sequencing of loads, including tripping of nonessential loads, is a required function for DG OPERABILITY.~~ (4)

~~In addition, proper sequencer operation is an integral part of offsite circuit OPERABILITY since its inoperability impacts on the ability to start and maintain energized loads required OPERABLE by LCO 3.8.10.~~ (4)

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Offsite circuits consist of the 34.5 kV buses supplying the Reserve Station Service Transformer(s) (RSST) which feed the transfer buses. The D, E, and F transfer buses supply the onsite electrical power to the four emergency buses for the two units. Unit 1 emergency bus H is fed through the F transfer bus from the C RSST that is supplied from 34.5 kV bus #3. Unit 1 emergency bus J is fed through the D transfer bus from the A RSST that is fed from 34.5 kV bus #4. Unit 1 station service bus 1B can be an alternate feed for Unit 1 H emergency bus, while Unit 1 J emergency bus may be fed from Unit 2 station service bus 2B. Unit 2 emergency bus H is fed through the E transfer bus from the B RSST and it is fed from 34.5 kV bus #4. Unit 2 emergency bus J is fed through the F transfer bus from the C RSST that is fed from 34.5 kV bus #3. This arrangement provides a separation of the offsite circuits by one 34.5 kV (bus #4) supplying the A and B RSSTs and the other offsite circuit being supplied from 34.5 kV (bus #3) supplying the C RSST.

BASES

LCO (continued)

It is acceptable for trains to be cross tied during shutdown conditions, allowing a single offsite power circuit to supply all required trains.

APPLICABILITY

The AC sources required to be OPERABLE in MODES 5 and 6 and during movement of recently irradiated fuel assemblies provide assurance that: TSTF 51

a. Systems to provide adequate coolant inventory makeup are available for the irradiated fuel assemblies in the core;

b. Systems needed to mitigate a fuel handling accident are available; <INSERT> TSTF 51 (6)

c. Systems necessary to mitigate the effects of events that can lead to core damage during shutdown are available; and

d. Instrumentation and control capability is available for monitoring and maintaining the unit in a cold shutdown condition or refueling condition.

The AC power requirements for MODES 1, 2, 3, and 4 are covered in LCO 3.8.1.

ACTIONS

A.1 the necessary portions of the electrical power distribution subsystem(s) (2)

An offsite circuit would be considered inoperable if it were not available to ~~one required ESF train. Although two trains are required by LCO 3.8.10, the~~ one train with ~~offsite power available~~ may be capable of supporting sufficient required features to allow continuation of CORE ALTERATIONS and recently irradiated fuel movement. By the allowance of the option to declare ~~required~~ features inoperable, with no offsite power available, appropriate restrictions will be implemented in accordance with the affected required features LCO's ACTIONS. (2) TSTF 51

(continued)

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involving handling recently irradiated fuel (i.e., fuel that has occupied part of a critical reactor core within a time frame established by analysis. The term recently is defined as all irradiated fuel assemblies, until analysis is performed to determine a specific time frame.)

BASES

ACTIONS (continued)

A.2.1, A.2.2, A.2.3, A.2.4, B.1, B.2, B.3, and B.4

With the offsite circuit not available to all required trains, the option would still exist to declare all required features inoperable. Since this option may involve undesired administrative efforts, the allowance for sufficiently conservative actions is made. With the required DG inoperable, the minimum required diversity of AC power sources is not available. It is, therefore, required to suspend CORE ALTERATIONS, movement of irradiated fuel assemblies, and operations involving positive reactivity additions. The Required Action to suspend positive reactivity additions does not preclude actions to maintain or increase reactor vessel inventory provided the required SDM is maintained.

Suspension of these activities does not preclude completion of actions to establish a safe conservative condition. These actions minimize the probability or the occurrence of postulated events. It is further required to immediately initiate action to restore the required AC sources and to continue this action until restoration is accomplished in order to provide the necessary AC power to the unit safety systems.

The Completion Time of immediately is consistent with the required times for actions requiring prompt attention. The restoration of the required AC electrical power sources should be completed as quickly as possible in order to minimize the time during which the unit safety systems may be without sufficient power.

Pursuant to LCO 3.0.6, the Distribution System's ACTIONS would not be entered even if all AC sources to it are inoperable, resulting in de-energization. Therefore, the Required Actions of Condition A are modified by a Note to indicate that when Condition A is entered with no AC power to any required ESF bus, the ACTIONS for LCO 3.8.10 must be immediately entered. This Note allows Condition A to provide requirements for the loss of the offsite circuit, whether or not a train is de-energized. LCO 3.8.10 would provide the appropriate restrictions for the situation involving a de-energized train.

(E) (2) recently TSTF 51 <INSERT> TSTF 286

(continued)

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that could result in loss of required SDM (MODE 5) or boron concentration (MODE 6). Suspending positive reactivity additions that could result in failure to meet the minimum SDM or boron concentration limit is required to assure continued safe operation. Introduction of coolant inventory must be from sources that have a boron concentration greater than what would be required in the RCS for minimum SDM or refueling boron concentration. This may result in an overall reduction in RCS boron concentration, but provides acceptable margin to maintaining subcritical operation. Introduction of temperature changes including temperature increases when operating with a positive MTC must also be evaluated to ensure they do not result in a loss of required SDM.

BASES (continued)

SURVEILLANCE REQUIREMENTS

SR 3.8.2.1

SR 3.8.2.1 requires the SRs from LCO 3.8.1 that are necessary for ensuring the OPERABILITY of the AC sources in other than MODES 1, 2, 3, and 4. SR 3.8.1.8 is not required to be met since only one offsite circuit is required to be OPERABLE. SR 3.8.1.17 is not required to be met because the required OPERABLE DG(s) is not required to undergo periods of being synchronized to the offsite circuit. SR 3.8.1.20 is excepted because starting independence is not required with the DG(s) that is not required to be operable. <INSERT> 5

This SR is modified by a Note. The reason for the Note is to preclude requiring the OPERABLE DG(s) from being paralleled with the offsite power network or otherwise rendered inoperable during performance of SRs, and to preclude deenergizing a required 4160 V ESF bus or disconnecting a required offsite circuit during performance of SRs. With limited AC sources available, a single event could compromise both the required circuit and the DG. It is the intent that these SRs must still be capable of being met, but actual performance is not required during periods when the DG and offsite circuit is required to be OPERABLE. Refer to the corresponding Bases for LCO 3.8.1 for a discussion of each SR.

TSTF 300 5 0 7 7 2 2

REFERENCES None.

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SR 3.8.1.10, SR 3.8.1.11, SR 3.8.1.12, SR 3.8.1.16, and SR 3.8.1.17 are not required to be performed because the loss of offsite power or ESF actuation signals are not required to be OPERABLE. These SRs are not required to be met because the required OPERABLE EDG and sequencing timing relays are not required to be OPERABLE because no ESF loads are assumed to be powered from the emergency bus by the safety analyses. SR 3.8.1.18 is excepted because starting independence is not required with the EDG(s) that is not required to be OPERABLE.

1. The criteria of the NRC Final Policy Statement on Technical Specifications Improvements have been included in 10 CFR 50.36(c)(2)(ii). Therefore, references in the ISTS Bases to the NRC Final Policy Statement are revised in the ITS Bases to reference 10 CFR 50.36.

2. Changes are made (additions, deletions, and/or changes) to the ISTS, which reflect the plant specific nomenclature, number, reference, system description, analysis, or licensing basis description.

3. The brackets have been removed and the proper plant specific information/value has been provided.

4. This information is deleted because it is not applicable to North Anna.

5. Changes are made to the ITS Bases which reflect changes in the ITS Specifications.

6. Bases changes made by TSTF-51 are incorporated with modifications. These modifications incorporate the concept of the approved changes made by TSTF-51, but the analysis value for the required time has not been determined. When the analysis is completed, the required time with be substituted for the phase, "a time frame established by analysis. The term recently is defined as all irradiated fuel assemblies, until analysis is performed to determine a specific time frame."

7. This is an editorial change for clarity, for consistency with the Improved Technical Specifications Writer's Guide, or for consistency with similar statements in the other ITS Bases.

B 3.8 ELECTRICAL POWER SYSTEMS

B 3.8.3 Diesel Fuel Oil, Lube Oil, and Starting Air

BASES

BACKGROUND

The four Emergency Each diesel generator (DG) are provided with two storage tanks, each having a fuel oil capacity sufficient to operate that diesel for a period of 7 days while the DG is supplying maximum post loss of coolant accident load demand discussed in the FSAR, Section 9.5.4.2 (Ref. 1). The maximum load demand is calculated using the assumption that a minimum of any two DGs on a unit is available. This onsite fuel oil capacity is sufficient to operate the DGs for longer than the time to replenish the onsite supply from outside sources.

Fuel oil is transferred from storage tank to day tank by either of two transfer pumps associated with each storage tank. Redundancy of pumps and piping precludes the failure of one pump, or the rupture of any pipe, valve or tank to result in the loss of more than one DG. All outside tanks, pumps, and piping are located underground or in a missile protected area.

For proper operation of the standby DGs, it is necessary to ensure the proper quality of the fuel oil. Regulatory Guide 1.137 (Ref. 2) addresses the recommended fuel oil practices as supplemented by ANSI N195 (Ref. 3). The fuel oil properties governed by these SRs are the water and sediment content, the kinematic viscosity, specific gravity (or API gravity), and impurity level.

The DG lubrication system is designed to provide sufficient lubrication to permit proper operation of its associated DG under all loading conditions. The system is required to circulate the lube oil to the diesel engine working surfaces and to remove excess heat generated by friction during operation. Each engine oil sump contains an inventory capable of supporting a minimum of [7] days of operation. [The onsite storage in addition to the engine oil sump is sufficient to ensure 7 days of continuous operation.] This supply is sufficient to allow the operator to replenish lube oil from outside sources.

Each DG has an air start system with adequate capacity for five successive start attempts on the DG without recharging the air start receiver(s). INSERT

(continued)

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INSERT

Each EDG has an air start system that contains two separate and independent subsystems. Normally, each subsystem is aligned to provide starting air to the associated EDG. Each subsystem consists of a receiver and a compressor. Only one air start subsystem is required to be OPERABLE for the EDG to be considered OPERABLE.

BASES (continued)

APPLICABLE SAFETY ANALYSES

The initial conditions of Design Basis Accident (DBA) and transient analyses in the FSAR, Chapter 6 (Ref. 4), and in the FSAR, Chapter 15 (Ref. 5), assume Engineered Safety Feature (ESF) systems are OPERABLE. The DGs are designed to provide sufficient capacity, capability, redundancy, and reliability to ensure the availability of necessary power to ESF systems so that fuel, Reactor Coolant System and containment design limits are not exceeded. These limits are discussed in more detail in the Bases for Section 3.2, Power Distribution Limits; Section 3.4, Reactor Coolant System (RCS); and Section 3.6, Containment Systems.

Since diesel fuel oil, lube oil, and the air start subsystem support the operation of the standby AC power sources, they satisfy Criterion 3 of the NRC Policy Statement. 10 CFR 50.36(c)(2)(ii)

LCO

Stored diesel fuel oil is required to have sufficient supply for 7 days of full load operation. It is also required to meet specific standards for quality. Additionally, sufficient lubricating oil supply must be available to ensure the capability to operate at full load for 7 days. This requirement, in conjunction with an ability to obtain replacement supplies within 7 days, supports the availability of DGs required to shut down the reactor and to maintain it in a safe condition for an anticipated operational occurrence (AOO) or a postulated DBA with loss of offsite power. DG day tank fuel requirements, as well as transfer capability from the storage tank to the day tank, are addressed in LCO 3.8.1, "AC Sources—Operating," and LCO 3.8.2, "AC Sources—Shutdown."

~~The starting air system is required to have a minimum capacity for five successive DG start attempts without recharging the air start receivers.~~ INSERT

APPLICABILITY

The AC sources (LCO 3.8.1 and LCO 3.8.2) are required to ensure the availability of the required power to shut down the reactor and maintain it in a safe shutdown condition after an AOO or a postulated DBA. Since stored diesel fuel oil, lube oil, and the starting air subsystem support LCO 3.8.1 and LCO 3.8.2, stored diesel fuel oil, lube oil,

(continued)

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INSERT

One air start subsystem is required to be OPERABLE to ensure EDG OPERABILITY. The required starting air subsystem receiver is required to have a minimum of 175 psig to provide the EDG with more than one start attempt without recharging the air start receivers.

BASES

APPLICABILITY (continued)

and starting air are required to be within limits when the associated DG is required to be OPERABLE.

ACTIONS

The ACTIONS Table is modified by a Note indicating that separate Condition entry is allowed for each DG. This is acceptable, since the Required Actions for each Condition provide appropriate compensatory actions for each inoperable DG subsystem. Complying with the Required Actions for one inoperable DG subsystem may allow for continued operation, and subsequent inoperable DG subsystem(s) are governed by separate Condition entry and application of associated Required Actions.

INSERT

C.1

In this Condition, the 7 day fuel oil supply for a DG is not available. However, the Condition is restricted to fuel oil level reductions that maintain at least a 6 day supply. These circumstances may be caused by events, such as full load operation required after an inadvertent start while at minimum required level, or feed and bleed operations, which may be necessitated by increasing particulate levels or any number of other oil quality degradations. This restriction allows sufficient time for obtaining the requisite replacement volume and performing the analyses required prior to addition of fuel oil to the tank. A period of 48 hours is considered sufficient to complete restoration of the required level prior to declaring the DG inoperable. This period is acceptable based on the remaining capacity (> 6 days), the fact that procedures will be initiated to obtain replenishment, and the low probability of an event during this brief period. This Condition applies for reasons other than Condition A

The EDG fuel oil transfer pumps are aligned so that the lead pump for each EDG takes suction on the 'A' tank. The back up pumps are aligned to take suction on the 'B' tank

B.1

With lube oil inventory < 500 gal, sufficient lubricating oil to support 7 days of continuous DG operation at full load conditions may not be available. However, the Condition is restricted to lube oil volume reductions that maintain at least a 6 day supply. This restriction allows sufficient time to obtain the requisite replacement volume. A period of 48 hours is considered sufficient to complete

(continued)

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INSERT

A.1, A.2, A.3, and A.4

In this Condition, the underground fuel oil storage tank is not within limits for the purpose of tank repair or inspection. Every ten years the fuel oil tank must be inspected for integrity under the requirements of ASME Code, Section XI. Because one tank is the source of fuel oil for all EDGs on both units, a dual unit outage would be required in order to provide the necessary time to complete the required maintenance or inspection. Prior to removal of the tank for repairs or inspections, verify 50,000 gallons of replacement fuel oil is available offsite and transportation is available to deliver that volume of fuel oil within 48 hours. Restrictions are placed on the remaining OPERABLE fuel oil storage tank and the 210,000-gallon above ground tank. The remaining OPERABLE fuel oil storage tank supplies fuel oil to the redundant EDGs of both units. Under this Condition, verification of the redundant fuel oil tank is required to confirm the required minimum amount of diesel fuel oil. In addition, the above ground tank, used to supply make up to the underground tanks, is required to be verified to contain the minimum level corresponding to 100,000 gallons. Verifications of onsite fuel oil are required on a 12 hour frequency to ensure an adequate source of fuel oil to the EDGs remains available. The inoperable underground fuel oil tank must be restored to within limits in 7 days. This time is considered reasonable based on the required maintenance and the requirements provided by the Required Actions.

B.1 and B.2

With the Required Actions and associated Completion Times for Condition A not met, then the unit must be brought to a MODE in which the LCO does not apply. To achieve this status, the unit must be brought to at least MODE 3 within 6 hours and MODE 5 within 36 hours. The allowed Completion Times are reasonable based on operating experience, to reach the required conditions from full power conditions in an orderly manner and without challenging unit systems.

BASES

ACTIONS

B.1 (continued)

restoration of the required volume prior to declaring the DG inoperable. This period is acceptable based on the remaining capacity (> 6 days), the low rate of usage, the fact that procedures will be initiated to obtain replenishment, and the low probability of an event during this brief period.

D.1

This Condition is entered as a result of a failure to meet the acceptance criterion of SR 3.8.3.2. Normally, trending of particulate levels allows sufficient time to correct high particulate levels prior to reaching the limit of acceptability. Poor sample procedures (bottom sampling), contaminated sampling equipment, and errors in laboratory analysis can produce failures that do not follow a trend. Since the presence of particulates does not mean failure of the fuel oil to burn properly in the diesel engine, and particulate concentration is unlikely to change significantly between Surveillance Frequency intervals, and proper engine performance has been recently demonstrated (within 31 days), it is prudent to allow a brief period prior to declaring the associated DG inoperable. The 7 day Completion Time allows for further evaluation, resampling and re-analysis of the DG fuel oil. stored in the below ground tanks

E.1

With the new fuel oil properties of the below ground tanks defined in the Bases for SR 3.8.3.2 not within the required limits, a period of 30 days is allowed for restoring the stored fuel oil properties. This period provides sufficient time to test the stored fuel oil to determine that the new fuel oil, when mixed with previously stored fuel oil, remains acceptable, ensuring it or to restore the stored fuel oil properties. This restoration may involve feed and bleed procedures, filtering, or combinations of these procedures. Even if a DG start and load was required during this time interval and the fuel oil properties were outside limits, there is a high likelihood that the DG would still be capable of performing its intended function.

(continued)

Rev. 0

BASES

ACTIONS (continued)

F.1

With the required starting air receiver several pressure < [225] 175 psig, sufficient capacity for five successive DG start attempts does not exist. However, as long as the receiver pressure is > [125] 150 psig, there is adequate capacity for at least one start attempt, and the DG can be considered OPERABLE while the air receiver pressure is restored to the required limit. A period of 48 hours is considered sufficient to complete restoration to the required pressure prior to declaring the DG inoperable. This period is acceptable based on the remaining air start capacity, the fact that most DG starts are accomplished on the first attempt, and the low probability of an event during this brief period.

G.1

With a Required Action and associated Completion Time not met, or one or more DG's fuel oil, lube oil, or starting air subsystem not within limits for reasons other than addressed by Conditions C through D, the associated DG may be incapable of performing its intended function and must be immediately declared inoperable. Only one starting air subsystem is required to be OPERABLE.

SURVEILLANCE REQUIREMENTS

SR 3.8.3.1

This SR provides verification that there is an adequate inventory of fuel oil in the storage tanks to support each one DG's operation for 7 days at full load. The 7 day period is sufficient time to place the unit in a safe shutdown condition and to bring in replenishment fuel from an offsite location.

The 31 day Frequency is adequate to ensure that a sufficient supply of fuel oil is available, since low level alarms are provided and unit operators would be aware of any large uses of fuel oil during this period.

~~SR 3.8.3.2~~

~~This Surveillance ensures that sufficient lube oil inventory is available to support at least 7 days of full load.~~

(continued)

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BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.3.2 (continued)

~~operation for each DG. The [500] gal requirement is based on the DG manufacturer consumption values for the run time of the DG. Implicit in this SR is the requirement to verify the capability to transfer the lube oil from its storage location to the DG, when the DG lube oil sump does not hold adequate inventory for 7 days of full load operation without the level reaching the manufacturer recommended minimum level.~~

~~A 31 day Frequency is adequate to ensure that a sufficient lube oil supply is onsite, since DG starts and run time are closely monitored by the unit staff.~~

SR 3.8.3.~~6~~2

The tests listed below are a means of determining whether new fuel oil is of the appropriate grade and has not been contaminated with substances that would have an immediate, detrimental impact on diesel engine combustion. If results from these tests are within acceptable limits, the fuel oil may be added to the storage tanks without concern for contaminating the entire volume of fuel oil in the storage tanks. These tests are to be conducted prior to adding the new fuel to the storage tank(s), but in no case is the time between receipt of new fuel and conducting the tests to exceed 31 days. The tests, limits, and applicable ASTM Standards are as follows:

a. Sample the new fuel oil in accordance with ASTM D4057-~~1988~~ (Ref. 6);

b. Verify in accordance with the tests specified in ASTM D975-~~1983~~ (Ref. 6) that the sample has an absolute specific gravity at 60/60°F of ≥ 0.83 and ≤ 0.89 or an API gravity at 60°F of ≥ 27° and ≤ 39°, a kinematic viscosity at ~~40°C~~ of ≥ 1.9 centistokes and ≤ 4.1 centistokes, and a flash point of ≥ 125°F; and
100°F

c. ~~Verify that the new fuel oil has a clear and bright appearance with proper color when tested in accordance with ASTM D4176-[ ] (Ref. 6).~~
is checked for water and sediment in accordance with the Diesel Fuel Oil Testing Program.

(continued)

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BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.3.2 (continued)

Failure to meet any of the above limits is cause for rejecting the new fuel oil, but does not represent a failure to meet the LCO concern since the fuel oil is not added to the storage tanks.

Within 31 days following the initial new fuel oil sample, the fuel oil is analyzed to establish that the other properties specified in Table 1 of ASTM D975-97a (Ref. 7) are met for new fuel oil when tested in accordance with ASTM D975-93a (Ref. 6), except that the analysis for sulfur may be performed in accordance with ASTM D1552-88 (Ref. 6) or ASTM D2622-92 (Ref. 6). The 31 day period is acceptable because the fuel oil properties of interest, even if they were not within stated limits, would not have an immediate effect on DG operation. This Surveillance ensures the availability of high quality fuel oil for the DGs.

Fuel oil degradation during long term storage shows up as an increase in particulate, due mostly to oxidation. The presence of particulate does not mean the fuel oil will not burn properly in a diesel engine. The particulate can cause fouling of filters and fuel oil injection equipment, however, which can cause engine failure.

Particulate concentrations should be determined in accordance with ASTM D2276-83, Method A (Ref. 6). This method involves a gravimetric determination of total particulate concentration in the fuel oil and has a limit of 10 mg/l. It is acceptable to obtain a field sample for subsequent laboratory testing in lieu of field testing. [For those designs in which the total stored fuel oil volume is contained in two or more interconnected tanks, each tank must be considered and tested separately.]

The Frequency of this test takes into consideration fuel oil degradation trends that indicate that particulate concentration is unlikely to change significantly between Frequency intervals.

(continued)

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BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.8.3.~~4~~ 3

This Surveillance ensures that, without the aid of the refill compressor, sufficient air start capacity for each EDG is available. The system design requirements provide for a minimum of ~~[2]~~ five ~~[1]~~ engine start cycles without recharging. were verified A start cycle is defined by the DG vendor, but usually is measured in terms of time (seconds of cranking) or engine cranking speed. The pressure specified in this SR is intended to reflect the lowest value at which the ~~[five]~~ more than one start~~[s]~~ can be accomplished. One air start subsystem is adequate to start the EDG with a minimum pressure ≥ 150 psig

The 31 day Frequency takes into account the capacity, capability, redundancy, and diversity of the AC sources and other indications available in the control room, including alarms, to alert the operator to below normal air start pressure.

SR 3.8.3.~~5~~ 4

Microbiological fouling is a major cause of fuel oil degradation. There are numerous bacteria that can grow in fuel oil and cause fouling, but all must have a water environment in order to survive. Removal of water from the fuel storage tanks once every ~~[31]~~ 92 days eliminates the necessary environment for bacterial survival. This is the most effective means of controlling microbiological fouling. In addition, it eliminates the potential for water entrainment in the fuel oil during EDG operation. Water may come from any of several sources, including condensation, ground water, rain water, and contaminated fuel oil, and from breakdown of the fuel oil by bacteria. Frequent checking for and removal of accumulated water minimizes fouling and provides data regarding the watertight integrity of the fuel oil system. The Surveillance Frequencies are established by Regulatory Guide 1.137 (Ref. 2). This SR is for preventive maintenance. The presence of water does not necessarily represent failure of this SR, provided the accumulated water is removed during performance of the Surveillance.

(continued)

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BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.8.3.6

Draining of the fuel oil stored in the supply tanks, removal of accumulated sediment, and tank cleaning are required at 10 year intervals by Regulatory Guide 1.137 (Ref. 2), paragraph 2.f. This SR also requires the performance of the ASME Code, Section XI (Ref. 8), examinations of the tanks. To preclude the introduction of surfactants in the fuel oil system, the cleaning should be accomplished using sodium hypochlorite solutions, or their equivalent, rather than soap or detergents. This SR is for preventive maintenance. The presence of sediment does not necessarily represent a failure of this SR, provided that accumulated sediment is removed during performance of the Surveillance.

TSTF 2

REFERENCES

1. UFSAR, Section 9.5.4.2.
2. Regulatory Guide 1.137.
3. ANSI N195-1976, Appendix B.
4. UFSAR, Chapter 8.
5. UFSAR, Chapter 15.
6. ASTM Standards: D4057-88; D975-83; D4176-86; D1552-83; D2622-82; D2276, Method A.
7. ASTM Standards, D975, Table 1, 1974.
8. ASME, Boiler and Pressure Vessel Code, Section XI.

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JUSTIFICATION FOR DEVIATIONS
ITS 3.8.3 BASES - DIESEL FUEL OIL AND STARTING AIR

1. Changes are made (additions, deletions, and/or changes) to the ISTS that reflect the plant specific nomenclature, number, reference, system description, analysis, or licensing basis description. This includes the change of diesel generator (DG) to emergency diesel generator (EDG) and FSAR to UFSAR.

2. Changes are made to the ITS Bases which reflect changes made to the ITS Specifications.

3. The criteria of the NRC Final Policy Statement on Technical Specifications Improvements have been included in 10 CFR 50.36(c)(2)(ii). Therefore, references in the ISTS Bases to the NRC Final Policy Statement are revised in the ITS Bases to reference 10 CFR 50.36.

4. The brackets are removed and the proper plant specific information/value is provided.

B 3.8 ELECTRICAL POWER SYSTEMS

B 3.8.4 DC Sources—Operating

BASES

BACKGROUND

The station DC electrical power system provides the AC emergency power system with control power. It also provides both motive and control power to selected safety related equipment and preferred AC vital bus power (via inverters). As required by 10 CFR 50, Appendix A, GDC 17 (Ref. 1), the DC electrical power system is designed to have sufficient independence, redundancy, and testability to perform its safety functions, assuming a single failure. The DC electrical power system also conforms to the recommendations of Regulatory Guide 1.6 (Ref. 2) and IEEE-308 (Ref. 3). 7 2

Safety

The 125/250 VDC electrical power system consists of two independent and redundant safety related Class 1E DC electrical power subsystems (Train A and Train B). Each subsystem consists of two 125 VDC batteries [(each battery [50]% capacity)], the associated battery charger(s) for each battery, and all the associated control equipment and interconnecting cabling. H J 3 INSERT 2

The 250 VDC source is obtained by use of the two 125 VDC batteries connected in series. Additionally there is [one] spare battery charger per subsystem, which provides backup service in the event that the preferred battery charger is out of service. If the spare battery charger is substituted for one of the preferred battery chargers, then the requirements of independence and redundancy between subsystems are maintained. 4

During normal operation, the 125/250 VDC load is powered from the battery chargers with the batteries floating on the system. In case of loss of normal power to the battery charger, the DC load is automatically powered from the station batteries. 3

The Train A (H) and Train B (J) DC electrical power subsystems provide the control power for its associated Class 1E AC power load group, 4.16 kV switchgear, and 480 V load centers. The DC electrical power subsystems also provide DC electrical power to the inverters, which in turn power the AC vital buses. 3 3

(continued)

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INSERT

A spare battery charger is installed on each train and can be substituted for either of the train's chargers.

BASES

BACKGROUND (continued)

The DC power distribution system is described in more detail in Bases for LCO 3.8.9, "Distribution System—Operating," and LCO 3.8.10, "Distribution Systems—Shutdown."

Each battery has adequate storage capacity to carry the required load continuously for at least 2 hours and to perform three complete cycles of intermittent loads discussed in the FSAR, Chapter [8] (Ref. 4).

Each 125 VDC battery is separately housed in a ventilated room apart from its charger and distribution centers. Each subsystem is located in an area separated physically and electrically from the other subsystem to ensure that a single failure in one subsystem does not cause a failure in a redundant subsystem. There is no sharing between redundant Class 1E subsystems, such as batteries, battery chargers, or distribution panels.

The batteries for Train A and Train B DC electrical power subsystems are sized to produce required capacity at 80% of nameplate rating, corresponding to warranted capacity at end of life cycles and the 100% design demand. Battery size is based on 125% of required capacity and, after selection of an available commercial battery, results in a battery capacity in excess of 150% of required capacity. The voltage limit is 2.13 V per cell, which corresponds to a total minimum voltage output of 128 V per battery discussed in the FSAR, Chapter [8] (Ref. 4). The criteria for sizing large lead storage batteries are defined in IEEE-485 (Ref. 5).

Each Train A and Train B DC electrical power subsystem has ample power output capacity for the steady state operation of connected loads required during normal operation, while at the same time maintaining its battery bank fully charged. Each battery charger also has sufficient capacity to restore the battery from the design minimum charge to its fully charged state within 24 hours while supplying normal steady state loads discussed in the FSAR, Chapter [8] (Ref. 4).

<INSERT>

APPLICABLE SAFETY ANALYSES

The initial conditions of Design Basis Accident (DBA) and transient analyses in the FSAR, Chapter [6] (Ref. 6), and in the FSAR, Chapter [15] (Ref. 7), assume that Engineered Safety Feature (ESF) systems are OPERABLE. The DC

(continued)

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INSERT

The EDG DC electrical power system consists of the battery, battery charger, and interconnecting cabling to supply the required DC voltage to allow the associated EDG components to perform the required safety function.

For the other unit, control power for breakers and electrical power for solenoid operated valves that are needed to support operation of each required Service Water (SW) pump, Main Control Room (MCR)/Emergency Switchgear Room (ESGR) Emergency Ventilation System (EVS) fan, and Auxiliary Building central exhaust fan. SW, MCR/ESGR EVS, and Auxiliary Building central exhaust system are shared systems.

BASES

APPLICABLE SAFETY ANALYSES (continued)

electrical power system provides normal and emergency DC electrical power for the DGs, emergency auxiliaries, and control and switching during all MODES of operation. (4)

The OPERABILITY of the DC sources is consistent with the initial assumptions of the accident analyses and is based upon meeting the design basis of the unit. This includes maintaining the DC sources OPERABLE during accident conditions in the event of:

a. An assumed loss of all offsite AC power or all onsite AC power; and

b. A worst case single failure.

<INSERT 1> (5)

The DC sources satisfy Criterion 3 of the NRC Policy Statement. 10 CFR 50.36(c)(2)(ii). (1)

LCO

The DC electrical power subsystems, each subsystem consisting of two batteries, battery charger for each battery and the corresponding control equipment and interconnecting cabling supplying power to the associated bus within the train are required to be OPERABLE to ensure the availability of the required power to shut down the reactor and maintain it in a safe condition after an anticipated operational occurrence (AOO) or a postulated DBA. Loss of any train DC electrical power subsystem does not prevent the minimum safety function from being performed (Ref. 4). (3)

<INSERT 2> (5)

An OPERABLE DC electrical power subsystem requires all required batteries and respective chargers to be operating and connected to the associated DC bus(es).

APPLICABILITY

The DC electrical power sources are required to be OPERABLE in MODES 1, 2, 3, and 4 to ensure safe unit operation and to ensure that:

a. Acceptable fuel design limits and reactor coolant pressure boundary limits are not exceeded as a result of AOOs or abnormal transients; and

(continued)

Rev. 0

INSERT 1

The OPERABILITY of the EDG DC electrical power system ensures the EDG may perform its required safety function.

INSERT 2

The EDG DC electrical power system consists of the battery, battery charger, and interconnecting cabling to supply the required DC voltage to allow the associated EDG components to perform the required safety function.

BASES

APPLICABILITY (continued)

b. Adequate core cooling is provided, and containment integrity and other vital functions are maintained in the event of a postulated DBA. <INSERT 1> (5)

The DC electrical power requirements for MODES 5 and 6 are addressed in the Bases for LCO 3.8.5, "DC Sources—Shutdown."

ACTIONS

A.1

Condition A represents one train with a loss of ability to completely respond to an event, and a potential loss of ability to remain energized during normal operation. It is, therefore, imperative that the operator's attention focus on stabilizing the unit, minimizing the potential for complete loss of DC power to the affected train. The 2 hour limit is consistent with the allowed time for an inoperable DC distribution system train. (8)

If one of the required DC electrical power subsystems is inoperable (e.g., inoperable battery, inoperable battery charger(s), or inoperable battery charger and associated inoperable battery), the remaining DC electrical power subsystem has the capacity to support a safe shutdown and to mitigate an accident condition. Since a subsequent worst case single failure would, however, result in the complete loss of the remaining 125 VDC electrical power subsystems with attendant loss of ESF functions, continued power operation should not exceed 2 hours. The 2 hour Completion Time is based on Regulatory Guide 1.93 (Ref. 8) and reflects a reasonable time to assess unit status as a function of the inoperable DC electrical power subsystem and, if the DC electrical power subsystem is not restored to OPERABLE status, to prepare to effect an orderly and safe unit shutdown. <INSERT 2> (2) (8)

B.1 and B.2

If the inoperable DC electrical power subsystem cannot be restored to OPERABLE status within the required Completion Time, the unit must be brought to a MODE in which the LCO does not apply. To achieve this status, the unit must be brought to at least MODE 3 within 6 hours and to MODE 5

(continued)

Rev. 0

INSERT 1

The EDG DC system is required to be OPERABLE in MODES 1, 2, 3, and 4 to ensure the OPERABILITY of the associated EDG in accordance with LCO 3.8.1. In MODES 5 or 6, the OPERABILITY requirements of the EDG DC system are determined by the EDGs that they support in accordance with LCO 3.8.2.

INSERT 2

For the Station batteries, a spare battery charger may be substituted for the normal charger without entry into Condition A.

BASES

ACTIONS

B.1 and B.2 (continued)

within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging plant systems. The Completion Time to bring the unit to MODE 5 is consistent with the time required in Regulatory Guide 1.93 (Ref. 8). 5

<INSERT>

SURVEILLANCE REQUIREMENTS

SR 3.8.4.1

For station and EDG batteries, Verifying battery terminal voltage while on float charge for the batteries helps to ensure the effectiveness of the charging system and the ability of the batteries to perform their intended function. Float charge is the condition in which the charger is supplying the continuous charge required to overcome the internal losses of a battery (or battery cell) and maintain the battery (or a battery cell) in a fully charged state. The voltage requirements are based on the nominal design voltage of the battery and are consistent with the initial voltages assumed in the battery sizing calculations. The 7 day Frequency is consistent with manufacturer recommendations and IEEE-450 (Ref. 9). 5

SR 3.8.4.2 5

Visual inspection of both station and EDG batteries to detect corrosion of the battery cells and connections, or measurement of the resistance of each intercell, interrack, intertier, and terminal connection, provides an indication of physical damage or abnormal deterioration that could potentially degrade battery performance.

<INSERT FROM SR 3.8.4.4>

The limits established for this SR must be no more than 20% above the resistance as measured during installation or not above the ceiling value established by the manufacturer. 2 6

The Surveillance Frequency for these inspections, which can detect conditions that can cause power losses due to resistance heating, is 92 days. This Frequency is considered acceptable based on operating experience related to detecting corrosion trends.

(continued)

Rev. 0

INSERT

C.1

Condition C represents the loss of the ability of the EDG DC system (e.g., inoperable battery charger or inoperable battery) to supply necessary power to the associated EDG. In this condition, the associated EDG is immediately declared inoperable and the associated Conditions or Required Actions of LCO 3.8.1 are followed.

D.1

Condition D represents the loss of one or more required LCO 3.8.4.c DC electrical power subsystem(s) needed to support the operation of required shared components on the other unit. SW, MCR/ESGR EVS, and Auxiliary Building central exhaust system are shared systems. In this condition, the associated required shared components are declared inoperable immediately. The associated Conditions or Required Actions of LCO 3.7.8, "Service Water System," LCO 3.7.10, "MCR/ESGR Emergency Ventilation Systems," and LCO 3.7.12, "Emergency Core Cooling System Pump Room Exhaust Air Cleanup System," are followed.

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.8.4.3

Visual inspection of the battery cells, cell plates, and battery racks provides an indication of physical damage or abnormal deterioration that could potentially degrade battery performance. <INSERT> TSTF 38

The 12 month Frequency for this SR is consistent with IEEE-450 (Ref. 9), which recommends detailed visual inspection of cell condition and rack integrity on a yearly basis. (5)

SR 3.8.4.4 and SR 3.8.4.5

Station and EDG battery

Visual inspection and resistance measurements of intercell, interrack, intertier, and terminal connections provide an indication of physical damage or abnormal deterioration that could indicate degraded battery condition. The anticorrosion material is used to help ensure good electrical connections and to reduce terminal deterioration. The visual inspection for corrosion is not intended to require removal of and inspection under each terminal connection. The removal of visible corrosion is a preventive maintenance SR. The presence of visible corrosion does not necessarily represent a failure of this SR provided visible corrosion is removed during performance of SR 3.8.4.4. (5) (8)

<more to SR 3.8.4.2>

Reviewer's Note: The requirement to verify that terminal connections are clean and tight applies only to nickel cadmium batteries as per IEEE Standard P1106, "IEEE Recommended Practice for Installation, Maintenance, Testing and Replacement of Vented Nickel - Cadmium Batteries for Stationary Applications." This requirement may be removed for lead acid batteries. (4)

The connection resistance limits for SR 3.8.4.5 shall be no more than 20% above the resistance as measured during installation, or not above the ceiling value established by the manufacturer. (2)

The Surveillance Frequencies of 12 months is consistent with IEEE-450 (Ref. 9), which recommends cell to cell and terminal connection resistance measurement on a yearly basis. (5)

(continued)

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INSERT

The presence of physical damage or deterioration does not necessarily represent a failure of this SR, provided an evaluation determines that the physical damage or deterioration does not affect the OPERABILITY of the battery (its ability to perform its design function).

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.8.4.6 AND SR 3.8.4.7

This SR requires that each battery charger be capable of supplying [400] amps and [125] V for ≥ [8] hours. These requirements are based on the design capacity of the chargers (Ref. 4). According to Regulatory Guide 1.32 (Ref. 10), the battery charger supply is required to be based on the largest combined demands of the various steady state loads and the charging capacity to restore the battery from the design minimum charge state to the fully charged state, irrespective of the status of the unit during these demand occurrences. The minimum required amperes and duration ensures that these requirements can be satisfied.

The Surveillance Frequency is acceptable, given the unit conditions required to perform the test and the other administrative controls existing to ensure adequate charger performance during these [18 months] intervals. In addition, this Frequency is intended to be consistent with expected fuel cycle lengths.

This Surveillance is required to be performed during MODES 5 and 6 since it would require the DC electrical power subsystem to be inoperable during performance of the test.

This SR is modified by a Note. The reason for the Note is that performing the Surveillance would perturb the electrical distribution system and challenge safety systems. Credit may be taken for unplanned events that satisfy this SR.

SR 3.8.4.[7]

A battery service test is a special test of battery capability, as found, to satisfy the design requirements (battery duty cycle) of the DC electrical power system. The discharge rate and test length should correspond to the design duty cycle requirements as specified in Reference 4.

The Surveillance Frequency of [18 months] is consistent with the recommendations of Regulatory Guide 1.32 (Ref. 10) and Regulatory Guide 1.129 (Ref. 11), which state that the battery service test should be performed during refueling operations or at some other outage, with intervals between tests, not to exceed [18 months].

(continued)

Rev. 0

INSERT 1

SR 3.8.4.7 requires that each EDG battery charger be capable of supplying ≥ 10 amps and ≥ 125 V for ≥ 4 hours. These values are based on the design requirements of the charger.

INSERT 2

The spare charger for the Station batteries is required to be tested to the same criteria as the normal charger if it is to be used as a substitute charger.

The Surveillance Frequency for SR 3.8.4.7 is acceptable given the EDG is not required to be OPERABLE to perform the required test.

BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.4.~~7~~ 8 (continued)

This SR is modified by ~~two~~ three Notes. Note 1 allows the performance of a modified performance discharge test in lieu of a service test ~~once per 60 months~~. 5

TSTF 360

It may ~~The modified performance discharge test is a simulated duty cycle~~ consist~~ing~~ of just two rates; ~~the~~ one minute rate for instance published for the battery or the largest current load of the duty cycle, followed by the test rate employed for the performance test, both of which envelope the duty cycle of the service test. Since the ampere-hours removed by a ~~rated~~ one minute discharge represents a very small portion of the battery capacity, the test rate can be changed to that for the performance test without compromising the results of the performance discharge test. The battery terminal voltage for the modified performance discharge test ~~should~~ must remain above the minimum battery terminal voltage specified in the battery service test for the duration of time equal to that of the service test.

TSTF 360

TSTF 360

A modified performance discharge test is a test of the battery capacity and its ability to provide a high rate, short duration load (usually the highest rate of the duty cycle). This will ~~offer~~ confirm the battery's ability to meet the critical period of the load duty cycle, in addition to determining its percentage of rated capacity. Initial conditions for the modified performance discharge test should be identical to those specified for a service test. 8 5

TSTF 360

<INSERT 1>

The reason for Note ~~2~~ 9 is that performing the Surveillance on the station batteries would perturb the electrical distribution system and challenge safety systems. Credit may be taken for unplanned events ~~that satisfy this SR~~. 5 9

<INSERT 2>

TSTF 283

TSTF 8

SR 3.8.4.~~8~~ 9

A battery performance discharge test for Station and EDG batteries is a test of constant current capacity of a battery, ~~normally done in the as found condition~~, after having been in service, to detect any change in the capacity determined by the acceptance test. The test is intended to determine overall battery degradation due to age and usage. 5 2

(continued)

Rev. 0

INSERT 1

Note 2 allows the performance discharge test in lieu of the service test once per 60 months.

INSERT 2

This restriction from normally performing the Surveillance in MODE 1, 2, 3, or 4 is further amplified to allow portions of the Surveillance to be performed for the purpose of reestablishing OPERABILITY (e.g., post work testing following corrective maintenance, corrective modification, deficient or incomplete surveillance testing, and other unanticipated OPERABILITY concerns) provided an assessment determines plant safety is maintained or enhanced. This assessment shall, as a minimum, consider the potential outcomes and transients associated with a failed partial Surveillance, a successful partial Surveillance, and a perturbation of the offsite or onsite system when they are tied together or operated independently for the partial Surveillance; as well as the operator procedures available to cope with these outcomes. These shall be measured against the avoided risk of the plant shutdown and startup to determine that plant safety is maintained or enhanced when portions of the Surveillance are performed in MODE 1, 2, 3, or 4. Risk insights or deterministic methods may be used for this assessment.

BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.4.8 (continued)

A battery modified performance discharge test is described in the Bases for SR 3.8.4.7. Either the battery performance discharge test or the modified performance discharge test is acceptable for satisfying SR 3.8.4.8; however, only the modified performance discharge test may be used to satisfy SR 3.8.4.8 while satisfying the requirements of SR 3.8.4.7 at the same time.

The acceptance criteria for this Surveillance are consistent with IEEE-450 (Ref. 9) and IEEE-485 (Ref. 5). These references recommend that the battery be replaced if its capacity is below 80% of the manufacturer's rating. A capacity of 80% shows that the battery rate of deterioration is increasing, even if there is ample capacity to meet the load requirements.

The Surveillance Frequency for this test is normally 60 months. If the battery shows degradation, or if the battery has reached 85% of its expected life and capacity is < 100% of the manufacturer's rating, the Surveillance Frequency is reduced to 12 months. However, if the battery shows no degradation but has reached 85% of its expected life, the Surveillance Frequency is only reduced to 24 months for batteries that retain capacity ≥ 100% of the manufacturer's rating. Degradation is indicated, according to IEEE-450 (Ref. 9), when the battery capacity drops by more than 10% relative to its capacity on the previous performance test or when it is ≥ 10% below the manufacturer's rating. These frequencies are consistent with the recommendations in IEEE-450 (Ref. 9).

The 60 month frequency is

and the 18 month Frequency is consistent with operating experience

This SR is modified by a Note. The reason for the Note is that performing the Surveillance would perturb the electrical distribution system and challenge safety systems. Credit may be taken for unplanned events that satisfy this SR.

TSTF 8

for the station batteries

<INSERT> TSTF 283

REFERENCES

1. 10 CFR 50, Appendix A, GDC 17. UFSAR, Chapter 3.
2. Regulatory Guide 1.6, March 10, 1971.
3. IEEE-308-1978. 1971

(continued)

Rev.0

INSERT

This restriction from normally performing the Surveillance in MODE 1, 2, 3, or 4 is further amplified to allow portions of the Surveillance to be performed for the purpose of reestablishing OPERABILITY (e.g., post work testing following corrective maintenance, corrective modification, deficient or incomplete surveillance testing, and other unanticipated OPERABILITY concerns) provided an assessment determines plant safety is maintained or enhanced. This assessment shall, as a minimum, consider the potential outcomes and transients associated with a failed partial Surveillance, a successful partial Surveillance, and a perturbation of the offsite or onsite system when they are tied together or operated independently for the partial Surveillance; as well as the operator procedures available to cope with these outcomes. These shall be measured against the avoided risk of the plant shutdown and startup to determine that plant safety is maintained or enhanced when portions of the Surveillance are performed in MODE 1, 2, 3, or 4. Risk insights or deterministic methods may be used for this assessment.

BASES

REFERENCES (continued)

4. (U)FSAR, Chapter ~~18~~ 2. 3 2
5. IEEE-485 ~~(1983)~~, June 1983. 3
6. (U)FSAR, Chapter ~~26~~ 7. 3 2
7. (U)FSAR, Chapter ~~15~~ 8. 3 2
8. Regulatory Guide 1.93, December 1974. 3
9. IEEE-450-~~(1987)~~.
10. Regulatory Guide 1.32, February 1977.
11. Regulatory Guide 1.129, December 1974.

Rev. 0

1. The criteria of the NRC Final Policy Statement on Technical Specifications Improvements have been included in 10 CFR 50.36(c)(2)(ii). Therefore, references in the ISTS Bases to the NRC Final Policy Statement are revised in the ITS Bases to reference 10 CFR 50.36.

2. Changes are made (additions, deletions, and/or changes) to the ISTS, which reflect the plant specific nomenclature, number, reference, system description, analysis, or licensing basis description.

3. The brackets have been removed and the proper plant specific information/value has been provided.

4. This information, including reviewer notes, is deleted because it is not applicable to North Anna.

5. Changes are made to the ITS Bases which reflect changes in the ITS Specifications.

6. Background section statement for the original sizing of the station batteries is not correct and is not stated in the UFSAR. Therefore, the statement has been deleted. This is acceptable because the sizing criteria for the large lead storage batteries is defined in the IEEE – 485, which is referenced in the Background section of the Bases.

7. North Anna Units 1 and 2 were designed and constructed on the basis of the proposed General Design Criteria, published in 1966. Since February 20, 1971, when the General Design Criteria for Nuclear Power Plants, Appendix A to 10 CFR Part 50, were published, the Company attempted to comply with the intent of the newer criteria to the extent practical, recognizing previous design commitments. The NRC's Safety Evaluation Report for North Anna Units 1 and 2 reviewed the plant against 10 CFR Part 50, Appendix A and concluded that the facility design conforms to the intent of the newer criteria. The North Anna UFSAR contains discussions comparing the design of the plant to the 10 CFR 50, Appendix A, General Design Criteria. Bases references to the 10 CFR 50, Appendix A criteria have been replaced with references to the appropriate section of the UFSAR.

8. This is an editorial change for clarity, for consistency with the Improved Technical Specifications Writer's Guide, or for consistency with similar statements in the other ITS Bases.

9. TSTF 283 modifies the Bases section of ITS SRs 3.8.4.8 and 3.8.4.9. The TSTF states that each SR testing requirement is not normally performed in MODE 1 or 2. These SRs are not allowed to be performed in MODE 1, 2, 3, or 4. Therefore, the TSTF for the Bases for these SRs are changed to reflect the correct MODE requirements.

B 3.8 ELECTRICAL POWER SYSTEMS

B 3.8.5 DC Sources—Shutdown

BASES

BACKGROUND

A description of the DC sources is provided in the Bases for LCO 3.8.4, "DC Sources—Operating."

APPLICABLE SAFETY ANALYSES

The initial conditions of Design Basis Accident and transient analyses in the FSAR, Chapter 6 (Ref. 1) and Chapter 15 (Ref. 2), assume that Engineered Safety Feature systems are OPERABLE. The DC electrical power system provides normal and emergency DC electrical power for the diesel generators, emergency auxiliaries, and control and switching during all MODES of operation. <INSERT 1>

The OPERABILITY of the DC subsystems is consistent with the initial assumptions of the accident analyses and the requirements for the supported systems' OPERABILITY.

The OPERABILITY of the minimum DC electrical power sources during MODES 5 and 6 and during movement of recently irradiated fuel assemblies ensures that:

a. The unit can be maintained in the shutdown or refueling condition for extended periods;

b. Sufficient instrumentation and control capability is available for monitoring and maintaining the unit status; and

c. Adequate DC electrical power is provided to mitigate events postulated during shutdown, such as a fuel handling accident. <INSERT 2>

The DC sources satisfy Criterion 3 of the NRC Policy Statement. 10CFR 50.36 (c)(2)(ii)

LCO

The DC electrical power subsystems, each subsystem consisting of two batteries, one battery charger per battery, and the corresponding control equipment and

(continued)

Rev. 0

INSERT 1

The EDG DC system provides power for the required EDG as described in LCO 3.8.2, "AC Sources –Shutdown."

INSERT 2

involving handling recently irradiated fuel. Due to radioactive decay, DC electrical power is only required to mitigate fuel handling accidents involving handling recently irradiated fuel. (i.e., fuel that has occupied part of a critical reactor core within a time frame established by analysis. The term recently is defined as all irradiated fuel assemblies, until analysis is performed to determine a specific time frame.)

BASES

LCO (continued)

interconnecting cabling within the train, are required to be OPERABLE to support required trains of the distribution systems required OPERABLE by LCO 3.8.10, "Distribution Systems—Shutdown." This ensures the availability of sufficient DC electrical power sources to operate the unit in a safe manner and to mitigate the consequences of postulated events during shutdown (e.g., fuel handling accidents). <INSERT 1> 4 <INSERT 2> TSTF 51

APPLICABILITY

The DC electrical power sources and EDG DC SYSTEM required to be OPERABLE in MODES 5 and 6, and during movement of irradiated fuel assemblies, provide assurance that: 4

a. Required features to provide adequate coolant inventory makeup are available for the recently irradiated fuel assemblies in the core; TSTF 51

b. Required features needed to mitigate a fuel handling accident are available; <INSERT 3> 5 TSTF 51

c. Required features necessary to mitigate the effects of events that can lead to core damage during shutdown are available; and

d. Instrumentation and control capability is available for monitoring and maintaining the unit in a cold shutdown condition or refueling condition.

The DC electrical power and EDG DC SYSTEM requirements for MODES 1, 2, 3, and 4 are covered in LCO 3.8.4. 4

ACTIONS

A.1, A.2.1, A.2.2, A.2.3, and A.2.4

If two trains are required by LCO 3.8.10, the remaining train with DC power available may be capable of supporting sufficient systems to allow continuation of CORE ALTERATIONS and recently irradiated fuel movement. By allowing the option to declare required features inoperable with the associated DC power source(s) inoperable, appropriate restrictions will be implemented in accordance with the affected required features LCO ACTIONS. In many instances, this option may involve undesired administrative efforts. Therefore, the TSTF 51

(continued)

Rev. 0

INSERT 1

The EDG DC system, consisting of a battery, battery charger, and the corresponding control equipment and interconnection cabling for the EDG, are required to be OPERABLE to support the EDG required by LCO 3.8.2, "AC Sources – Shutdown."

INSERT 2

involving handling recently irradiated fuel.

INSERT 3

involving handling recently irradiated fuel (i.e., fuel that has occupied part of a critical reactor core within a time frame established by analysis. The term recently is defined as all irradiated fuel assemblies, until analysis is performed to determine a specific time frame.)

BASES

ACTIONS

A.1, A.2.1, A.2.2, A.2.3, and A.2.4 (continued)

TSTF 51

allowance for sufficiently conservative actions is made (i.e., to suspend CORE ALTERATIONS, movement of recently irradiated fuel assemblies, and operations involving positive reactivity additions). The Required Action to suspend positive reactivity additions does not preclude actions to maintain or increase reactor vessel inventory, provided the required SDM is maintained. <INSERT 1>

TSTF 286

Suspension of these activities shall not preclude completion of actions to establish a safe conservative condition. These actions minimize probability of the occurrence of postulated events. It is further required to immediately initiate action to restore the required DC electrical power subsystems and to continue this action until restoration is accomplished in order to provide the necessary DC electrical power to the unit safety systems.

The Completion Time of immediately is consistent with the required times for actions requiring prompt attention. The restoration of the required DC electrical power subsystems should be completed as quickly as possible in order to minimize the time during which the unit safety systems may be without sufficient power.

<INSERT 2> (4)

SURVEILLANCE REQUIREMENTS

SR 3.8.5.1

SR 3.8.5.1 requires performance of all Surveillances required by SR 3.8.4.1 through SR 3.8.4.8. Therefore, see the corresponding Bases for LCO 3.8.4 for a discussion of each SR. (4) (4)

This SR is modified by a Note. The reason for the Note is to preclude requiring the OPERABLE DC sources or EDG DC system from being discharged below their capability to provide the required power supply or otherwise rendered inoperable during the performance of SRs. It is the intent that these SRs must still be capable of being met, but actual performance is not required. (4)

(continued)

Rev. 0

INSERT 1

that could result in loss of required SDM (MODE 5) or boron concentration (MODE 6). Suspending positive reactivity additions that could result in failure to meet the minimum SDM or boron concentration limit is required to assure continued safe operation. Introduction of coolant inventory must be from sources that have a boron concentration greater than what would be required in the RCS for minimum SDM or refueling boron concentration. This may result in an overall reduction in RCS boron concentration, but provides acceptable margin to maintaining subcritical operation. Introduction of temperature changes including temperature increases when operating with a positive MTC must also be evaluated to ensure they do not result in a loss of required SDM.

INSERT 2

B.1

With the required EDG's DC system inoperable, the EDG is not OPERABLE and the applicable Conditions and Required Actions of LCO 3.8.2, "AC Sources – Shutdown," must be entered immediately.

BASES (continued)

REFERENCES

1. UFSAR, Chapter ~~6~~ 8. (1)(2)
2. UFSAR, Chapter ~~6~~ 15. (1)(2)

Rev.0

1. Changes are made (additions, deletions, and/or changes) to the ISTS, which reflect the plant specific nomenclature, number, reference, system description, analysis, or licensing basis description.

2. The brackets have been removed and the proper plant specific information/value has been provided.

3. The criteria of the NRC Final Policy Statement on Technical Specifications Improvements have been included in 10 CFR 50.36(c)(2)(ii). Therefore, references in the ISTS Bases to the NRC Final Policy Statement are revised in the ITS Bases to reference 10 CFR 50.36.

4. Changes are made to the ITS Bases which reflect changes made to the ITS Specifications.

5. Bases changes made by TSTF-51 are incorporated with modifications. These modifications incorporate the concept of the approved changes made by TSTF-51, but the analysis value for the required time has not been determined. When the analysis is completed, the required time with be substituted for the phase, "a time frame established by analysis. The term recently is defined as all irradiated fuel assemblies, until analysis is performed to determine a specific time frame."

B 3.8 ELECTRICAL POWER SYSTEMS

B 3.8.6 Battery Cell Parameters

BASES

BACKGROUND

This LCO delineates the limits on electrolyte temperature, level, float voltage, and specific gravity for the DC power source batteries. A discussion of these batteries and their OPERABILITY requirements is provided in the Bases for LCO 3.8.4, "DC Sources—Operating," and LCO 3.8.5, "DC Sources—Shutdown."

Station and EOG

APPLICABLE SAFETY ANALYSES

The initial conditions of Design Basis Accident (DBA) and transient analyses in the FSAR, Chapter 06 (Ref. 1) and Chapter 015 (Ref. 2), assume Engineered Safety Feature systems are OPERABLE. The DC electrical power system provides normal and emergency DC electrical power for the diesel generators, emergency auxiliaries, and control and switching during all MODES of operation.

INSERT

The OPERABILITY of the DC subsystems is consistent with the initial assumptions of the accident analyses and is based upon meeting the design basis of the unit. This includes maintaining at least one train of DC sources OPERABLE during accident conditions, in the event of:

a. An assumed loss of all offsite AC power or all onsite AC power; and

b. A worst case single failure.

Battery cell parameters satisfy the Criterion 3 of the NRC Policy Statement.

10 CFR 50.36 (c)(2)(ii)

LCO

Battery cell parameters must remain within acceptable limits to ensure availability of the required DC power to shut down the reactor and maintain it in a safe condition after an anticipated operational occurrence or a postulated DBA. Electrolyte limits are conservatively established, allowing continued DC electrical system function even with Category A and B limits not met.

(continued)

Rev. 0

INSERT

The EDG DC electrical power system consists of the battery, battery charger, and interconnecting cabling supplying power to the associated EDG components to supply the required DC voltage to allow the EDG to perform the required safety function.

BASES (continued)

APPLICABILITY

The battery cell parameters are required solely for the support of the associated DC electrical power subsystem(s) and EDG DC SYSTEM(S) (1) Therefore, battery electrolyte is only required when the DC power source is required to be OPERABLE. Refer to the Applicability discussion in Bases for LCO 3.8.4 and LCO 3.8.5.

the

ACTIONS

A.1, A.2, and A.3

With one or more cells in one or more batteries not within limits (i.e., Category A limits not met, Category B limits not met, or Category A and B limits not met) but within the Category C limits specified in Table 3.8.6-1 in the accompanying LCO, the battery is degraded but there is still sufficient capacity to perform the intended function. Therefore, the affected battery is not required to be considered inoperable solely as a result of Category A or B limits not met and operation is permitted for a limited period.

The pilot cell electrolyte level and float voltage are required to be verified to meet the Category C limits within 1 hour (Required Action A.1). This check will provide a quick indication of the status of the remainder of the battery cells. One hour provides time to inspect the electrolyte level and to confirm the float voltage of the pilot cells. One hour is considered a reasonable amount of time to perform the required verification.

Verification that the Category C limits are met (Required Action A.2) provides assurance that during the time needed to restore the parameters to the Category A and B limits, the battery is still capable of performing its intended function. A period of 24 hours is allowed to complete the initial verification because specific gravity measurements must be obtained for each connected cell. Taking into consideration both the time required to perform the required verification and the assurance that the battery cell parameters are not severely degraded, this time is considered reasonable. The verification is repeated at 7 day intervals until the parameters are restored to Category A or B limits. This periodic verification is consistent with the normal Frequency of pilot cell Surveillances.

(continued)

Rev. 0

BASES

ACTIONS

A.1, A.2, and A.3 (continued)

Continued operation is only permitted for 31 days before battery cell parameters must be restored to within Category A and B limits. With the consideration that, while battery capacity is degraded, sufficient capacity exists to perform the intended function and to allow time to fully restore the battery cell parameters to normal limits, this time is acceptable prior to declaring the battery inoperable.

B.1

With one or more batteries with one or more battery cell parameters outside the Category C limit for any connected cell, sufficient capacity to supply the maximum expected load requirement is not assured and the corresponding DC electrical power subsystem must be declared inoperable. Additionally, other potentially extreme conditions, such as not completing the Required Actions of Condition A within the required Completion Time or average electrolyte temperature of representative cells falling below 60°F are also cause for immediately declaring the associated DC electrical power subsystem inoperable.

or EDG DC system (1)

for the station batteries (1)

Representative cells will consist of at least 10 cells. (4)

SURVEILLANCE REQUIREMENTS

SR 3.8.6.1

This SR verifies that Category A battery cell parameters are consistent with IEEE-450 (Ref. 3), which recommends regular battery inspections (at least one per month) including voltage, specific gravity, and electrolyte temperature LEVEL of pilot cells. (1)

SR 3.8.6.2

The quarterly inspection of specific gravity and voltage is consistent with IEEE-450 (Ref. 3). In addition, within 24 hours of a battery discharge < 110 V or a battery overcharge > 150 V, the battery must be demonstrated to meet Category B limits. Transients, such as motor starting transients, which may momentarily cause battery voltage to drop to ≤ 110 V, do not constitute a battery discharge (2) (2)

(continued)

Rev.0

BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.6.2 (continued)

provided the battery terminal voltage and float current return to pre-transient values. This inspection is also consistent with IEEE-450 (Ref. 3), which recommends special inspections following a severe discharge or overcharge, to ensure that no significant degradation of the battery occurs as a consequence of such discharge or overcharge.

SR 3.8.6.3

This Surveillance verification that the average temperature of representative cells of the station batteries is > 60°F, is consistent with a recommendation of IEEE-450 (Ref. 3), that states that the temperature of electrolytes in representative cells should be determined on a quarterly basis. 1

Lower than normal temperatures act to inhibit or reduce battery capacity. This SR ensures that the operating temperatures remain within an acceptable operating range. This limit is based on manufacturer recommendations.

Table 3.8.6-1

This table delineates the limits on electrolyte level, float voltage, and specific gravity for three different categories. The meaning of each category is discussed below.

Category A defines the normal parameter limit for each designated pilot cell in each battery. The cells selected as pilot cells are those whose ~~temperature~~ level, voltage, and electrolyte specific gravity approximate the state of charge of the entire battery. 1

The Category A limits specified for electrolyte level are based on manufacturer recommendations and are consistent with the guidance in IEEE-450 (Ref. 3), with the extra ¼ inch allowance above the high water level indication for operating margin to account for temperatures and charge effects. In addition to this allowance, footnote a to Table 3.8.6-1 permits the electrolyte level to be above the specified maximum level during equalizing charge, provided it is not overflowing. These limits ensure that the plates

(continued)

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BASES

SURVEILLANCE REQUIREMENTS

Table 3.8.6-1 (continued)

suffer no physical damage, and that adequate electron transfer capability is maintained in the event of transient conditions. IEEE-450 (Ref. 3) recommends that electrolyte level readings should be made only after the battery has been at float charge for at least 72 hours.

The Category A limit specified for float voltage is ≥ 2.13 V per cell. This value is based on the recommendations of IEEE-450 (Ref. 3), which states that prolonged operation of cells < 2.13 V can reduce the life expectancy of cells.

The Category A limit specified for specific gravity for each pilot cell is ≥ 1.200 (0.015 below the manufacturer fully charged nominal specific gravity or a battery charging current that had stabilized at a low value). This value is characteristic of a charged cell with adequate capacity. According to IEEE-450 (Ref. 3), the specific gravity readings are based on a temperature of 77°F (25°C). (2)

The specific gravity readings are corrected for actual electrolyte temperature and level. For each 3°F (1.67°C) above 77°F (25°C), 1 point (0.001) is added to the reading; 1 point is subtracted for each 3°F below 77°F. The specific gravity of the electrolyte in a cell increases with a loss of water due to electrolysis or evaporation.

Category B defines the normal parameter limits for each connected cell. The term "connected cell" excludes any battery cell that may be jumpered out.

The Category B limits specified for electrolyte level and float voltage are the same as those specified for Category A <INSERT> (4) and have been discussed above. A The Category B limit specified for specific gravity for each connected cell is ≥ 1.195 (0.020 below the manufacturer fully charged, nominal specific gravity) with the average of all connected cells > 1.205 (0.010 below the manufacturer fully charged, nominal specific gravity). These values are based on manufacturer's recommendations. The minimum specific gravity value required for each cell ensures that the effects of a highly charged or newly installed cell will not mask overall degradation of the battery. (2)

(continued)

Rev. 0

INSERT

For any cell with voltage below the limit and electrolyte temperature > 3 °F from the average electrolyte temperature, correct the cell voltage for average electrolyte temperature.

BASES

SURVEILLANCE REQUIREMENTS

Table 3.8.6-1 (continued)

Category C defines the limits for each connected cell. These values, although reduced, provide assurance that sufficient capacity exists to perform the intended function and maintain a margin of safety. When any battery parameter is outside the Category C limits, the assurance of sufficient capacity described above no longer exists, and the battery must be declared inoperable.

The Category C limits specified for electrolyte level (above the top of the plates and not overflowing) ensure that the plates suffer no physical damage and maintain adequate electron transfer capability. The Category C limits for float voltage is based on IEEE-450 (Ref. 3), which states that a cell voltage of 2.07 V or below, under float conditions and not caused by elevated temperature of the cell, indicates internal cell problems and may require cell replacement.

The Category C limit of average specific gravity ≥ 1.195 is based on manufacturer recommendations (0.020 below the manufacturer recommended fully charged, nominal specific gravity). In addition to that limit, it is required that the specific gravity for each connected cell must be no less than 0.020 below the average of all connected cells. This limit ensures that the effect of a highly charged or new cell does not mask overall degradation of the battery.

The footnotes to Table 3.8.6-1 are applicable to Category A, B, and C specific gravity. Footnote (b) to Table 3.8.6-1 requires the above mentioned correction for electrolyte level and temperature, with the exception that level correction is not required when battery charging current is < 2~~0~~ amps on float charge. This current provides, in general, an indication of overall battery condition.

Station (4) (2)

Because of specific gravity gradients that are produced during the recharging process, delays of several days may occur while waiting for the specific gravity to stabilize. A stabilized charger current is an acceptable alternative to specific gravity measurement for determining the state of charge. This phenomenon is discussed in IEEE-450 (Ref. 3). Footnote (c) to Table 3.8.6-1 allows the float charge current to be used as an alternate to specific gravity for

(continued)

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BASES

SURVEILLANCE REQUIREMENTS

Table 3.8.6-1 (continued)

up to 7~~0~~ days following a battery recharge. Within 7~~0~~ days, each connected cell's specific gravity must be measured to confirm the state of charge. Following a minor battery recharge (such as equalizing charge that does not follow a deep discharge) specific gravity gradients are not significant, and confirming measurements may be made in less than 7~~0~~ days.

~~Reviewer's Note: The value of [2] amps used in footnote (b) and (c) is the nominal value for float current established by the battery vendor as representing a fully charged battery with an allowance for overall battery condition.~~

REFERENCES

1. U FSAR, Chapter 6~~1~~.
2. U FSAR, Chapter 15~~1~~.
3. IEEE-450-~~0~~1980~~0~~.

Rev. 0

JUSTIFICATION FOR DEVIATIONS
ITS 3.8.6 BASES - BATTERY CELL PARAMETERS

1. Changes are made to reflect those changes made to the ISTS. The following requirements are renumbered or revised, where applicable, to reflect the changes.

2. The brackets have been removed and the proper plant specific information/value has been provided.

3. The criteria of the NRC Final Policy Statement on Technical Specifications Improvements have been included in 10 CFR 50.36(c)(2)(ii). Therefore, references in the ISTS Bases to the NRC Final Policy Statement are revised in the ITS Bases to reference 10 CFR 50.36.

4. Changes are made to reflect the movement of information from the CTS to the ISTS Bases.

5. Changes are made (additions, deletions, and/or changes) to the ISTS which reflect the plant specific nomenclature, number, reference, system description, analysis, or licensing basis description.

6. This is an editorial change for clarity, for consistency with the Improved Technical Specifications Writer's Guide, or for consistency with similar statements in the other ITS Bases.

B 3.8 ELECTRICAL POWER SYSTEMS

B 3.8.7 Inverters—Operating

BASES

BACKGROUND

The inverters are the preferred source of power for the AC vital buses because of the stability and reliability they achieve. The function of the inverter is to provide AC electrical power to the vital buses. The inverters can be powered from ~~an internal AC source/rectifier~~ a battery charger or from the station battery. The station battery provides an uninterruptible power source for the instrumentation and controls for the Reactor ~~Protective~~ TRIP System (R~~P~~S) and the Engineered Safety Feature Actuation System (ESFAS). Specific details on inverters and their operating characteristics are found in the U FSAR, Chapter ~~08~~ (Ref. 1).

APPLICABLE SAFETY ANALYSES

The initial conditions of U Design Basis Accident (DBA) and transient analyses in the U FSAR, Chapter ~~06~~ (Ref. 2) and Chapter ~~15~~ (Ref. 3), assume Engineered Safety Feature systems are OPERABLE. The inverters are designed to provide the required capacity, capability, redundancy, and reliability to ensure the availability of necessary power to the R~~P~~S and ESFAS instrumentation and controls so that the fuel, Reactor Coolant System, and containment design limits are not exceeded. These limits are discussed in more detail in the Bases for Section 3.2, Power Distribution Limits; Section 3.4, Reactor Coolant System (RCS); and Section 3.6, Containment Systems.

The OPERABILITY of the inverters is consistent with the initial assumptions of the accident analyses and is based on meeting the design basis of the unit. This includes maintaining required AC vital buses OPERABLE during accident conditions in the event of:

a. An assumed loss of all offsite AC electrical power or all onsite AC electrical power; and

b. A worst case single failure.

Inverters are a part of the distribution system and, as such, satisfy Criterion 3 of ~~the NRC Policy Statement~~ 10CFR 50.36 (c)(2)(ii)

(continued)

Rev. 0

BASES (continued)

LCO

The inverters ensure the availability of AC electrical power for the systems instrumentation required to shut down the reactor and maintain it in a safe condition after an anticipated operational occurrence (AOO) or a postulated DBA.

Maintaining the required inverters OPERABLE ensures that the redundancy incorporated into the design of the RPS and ESFAS instrumentation and controls is maintained. The four inverters (two per train) ensure an uninterruptible supply of AC electrical power to the AC vital buses even if the 4.16 kV safety buses are de-energized. 2

Operable inverters require the associated vital bus to be powered by the inverter with output voltage and frequency within tolerances, and power input to the inverter from a 125 VDC station battery. Alternatively, power supply may be from an internal AC source via rectifier as long as the station battery is available as the uninterruptible power supply. 5 4 2 a battery charger 1

This LCO is modified by a Note that allows one (two) inverter to be disconnected from a (common) battery for ≤ 24 hours, if the vital bus is powered from a Class 1E constant voltage transformer or inverter using internal AC source during the period and all other inverters are operable. This allows an equalizing charge to be placed on the battery. If the inverters were not disconnected, the resulting voltage condition might damage the inverters. These provisions minimize the loss of equipment that would occur in the event of a loss of offsite power. The 24 hour time period for the allowance minimizes the time during which a loss of offsite power could result in the loss of equipment energized from the affected AC vital bus while taking into consideration the time required to perform an equalizing charge on the battery bank. its associated 2 4 6 1 2 the associated

The intent of this Note is to limit the number of inverters that may be disconnected. Only those inverters associated with the single battery undergoing an equalizing charge may be disconnected. All other inverters must be aligned to their associated batteries, regardless of the number of inverters or unit design.

(continued)

Rev. 0

BASES (continued)

APPLICABILITY

The inverters are required to be OPERABLE in MODES 1, 2, 3, and 4 to ensure that:

a. Acceptable fuel design limits and reactor coolant pressure boundary limits are not exceeded as a result of AOOs or abnormal transients; and

b. Adequate core cooling is provided, and containment OPERABILITY and other vital functions are maintained in the event of a postulated DBA.

Inverter requirements for MODES 5 and 6 are covered in the Bases for LCO 3.8.8, "Inverters—Shutdown."

ACTIONS

A.1

With a required inverter inoperable, its associated AC vital bus becomes inoperable until it is [manually] re-energized from its [AC Class 1E] constant voltage source transformer [or inverter using internal AC source]. (4)

For this reason a Note has been included in Condition A requiring the entry into the Conditions and Required Actions of LCO 3.8.9, "Distribution Systems—Operating." This ensures that the vital bus is re-energized within 2 hours.

Required Action A.1 allows 24 hours to fix the inoperable inverter and return it to service. The 24 hour limit is based upon engineering judgment, taking into consideration the time required to repair an inverter and the additional risk to which the unit is exposed because of the inverter inoperability. This has to be balanced against the risk of an immediate shutdown, along with the potential challenges to safety systems such a shutdown might entail. When the AC vital bus is powered from its constant voltage source, it is relying upon interruptible AC electrical power sources (offsite and onsite). The uninterruptible inverter source to the AC vital buses is the preferred source for powering instrumentation trip setpoint devices.

(continued)

Rev. 0

BASES

ACTIONS (continued)

B.1 and B.2

If the inoperable devices or components cannot be restored to OPERABLE status within the required Completion Time, the unit must be brought to a MODE in which the LCO does not apply. To achieve this status, the unit must be brought to at least MODE 3 within 6 hours and to MODE 5 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging plant systems. 1

unit

SURVEILLANCE REQUIREMENTS

SR 3.8.7.1

This Surveillance verifies that the inverters are functioning properly with all required circuit breakers closed and AC vital buses energized from the inverter. The verification of proper voltage and frequency output ensures that the required power is readily available for the instrumentation of the RPS and ESFAS connected to the AC vital buses. The 7 day Frequency takes into account the redundant capability of the inverters and other indications available in the control room that alert the operator to inverter malfunctions. 4 5 T

REFERENCES

1. FSAR, Chapter 8. 1 2
2. FSAR, Chapter 6. 1 2
3. FSAR, Chapter 15. 1 2

Rev. 0

1. Changes are made (additions, deletions, and/or changes) to the ISTS which reflect the plant specific nomenclature, number, reference, system description, analysis, or licensing basis description.

2. The brackets have been removed and the proper plant specific information/value has been provided.

3. The criteria of the NRC Final Policy Statement on Technical Specifications Improvements have been included in 10 CFR 50.36(c)(2)(ii). Therefore, references in the ISTS Bases to the NRC Final Policy Statement are revised in the ITS Bases to reference 10 CFR 50.36.

4. Changes are made to reflect those changes made to the ISTS. The following requirements are renumbered or revised, where applicable, to reflect the changes.

5. Editorial change made for enhanced clarity or to be consistent with the ISTS Writers Guide.

B 3.8 ELECTRICAL POWER SYSTEMS

B 3.8.8 Inverters—Shutdown

BASES

BACKGROUND

A description of the inverters is provided in the Bases for LCO 3.8.7, "Inverters—Operating."

APPLICABLE SAFETY ANALYSES

The initial conditions of Design Basis Accident (DBA) and transient analyses in the FSAR, Chapter 6 (Ref. 1) and Chapter 15 (Ref. 2), assume Engineered Safety Feature systems are OPERABLE. The DC to AC inverters are designed to provide the required capacity, capability, redundancy, and reliability to ensure the availability of necessary power to the Reactor Protective System and Engineered Safety Features Actuation System instrumentation and controls so that the fuel, Reactor Coolant System, and containment design limits are not exceeded.

The OPERABILITY of the inverters is consistent with the initial assumptions of the accident analyses and the requirements for the supported systems' OPERABILITY.

The OPERABILITY of the minimum inverters to each AC vital bus during MODES 5 and 6 ensures that:

a. The unit can be maintained in the shutdown or refueling condition for extended periods;

b. Sufficient instrumentation and control capability is available for monitoring and maintaining the unit status; and

c. Adequate power is available to mitigate events postulated during shutdown, such as a fuel handling accident.

The inverters were previously identified as part of the distribution system and, as such, satisfy Criterion 3 of the NRC Policy Statement.

(continued)

INSERT

involving handling recently irradiated fuel. Due to radioactive decay, the inverter(s) are only required to mitigate fuel handling accidents involving handling recently irradiated fuel (i.e., fuel that has occupied part of a critical core within a time frame established by analysis. The term recently is defined as all irradiated fuel assemblies, until analysis is performed to determine a specific time frame.)

BASES (continued)

LCO

required

The inverter(s) ensure the availability of electrical power for the instrumentation for systems required to shut down the reactor and maintain it in a safe condition after an anticipated operational occurrence or a postulated DBA. The battery powered inverters provide uninterruptible supply of AC electrical power to the AC vital buses even if the 4.16 kV safety buses are de-energized. OPERABILITY of the inverters requires that the AC vital bus be powered by the inverter. This ensures the availability of sufficient inverter power sources to operate the unit in a safe manner and to mitigate the consequences of postulated events during shutdown (e.g., fuel handling accidents). <INSERT 1> TSTF 51 (1)

APPLICABILITY

The inverters required to be OPERABLE in MODES 5 and 6 and during movement of recently irradiated fuel assemblies provide assurance that: TSTF 51

a. Systems to provide adequate coolant inventory makeup are available for the irradiated fuel in the core;

b. Systems needed to mitigate a fuel handling accident are available; <INSERT 2> TSTF 51 (4)

c. Systems necessary to mitigate the effects of events that can lead to core damage during shutdown are available; and

d. Instrumentation and control capability is available for monitoring and maintaining the unit in a cold shutdown condition or refueling condition.

Inverter requirements for MODES 1, 2, 3, and 4 are covered in LCO 3.8.7.

ACTIONS

A.1, A.2.1, A.2.2, A.2.3, and A.2.4

If two trains are required by LCO 3.8.10, "Distribution Systems—Shutdown," the remaining OPERABLE Inverters may be capable of supporting sufficient required features to allow continuation of CORE ALTERATIONS, recently irradiated fuel movement, and operations with a potential for positive reactivity additions. By the allowance of the option to declare TSTF 51

(continued)

Rev. 0

INSERT 1

involving handling recently irradiated fuel

INSERT 2

involving handling recently irradiated fuel (i.e., fuel that has occupied part of a critical core within a time frame established by analysis. The term recently is defined as all irradiated fuel assemblies, until analysis is performed to determine a specific time frame.)

BASES

ACTIONS

A.1, A.2.1, A.2.2, A.2.3, and A.2.4 (continued)

required features inoperable with the associated inverter(s) inoperable, appropriate restrictions will be implemented in accordance with the affected required features LCOs' Required Actions. In many instances, this option may involve undesired administrative efforts. Therefore, the allowance for sufficiently conservative actions is made (i.e., to suspend CORE ALTERATIONS, movement of irradiated fuel assemblies, and operations involving positive reactivity additions). The Required Action to suspend positive reactivity additions does not preclude actions to maintain or increase reactor vessel inventory, provided the required SDM is maintained.

TSTF 51

recently

INSERT

TSTF 286

Suspension of these activities shall not preclude completion of actions to establish a safe conservative condition. These actions minimize the probability of the occurrence of postulated events. It is further required to immediately initiate action to restore the required inverters and to continue this action until restoration is accomplished in order to provide the necessary inverter power to the unit safety systems.

The Completion Time of immediately is consistent with the required times for actions requiring prompt attention. The restoration of the required inverters should be completed as quickly as possible in order to minimize the time the unit safety systems may be without power or powered from a constant voltage source transformer.

SURVEILLANCE REQUIREMENTS

SR 3.8.8.1

This Surveillance verifies that the inverters are functioning properly with all required circuit breakers closed and AC vital buses energized from the inverter. The verification of proper voltage and frequency output ensures that the required power is readily available for the instrumentation connected to the AC vital buses. The 7 day Frequency takes into account the redundant capability of the inverters and other indications available in the control room that alert the operator to inverter malfunctions. (1)

(continued)

Rev. 0

INSERT

that could result in loss of required SDM (MODE 5) or boron concentration (MODE 6). Suspending positive reactivity additions that could result in failure to meet the minimum SDM or boron concentration limit is required to assure continued safe operation. Introduction of coolant inventory must be from sources that have a boron concentration greater than what would be required in the RCS for minimum SDM or refueling boron concentration. This may result in an overall reduction in RCS boron concentration, but provides acceptable margin to maintaining subcritical operation. Introduction of temperature changes including temperature increases when operating with a positive MTC must also be evaluated to ensure they do not result in a loss of required SDM.

BASES (continued)

REFERENCES

1. U FSAR, Chapter ~~6~~ 6. 1 2
2. U FSAR, Chapter ~~15~~ 15. 1 2

Rev. 0

1. Changes are made (additions, deletions, and/or changes) to the ISTS, which reflect the plant specific nomenclature, number, reference, system description, analysis, or licensing basis description.

2. The brackets have been removed and the proper plant specific information/value has been provided.

3. The criteria of the NRC Final Policy Statement on Technical Specifications Improvements have been included in 10 CFR 50.36(c)(2)(ii). Therefore, references in the ISTS Bases to the NRC Final Policy Statement are revised in the ITS Bases to reference 10 CFR 50.36.

4. Bases changes made by TSTF-51 are incorporated with modifications. These modifications incorporate the concept of the approved changes made by TSTF-51, but the analysis value for the required time has not been determined. When the analysis is completed, the required time with be substituted for the phase, "a time frame established by analysis. The term recently is defined as all irradiated fuel assemblies, until analysis is performed to determine a specific time frame."

5. This is an editorial change for clarity, for consistency with the Improved Technical Specifications Writer's Guide, or for consistency with similar statements in the other ITS Bases.

B 3.8 ELECTRICAL POWER SYSTEMS

B 3.8.9 Distribution Systems—Operating

BASES

BACKGROUND

The onsite Class 1E AC, DC, and AC vital bus electrical power distribution systems are divided by train into two redundant and independent AC, DC, and AC vital bus electrical power distribution subsystems. (1)

The AC electrical power subsystem for each train consists of a primary Engineered Safety Feature (ESF) 4.16 kV bus and secondary 480 and 120 V buses, distribution panels, motor control centers and load centers. Each 4.16 kV ESF bus has at least one separate and independent offsite source of power as well as a dedicated onsite diesel generator (DG) source. Each 4.16 kV ESF bus is normally connected to a preferred offsite source. After a loss of the preferred offsite power source to a 4.16 kV ESF bus, a transfer to the alternate offsite source is accomplished by utilizing a time delayed bus undervoltage relay. If all offsite sources are unavailable, the onsite emergency DG supplies power to the 4.16 kV ESF bus. Control power for the 4.16 kV breakers is supplied from the Class 1E batteries. Additional description of this system may be found in the Bases for LCO 3.8.1, "AC Sources—Operating," and the Bases for LCO 3.8.4, "DC Sources—Operating." (1) (4) (E) (2) emergency (1) (2) (E) (2)

The secondary AC electrical power distribution buses and system for each train includes the safety related load centers, motor control centers, and distribution panels shown in Table B 3.8.9-1. (sub) TSTF16 (4)

The 120 VAC vital buses are arranged in two load groups per train and are normally powered from the inverters. The alternate power supply for the vital buses are Class 1E constant voltage source transformers powered from the same train as the associated inverter, and its use is governed by LCO 3.8.7, "Inverters—Operating." Each constant voltage source transformer is powered from a Class 1E AC bus. (2)

There are two independent 125/250 VDC electrical power distribution subsystems (one for each train). TSTF 16 (2)

<INSERT> (5)

The list of all required distribution buses is presented in Table B 3.8.9-1. TSTF16 (4)

(continued)

Rev. 0

INSERT

For the other unit, one AC and DC bus on that unit is needed to support operation of each required Service Water (SW) pump, Main Control Room (MCR)/Emergency Switchgear Room (ESGR) Emergency Ventilation System (EVS) fan, and Auxiliary Building central exhaust fan. SW, MCR/ESGR EVS, and Auxiliary Building central exhaust system are shared systems.

BASES (continued)

APPLICABLE SAFETY ANALYSES

The initial conditions of Design Basis Accident (DBA) and transient analyses in the FSAR, Chapter 6 (Ref. 1), and in the FSAR, Chapter 15 (Ref. 2), assume ESF systems are OPERABLE. The AC, DC, and AC vital bus electrical power distribution systems are designed to provide sufficient capacity, capability, redundancy, and reliability to ensure the availability of necessary power to ESF systems so that the fuel, Reactor Coolant System, and containment design limits are not exceeded. These limits are discussed in more detail in the Bases for Section 3.2, Power Distribution Limits; Section 3.4, Reactor Coolant System (RCS); and Section 3.6, Containment Systems.

The OPERABILITY of the AC, DC, and AC vital bus electrical power distribution systems is consistent with the initial assumptions of the accident analyses and is based upon meeting the design basis of the unit. This includes maintaining power distribution systems OPERABLE during accident conditions in the event of:

a. An assumed loss of all offsite power or all onsite AC electrical power; and

b. A worst case single failure.

The distribution systems satisfy Criterion 3 of the NRC Policy Statement. 10 CFR 50.36 (c)(2)(ii)

LCO

The required power distribution subsystems listed in Table B 3.8.9-1 ensure the availability of AC, DC, and AC vital bus electrical power for the systems required to shut down the reactor and maintain it in a safe condition after an anticipated operational occurrence (AOO) or a postulated DBA. The AC, DC, and AC vital bus electrical power distribution subsystems are required to be OPERABLE.

Maintaining the Train A and Train B AC, DC, and AC vital bus electrical power distribution subsystems OPERABLE ensures that the redundancy incorporated into the design of ESF is not defeated. Therefore, a single failure within any system or within the electrical power distribution subsystems will not prevent safe shutdown of the reactor.

(continued)

Rev. 0

BASES

LCO (continued)

OPERABLE AC electrical and power distribution subsystems require the associated buses, load centers, ~~motor control centers, and distribution panels~~ to be energized to their proper voltages. OPERABLE DC electrical power distribution subsystems require the associated buses to be energized to their proper voltage from either the associated battery or charger. OPERABLE vital bus electrical power distribution subsystems require the associated buses to be energized to their proper voltage from the associated inverter via inverted DC voltage, ~~inverter using internal AC source,~~ or ~~Class 1E~~ constant voltage transformer.

(4)

TSTF 16 (4)

(1)

In addition, tie breakers between redundant safety related AC, DC, and AC vital bus power distribution subsystems, if they exist, must be open. This prevents any electrical malfunction in any power distribution subsystem from propagating to the redundant subsystem, that could cause the failure of a redundant subsystem and a loss of essential safety function(s). If any tie breakers are closed, the affected redundant electrical power distribution subsystems are considered inoperable. This applies to the onsite, safety related redundant electrical power distribution subsystems. It does not, however, preclude redundant Class 1E 4.16 kV buses from being powered from the same offsite circuit.

APPLICABILITY

The electrical power distribution subsystems are required to be OPERABLE in MODES 1, 2, 3, and 4 to ensure that:

a. Acceptable fuel design limits and reactor coolant pressure boundary limits are not exceeded as a result of AOOs or abnormal transients; and

b. Adequate core cooling is provided, and containment OPERABILITY and other vital functions are maintained in the event of a postulated DBA.

Electrical power distribution subsystem requirements for MODES 5 and 6 are covered in the Bases for LCO 3.8.10, "Distribution Systems—Shutdown."

(continued)

Rev. 0

BASES (continued)

ACTIONS

A.1

With one or more required AC buses, load centers, motor control centers, or distribution panels, except AC vital buses, in one train inoperable, the remaining AC electrical power distribution subsystem in the other train is capable of supporting the minimum safety functions necessary to shut down the reactor and maintain it in a safe shutdown condition, assuming no single failure. The overall reliability is reduced, however, because a single failure in the remaining power distribution subsystems could result in the minimum required ESF functions not being supported. Therefore, the required AC buses, load centers, motor control centers, and distribution panels must be restored to OPERABLE status within 8 hours.

Condition A worst scenario is one train without AC power (i.e., no offsite power to the train and the associated DG inoperable). In this Condition, the unit is more vulnerable to a complete loss of AC power. It is, therefore, imperative that the unit operator's attention be focused on minimizing the potential for loss of power to the remaining train by stabilizing the unit, and on restoring power to the affected train. The 8 hour time limit before requiring a unit shutdown in this Condition is acceptable because of:

a. The potential for decreased safety if the unit operator's attention is diverted from the evaluations and actions necessary to restore power to the affected train, to the actions associated with taking the unit to shutdown within this time limit; and

b. The potential for an event in conjunction with a single failure of a redundant component in the train with AC power.

The second Completion Time for Required Action A.1 establishes a limit on the maximum time allowed for any combination of required distribution subsystems to be inoperable during any single contiguous occurrence of failing to meet the LCO. If Condition A is entered while, for instance, a DC bus is inoperable and subsequently restored OPERABLE, the LCO may already have been not met for up to 2 hours. This could lead to a total of 10 hours, since initial failure of the LCO, to restore the AC distribution system. At this time, a DC circuit could again

(continued)

INSERT

With one or more LCO 3.8.9.a AC electrical power distribution subsystem(s) inoperable, the minimum safety functions can still be accomplished, assuming no single failure, as long as one set of redundant required equipment (AC buses and load centers) supporting each safety function remains energized to their proper voltages. Redundant required equipment is listed in Table B 3.8.9–1.

BASES

ACTIONS

A.1 (continued)

become inoperable, and AC distribution restored OPERABLE. This could continue indefinitely.

The Completion Time allows for an exception to the normal "time zero" for beginning the allowed outage time "clock." This will result in establishing the "time zero" at the time the LCO was initially not met, instead of the time Condition A was entered. The 16 hour Completion Time is an acceptable limitation on this potential to fail to meet the LCO indefinitely.

6

<INSERT> TSTF 16

B.1 LCO 3.8.9.a

and a loss of function has not yet occurred

4

TSTF-16

With one or more AC vital bus es inoperable, the remaining OPERABLE AC vital buses are capable of supporting the minimum safety functions necessary to shut down the unit and maintain it in the safe shutdown condition. Overall reliability is reduced, however, since an additional single failure could result in the minimum required ESF functions not being supported. Therefore, the required AC vital bus must be restored to OPERABLE status within 2 hours by powering the bus from the associated inverter via inverted DC, ~~inverter using internal AC source~~, or ~~Class 1E~~ constant voltage transformer.

1

1

Condition B represents one or more AC vital bus es without power; potentially both the DC source and the associated AC source are nonfunctioning. In this situation, the unit is significantly more vulnerable to a complete loss of all noninterruptible power. It is, therefore, imperative that the operator's attention focus on stabilizing the unit, minimizing the potential for loss of power to the remaining vital buses and restoring power to the affected vital bus.

TSTF16

This 2 hour limit is more conservative than Completion Times allowed for the vast majority of components that are without adequate vital AC power. Taking exception to LCO 3.0.2 for components without adequate vital AC power, that would have the Required Action Completion Times shorter than 2 hours if declared inoperable, is acceptable because of:

(continued)

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INSERT

Required Action A.1 is modified by a Note that requires the applicable Conditions and Required Actions of LCO 3.8.4, "DC Sources-Operating," to be entered for DC train(s) made inoperable power distribution subsystem(s). This is an exception to LCO 3.0.6 and ensures the proper actions are taken for these components. Inoperability of a distribution system can result in loss of charging power to batteries and eventual loss of DC power. This Note ensures that appropriate attention is given to restoring charging power to batteries, if necessary, after loss of distribution systems.

BASES

ACTIONS

B.1 (continued)

a. The potential for decreased safety by requiring a change in unit conditions (i.e., requiring a shutdown) and not allowing stable operations to continue;

b. The potential for decreased safety by requiring entry into numerous Applicable Conditions and Required Actions for components without adequate vital AC power and not providing sufficient time for the operators to perform the necessary evaluations and actions for restoring power to the affected train; and

c. The potential for an event in conjunction with a single failure of a redundant component.

The 2 hour Completion Time takes into account the importance to safety of restoring the AC vital bus to OPERABLE status, the redundant capability afforded by the other OPERABLE vital buses, and the low probability of a DBA occurring during this period.

The second Completion Time for Required Action B.1 establishes a limit on the maximum allowed for any combination of required distribution subsystems to be inoperable during any single contiguous occurrence of failing to meet the LCO. If Condition B is entered while, for instance, an AC bus is inoperable and subsequently returned OPERABLE, the LCO may already have been not met for up to 8 hours. This could lead to a total of 10 hours, since initial failure of the LCO, to restore the vital bus distribution system. At this time, an AC train could again become inoperable, and vital bus distribution restored OPERABLE. This could continue indefinitely.

This Completion Time allows for an exception to the normal "time zero" for beginning the allowed outage time "clock." This will result in establishing the "time zero" at the time the LCO was initially not met, instead of the time Condition B was entered. The 16 hour Completion Time is an acceptable limitation on this potential to fail to meet the LCO indefinitely.

(continued)

Rev.0

BASES

ACTIONS (continued)

C.1 LCO 3.8.9.a

With DC bus(es) in one train inoperable, and a loss of function has not yet occurred the remaining DC electrical power distribution subsystems are capable of supporting the minimum safety functions necessary to shut down the reactor and maintain it in a safe shutdown condition, assuming no single failure. The overall reliability is reduced, however, because a single failure in the remaining DC electrical power distribution subsystem could result in the minimum required ESF functions not being supported. Therefore, the required DC buses must be restored to OPERABLE status within 2 hours by powering the bus from the associated battery or charger.

One or more

TSTF-16 4

TSTF-16 4 1

Condition C represents one train or more DC buses without adequate DC power; potentially both with the battery significantly degraded and the associated charger nonfunctioning. In this situation, the unit is significantly more vulnerable to a complete loss of all DC power. It is, therefore, imperative that the operator's attention focus on stabilizing the unit, minimizing the potential for loss of power to the remaining trains and restoring power to the affected train.

TSTF16 4

This 2 hour limit is more conservative than Completion Times allowed for the vast majority of components that would be without power. Taking exception to LCO 3.0.2 for components without adequate DC power, which would have Required Action Completion Times shorter than 2 hours, is acceptable because of:

a. The potential for decreased safety by requiring a change in unit conditions (i.e., requiring a shutdown) while allowing stable operations to continue;

b. The potential for decreased safety by requiring entry into numerous applicable Conditions and Required Actions for components without DC power and not providing sufficient time for the operators to perform the necessary evaluations and actions for restoring power to the affected train; and

c. The potential for an event in conjunction with a single failure of a redundant component.

The 2 hour Completion Time for DC buses is consistent with Regulatory Guide 1.93 (Ref. 3).

(continued)

Rev. 0

BASES

ACTIONS

C.1 (continued)

The second Completion Time for Required Action C.1 establishes a limit on the maximum time allowed for any combination of required distribution subsystems to be inoperable during any single contiguous occurrence of failing to meet the LCO. If Condition C is entered while, for instance, an AC bus is inoperable and subsequently returned OPERABLE, the LCO may already have been not met for up to 8 hours. This could lead to a total of 10 hours, since initial failure of the LCO, to restore the DC distribution system. At this time, an AC train could again become inoperable, and DC distribution restored OPERABLE. This could continue indefinitely.

This Completion Time allows for an exception to the normal "time zero" for beginning the allowed outage time "clock." This will result in establishing the "time zero" at the time the LCO was initially not met, instead of the time Condition C was entered. The 16-hour Completion Time is an acceptable limitation on this potential to fail to meet the LCO indefinitely. (6)

D and E <INSERT1> (5)

(F) D.1 and D.2 (F)

LCO 3.8.9.a

If the inoperable distribution subsystem cannot be restored to OPERABLE status within the required Completion Time, the unit must be brought to a MODE in which the LCO does not apply. To achieve this status, the unit must be brought to at least MODE 3 within 6 hours and to MODE 5 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging ~~plant~~ unit systems. (4) (2)

(6) D.1

~~With two trains with inoperable distribution subsystems that result in a loss of safety function, adequate core cooling, containment OPERABILITY and other vital functions for DBA mitigation would be compromised, and immediate plant shutdown in accordance with LCO 3.0.3 is required.~~ <INSERT 2> (4) TSTF 16

(continued)

Rev 0

INSERT 1

D.1

With one or more required LCO 3.8.9.b AC electrical power distribution subsystem(s) inoperable, the shared component(s) on the other unit is not capable of operating. The bus is de-energized. In this condition, the associated shared component is declared inoperable immediately. SW, MCR/ESGR EVS, and Auxiliary Building central exhaust system are shared systems. The associated Conditions or Required Actions of LCO 3.7.8, "Service Water System," LCO 3.7.10, "MCR/ESGR Emergency Ventilation System," and LCO 3.7.12, "Emergency Core Cooling System Pump Room Exhaust Air Cleanup System," are followed.

E.1

With one or more required LCO 3.8.9.b DC electrical power distribution subsystem(s) inoperable, the shared component(s) on the other unit is not capable of operating. In this condition, the associated shared component is declared inoperable immediately. SW, MCR/ESGR EVS, and Auxiliary Building central exhaust system are shared systems. The associated Conditions or Required Actions of LCO 3.7.8, LCO 3.7.10, and LCO 3.7.12 are followed.

INSERT 2

Condition G corresponds to a level of degradation in the electrical power distribution system that causes a required safety function to be lost. When more than one inoperable LCO 3.8.9.a electrical power distribution subsystem results in the loss of a required function, the plant is in a condition outside the accident analysis. Therefore, no additional time is justified for continued operation. LCO 3.0.3 must be entered immediately to commence a controlled shutdown.

BASES (continued)

SURVEILLANCE REQUIREMENTS

SR 3.8.9.1

This Surveillance verifies that the required AC, DC, and AC vital bus electrical power distribution systems are functioning properly, with the correct circuit breaker alignment. The correct breaker alignment ensures the appropriate separation and independence of the electrical divisions is maintained, and the appropriate voltage is available to each required bus. The verification of proper voltage availability on the buses ensures that the required voltage is readily available for motive as well as control functions for critical system loads connected to these buses. The 7 day Frequency takes into account the redundant capability of the AC, DC, and AC vital bus electrical power distribution subsystems, and other indications available in the control room that alert the operator to subsystem malfunctions.

REFERENCES

1. U FSAR, Chapter 6.
2. U FSAR, Chapter 15.
3. Regulatory Guide 1.93, December 1974.

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Table B 3.8.9-1 (page 1 of 1)
AC and DC Electrical Power Distribution Systems

TYPE	VOLTAGE	TRAIN A* (Unit 1 Unit 2 H)	TRAIN B* (Unit 1 Unit 2 J)	
AC safety buses (emergency)	4160 V	ESF Bus [NB01] (1H 2H)	ESF Bus [NB02] (1J 2J)	(2) (4) (2) (1)
	480 V	Load Centers [NG01, NG03] (1H 2H 1H1 2H1)	Load Centers [NG02, NG04] (1J 2J 1J1 2J1)	(1)
	[480 V]	Motor Control Centers [NG01A, NG01I, NG01B, NG03C, NG03I, NG03D]	Motor Control Centers [NG02A, NG02I, NG02B, NG04C, NG04I, NG04D]	(4)
	[120 V]	Distribution Panels [NP01, NP03]	Distribution Panels [NP02, NP04]	(4)
DC buses	125 V	Bus [NK01] (1-I 2-I)	Bus [NK02] (1-III 2-III)	(1)
		Bus [NK03] (1-II 2-II)	Bus [NK04] (1-IV 2-IV)	(1)
		Distribution Panels [NK41, NK43, NK51]	Distribution Panels [NK42, NK44, NK52]	(4)
AC vital buses	120 V	Bus [NN01] (1-1 2-1)	Bus [NN02] (1-3 2-3)	(1)
		Bus [NN03] (1-2 2-2)	Bus [NN04] (1-4 2-4)	(1)

* Each train of the AC and DC electrical power distribution systems is a subsystem.

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1. The brackets have been removed and the proper plant specific information/value has been provided.

2. Changes are made (additions, deletions, and/or changes) to the ISTS which reflect the plant specific nomenclature, number, reference, system description, analysis, or licensing basis description.

3. The criteria of the NRC Final Policy Statement on Technical Specifications Improvements have been included in 10 CFR 50.36(c)(2)(ii). Therefore, references in the ISTS Bases to the NRC Final Policy Statement are revised in the ITS Bases to reference 10 CFR 50.36.

4. ISTS Bases for LCO 3.8.9 in the Background, LCO, and Action sections states that the electrical power distribution subsystems include the associated buses, load centers, motor control centers, and distribution panels. The CTS requirements of LCOs 3.8.2.1 and 3.8.2.3 list the requirements for the load centers, the 4160, 480, and 120 AC volt buses and 125-volt DC buses. The load center and bus requirements are moved from the CTS to the ITS Bases in the various sections and Table B 3.8.9-1. This changes the ISTS by deleting the motor control centers and distribution panels from the ITS Bases sections and Table. The ITS Table divides the Unit 1 and Unit 2 into separate lists of buses, load centers, and distribution panels. The inclusion of only the load centers and the AC and DC buses into the Bases is acceptable because this reflects the CTS description of the required load centers and buses. The required load centers and buses are accurate and reflect the minimum electrical design for the unit.

5. Changes are made to the ITS Bases which reflect changes made to the ITS Specifications.

6. Editorial change made for enhanced clarity or to be consistent with the ISTS Writers Guide.

B 3.8 ELECTRICAL POWER SYSTEMS

B 3.8.10 Distribution Systems—Shutdown

BASES

BACKGROUND

A description of the AC, DC, and AC vital bus electrical power distribution systems is provided in the Bases for LCO 3.8.9, "Distribution Systems—Operating."

APPLICABLE SAFETY ANALYSES

The initial conditions of Design Basis Accident and transient analyses in the FSAR, Chapter 6 (Ref. 1) and Chapter 15 (Ref. 2), assume Engineered Safety Feature (ESF) systems are OPERABLE. The AC, DC, and AC vital bus electrical power distribution systems are designed to provide sufficient capacity, capability, redundancy, and reliability to ensure the availability of necessary power to ESF systems so that the fuel, Reactor Coolant System, and containment design limits are not exceeded.

The OPERABILITY of the AC, DC, and AC vital bus electrical power distribution system is consistent with the initial assumptions of the accident analyses and the requirements for the supported systems' OPERABILITY.

The OPERABILITY of the minimum AC, DC, and AC vital bus electrical power distribution subsystems during MODES 5 and 6, and during movement of irradiated fuel assemblies ensures that:

a. The unit can be maintained in the shutdown or refueling condition for extended periods;

b. Sufficient instrumentation and control capability is available for monitoring and maintaining the unit status; and

c. Adequate power is provided to mitigate events postulated during shutdown, such as a fuel handling accident.

The AC and DC electrical power distribution systems satisfy Criterion 3 of the NRC Policy Statement.

(continued)

INSERT

involving handling recently irradiated fuel. Due to radioactive decay, the AC and DC electrical power is only required to mitigate fuel handling accidents involving handling recently irradiated fuel. (i.e., fuel that has occupied part of a critical core within a time frame established by analysis. The term recently is defined as all irradiated fuel assemblies, until analysis is performed to determine a specific time frame.)

BASES (continued)

LCO

Various combinations of subsystems, equipment, and components are required OPERABLE by other LCOs, depending on the specific ~~plant~~ unit condition. Implicit in those requirements is the required OPERABILITY of necessary support required features. This LCO explicitly requires energization of the portions of the electrical distribution system necessary to support OPERABILITY of required systems, equipment, and components—all specifically addressed in each LCO and implicitly required via the definition of OPERABILITY. (1)

Maintaining these portions of the distribution system energized ensures the availability of sufficient power to operate the unit in a safe manner to mitigate the consequences of postulated events during shutdown (e.g., fuel handling accidents). TSTF 51 <INSERT 1>

APPLICABILITY

The AC and DC electrical power distribution subsystems required to be OPERABLE in MODES 5 and 6, and during movement of ~~irradiated~~ recently fuel assemblies, provide assurance that: TSTF 51

a. Systems to provide adequate coolant inventory makeup are available for the irradiated fuel in the core;

b. Systems needed to mitigate a fuel handling accident are available; <INSERT 2> (4) TSTF 51

c. Systems necessary to mitigate the effects of events that can lead to core damage during shutdown are available; and

d. Instrumentation and control capability is available for monitoring and maintaining the unit in a cold shutdown condition and refueling condition.

The AC, DC, and AC vital bus electrical power distribution subsystems requirements for MODES 1, 2, 3, and 4 are covered in LCO 3.8.9.

(continued)

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INSERT 1

involving handling recently irradiated fuel

INSERT 2

involving handling recently irradiated fuel (i.e., fuel that has occupied part of a critical core within a time frame established by analysis. The term recently is defined as all irradiated fuel assemblies, until analysis is performed to determine a specific time frame.)

BASES (continued)

ACTIONS

A.1, A.2.1, A.2.2, A.2.3, A.2.4, and A.2.5

Although redundant required features may require redundant trains of electrical power distribution subsystems to be OPERABLE, one OPERABLE distribution subsystem train may be capable of supporting sufficient required features to allow continuation of CORE ALTERATIONS and fuel movement. By allowing the option to declare required features associated with an inoperable distribution subsystem inoperable, appropriate restrictions are implemented in accordance with the affected distribution subsystem LCO's Required Actions. In many instances, this option may involve undesired administrative efforts. Therefore, the allowance for sufficiently conservative actions is made (i.e., to suspend CORE ALTERATIONS, movement of irradiated fuel assemblies, and operations involving positive reactivity additions).

TSTF 51 recently irradiated

TSTF 51 recently

(INSERT 1) (INSERT 2) 5

TSTF 286

Suspension of these activities does not preclude completion of actions to establish a safe conservative condition. These actions minimize the probability of the occurrence of postulated events. It is further required to immediately initiate action to restore the required AC and DC electrical power distribution subsystems and to continue this action until restoration is accomplished in order to provide the necessary power to the unit safety systems.

Notwithstanding performance of the above conservative Required Actions, a required residual heat removal (RHR) subsystem may be inoperable. In this case, Required Actions A.2.1 through A.2.4 do not adequately address the concerns relating to coolant circulation and heat removal. Pursuant to LCO 3.0.6, the RHR ACTIONS would not be entered. Therefore, Required Action A.2.5 is provided to direct declaring RHR inoperable, which results in taking the appropriate RHR actions.

The Completion Time of immediately is consistent with the required times for actions requiring prompt attention. The restoration of the required distribution subsystems should be completed as quickly as possible in order to minimize the time the unit safety systems may be without power.

(continued)

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INSERT 1

that could result in loss of required SDM (MODE 5) or boron concentration (MODE 6)

INSERT 2

Suspending positive reactivity additions that could result in failure to meet the minimum SDM or boron concentration limit is required to assure continued safe operation. Introduction of coolant inventory must be from sources that have a boron concentration greater than what would be required in the RCS for minimum SDM or refueling boron concentration. This may result in an overall reduction in RCS boron concentration, but provides acceptable margin to maintaining subcritical operation. Introduction of temperature changes including temperature increases when operating with a positive MTC must also be evaluated to ensure they do not result in a loss of required SDM.

BASES (continued)

SURVEILLANCE REQUIREMENTS

SR 3.8.10.1

This Surveillance verifies that the required AC, DC, and AC vital bus electrical power distribution subsystems are functioning properly, with all the buses energized. The verification of proper voltage availability on the buses ensures that the required power is readily available for motive as well as control functions for critical system loads connected to these buses. The 7 day Frequency takes into account the capability of the electrical power distribution subsystems, and other indications available in the control room that alert the operator to subsystem malfunctions.

REFERENCES

1. U FSAR, Chapter ~~6~~.
2. U FSAR, Chapter ~~15~~.

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1. Changes are made (additions, deletions, and/or changes) to the ISTS, which reflect the plant specific nomenclature, number, reference, system description, analysis, or licensing basis description.

2. The brackets have been removed and the proper plant specific information/value has been provided.

3. The criteria of the NRC Final Policy Statement on Technical Specifications Improvements have been included in 10 CFR 50.36(c)(2)(ii). Therefore, references in the ISTS Bases to the NRC Final Policy Statement are revised in the ITS Bases to reference 10 CFR 50.36.

4. Bases changes made by TSTF-51 are incorporated with modifications. These modifications incorporate the concept of the approved changes made by TSTF-51, but the analysis value for the required time has not been determined. When the analysis is completed, the required time with be substituted for the phase, "a time frame established by analysis. The term recently is defined as all irradiated fuel assemblies, until analysis is performed to determine a specific time frame."

5. Editorial change made for enhanced clarity or to be consistent with the ISTS Writers Guide.