3.8 ELECTRICAL POWER SYSTEMS

3.8.1 AC Sources - Operating

LCO 3.8.1 The following AC electrical power sources shall be OPERABLE:

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

b. Two diesel generators (DGs) each capable of supplying one train of the onsite Class 1E AC Electrical Power Distribution System.

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

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One required offsite circuit inoperable.	A.1 Perform SR 3.8.1.1 for OPERABLE required offsite circuit.	1 hour <u>AND</u> Once per 12 hours thereafter
	<u>AND</u>	
	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)
	<u>AND</u>	

CONDITION	REQUIRED ACTION	COMPLETION TIME
A (continued)	A.3 --------------NOTE-------------- Startup Transformer No. 2 may be removed from service for up to 30 days for preplanned preventative maintenance. This 30 day Completion Time may be applied not more than once in any 10 year period. The provisions of LCO 3.0.4 are not applicable to Startup Transformer No. 2 during this 30 day preventative maintenance period. ------------------------------------ Restore required offsite circuit to OPERABLE status.	72 hours <u>AND</u> 10 days from discovery of failure to meet LCO
B. One DG inoperable.	B.1 Perform SR 3.8.1.1 for OPERABLE required offsite circuit(s).	1 hour <u>AND</u> Once per 12 hours thereafter
	<u>AND</u>	
	B.2 Declare required feature(s) supported by the inoperable DG inoperable when its redundant required feature(s) is inoperable.	4 hours from discovery of Condition B concurrent with inoperability of redundant required feature(s)
	<u>AND</u>	
	B.3.1 Determine OPERABLE DG is not inoperable due to common cause failure. <u>OR</u>	24 hours

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. (continued)	B.3.2 Perform SR 3.8.1.2 for OPERABLE DG. <u>AND</u> B.4 Restore DG to OPERABLE status.	24 hours 7 days <u>AND</u> 10 days from discovery of failure to meet LCO
C. Two required offsite circuits inoperable.	C.1 Declare required feature(s) inoperable when its redundant required feature(s) is inoperable. <u>AND</u> C.2 Restore one required offsite circuit to OPERABLE status.	12 hours from discovery of Condition C concurrent with inoperability of redundant required feature(s) 24 hours
D. One required offsite circuit inoperable. <u>AND</u> One DG inoperable.	--------------------NOTE-------------------- Enter applicable Conditions and Required Actions of LCO 3.8.6, "Distribution Systems - Operating," when Condition D is entered with no AC power source to any train. --- D.1 Restore required offsite circuit to OPERABLE status. <u>OR</u> D.2 Restore DG to OPERABLE status.	 12 hours 12 hours
E. Two DGs inoperable.	E.1 Restore one DG to OPERABLE status.	2 hours

CONDITION	REQUIRED ACTION	COMPLETION TIME
F. Required Action and Associated Completion Time of Condition A, B, C, D, or E not met.	F.1 Be in MODE 3. AND F.2 Be in MODE 5.	12 hours 36 hours
G. Three or more required AC sources inoperable.	G.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	-----NOTE----- All DG starts may be preceded by an engine prelube period and followed by a warmup period prior to loading. ---------- Verify each DG starts from standby conditions and, in $\leq$ 15 seconds achieves "ready-to-load" conditions.	31 days
SR 3.8.1.3	-----NOTES----- 1. DG 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 DG at a time. 4. This SR shall be preceded by and follow, without shutdown, a successful performance of SR 3.8.1.2. ---------- Verify each DG is synchronized and loaded and operates for $\geq$ 60 minutes at a load $\geq$ 2475 kW and $\leq$ 2750 kW.	31 days

SURVEILLANCE		FREQUENCY
SR 3.8.1.4	Verify each day tank contains ≥ 160 gallons of fuel oil.	31 days
SR 3.8.1.5	Check for and remove accumulated water from each day tank.	31 days
SR 3.8.1.6	Verify the fuel oil transfer system operates to transfer fuel oil from storage tanks to the day tank.	31 days
SR 3.8.1.7	------------------------------NOTE------------------------------ 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 plant is maintained or enhanced. --- Verify automatic transfer of AC power sources to the selected offsite circuit and manual transfer to the alternate required offsite circuit.	18 months
SR 3.8.1.8	------------------------------NOTE------------------------------ All DG starts may be preceded by an engine prelube period. --- Verify on an actual or simulated loss of offsite power signal: a. De-energization of emergency buses; b. Load shedding from emergency buses; and c. DG auto-starts from standby condition and: 1. achieves "ready-to-load" conditions in ≤ 15 seconds, 2. energizes permanently connected loads, 3. energizes auto-connected shutdown load through automatic load sequencing timers, and 4. supplies connected loads for ≥ 5 minutes.	18 months

SURVEILLANCE		FREQUENCY
SR 3.8.1.9	-------------------------------NOTE------------------------------- All DG starts may be preceded by an engine prelube period. --- 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. DG auto-starts from standby condition and: 1. achieves "ready-to-load" conditions in $\leq$ 15 seconds, 2. energizes permanently connected loads, 3. energizes auto-connected emergency loads through load sequencing timers, and 4. supplies connected loads for $\geq$ 5 minutes.	18 months

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 diesel generator (DG) 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 irradiated fuel assemblies.

ACTIONS

---NOTE---

LCO 3.0.3 is not applicable.

CONDITION	REQUIRED ACTION	COMPLETION TIME
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. ---	
	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>	

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. (continued)	A.2.2	Suspend movement of irradiated fuel assemblies.	Immediately
	<u>AND</u>		
	A.2.3	Suspend operations involving positive reactivity additions that could result in loss of required SDM or boron concentration.	Immediately
	<u>AND</u>		
	A.2.4	Initiate action to restore required offsite power circuit to OPERABLE status.	Immediately
B. One required DG inoperable.	B.1	Suspend CORE ALTERATIONS.	Immediately
	<u>AND</u>		
	B.2	Suspend movement of irradiated fuel assemblies.	Immediately
	<u>AND</u>		
	B.3	Suspend operations involving positive reactivity additions that could result in loss of required SDM or boron concentration.	Immediately
	<u>AND</u>		
	B.4	Initiate action to restore required DG to OPERABLE status.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.8.2.1	-------------------------------NOTES------------------------------ 1. SR 3.8.1.3 is not required to be performed. 2. The 15 second acceptance criteria of SR 3.8.1.2 is not applicable. --- For AC Sources required to be OPERABLE, the SRs of Specification 3.8.1, "AC Sources – Operating," except SR 3.8.1.4, SR 3.8.1.7, SR 3.8.1.8, and SR 3.8.1.9, are applicable.	31 days

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 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
A. One or more DG fuel oil storage tank(s) with fuel volume < 20,000 gallons and > 17,140 gallons.	A.1 Restore fuel oil volume to within limits.	48 hours
B. One or more DGs with stored fuel oil total particulates not within limit.	B.1 Restore fuel oil total particulates to within limits.	7 days
C. One or more DGs with new fuel oil properties not within limits.	C.1 Restore stored fuel oil properties to within limits.	30 days
D. One or more DGs with required starting air receiver pressure < 175 psig and $\geq$ 158 psig.	D.1 Restore required starting air receiver pressure to within limits.	48 hours

CONDITION	REQUIRED ACTION	COMPLETION TIME
E. Required Action and associated Completion Time not met. <u>OR</u> One or more DGs with diesel fuel oil or required starting air subsystem not within limits for reasons other than Condition A, B, C, or D.	E.1 Declare associated DG inoperable.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.8.3.1	Verify each fuel oil storage tank contains $\geq$ 20,000 gallons 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 DG required air start receiver pressure is $\geq$ 175 psig.	31 days
SR 3.8.3.4	Check for and remove accumulated water from each fuel oil storage tank.	31 days

3.8 ELECTRICAL POWER SYSTEMS

3.8.4 DC Sources - Operating

LCO 3.8.4 Both DC electrical power subsystems shall be OPERABLE.

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

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One DC electrical power subsystem inoperable.	A.1 Restore DC electrical power subsystem to OPERABLE status.	8 hours
B. Required Action and Associated Completion Time not met.	B.1 Be in MODE 3. <u>AND</u> B.2 Be in MODE 5.	12 hours 36 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.8.4.1	Verify battery terminal voltage is $\geq$ 124.7 V on float charge.	7 days
SR 3.8.4.1	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 or a modified performance discharge test.	18 months

SURVEILLANCE		FREQUENCY
SR 3.8.4.3	Verify 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> 12 months when battery shows degradation, or has reached 85% of the expected life with capacity < 100% of manufacturer's rating <u>AND</u> 24 months when battery has reached 85% of the expected life with capacity ≥ 100% of manufacturer's rating

3.8 ELECTRICAL POWER SYSTEMS

3.8.5 DC Sources - Shutdown

LCO 3.8.5 One DC electrical power subsystem shall be OPERABLE.

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

ACTIONS

--NOTE--
LCO 3.0.3 is not applicable.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One required DC electrical power subsystem inoperable.	A.1.1 Suspend CORE ALTERATIONS.	Immediately
	AND	
	A.1.2 Suspend movement of irradiated fuel assemblies.	Immediately
	AND	
	A.1.3 Suspend operations involving positive reactivity additions that could result in loss of required SDM or boron concentration.	Immediately
	.AND	
	A.1.4 Initiate action to restore required DC electrical power subsystems to OPERABLE status.	Immediately
	AND	

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. (continued)	A.1.5	Enter applicable Conditions and Required Actions of LCO 3.4.11, "Low Temperature Overpressure Protection (LTOP) System," for LTOP features made inoperable by Condition A.	Immediately

SURVEILLANCE REQUIREMENTS

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

3.8 ELECTRICAL POWER SYSTEMS

3.8.6 Battery Cell Parameters

LCO 3.8.6 Battery cell parameters shall be within limits.

APPLICABILITY: When associated DC electrical power subsystems are required to be OPERABLE.

ACTIONS

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

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more 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. <u>AND</u>	1 hour
	A.2 Verify battery cell parameters meet Table 3.8.6-1 Category C limits. <u>AND</u>	24 hours <u>AND</u> Once per 7 days thereafter
	A.3 Restore battery cell parameters to Table 3.8.6-1 Category A and B limits.	31 days

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. Required Action and associated Completion Time of Condition A not met. <u>OR</u> One or more batteries with pilot cell or average electrolyte temperature of the representative cells $< 60°F$. <u>OR</u> One or more 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 battery cell parameters meet Table 3.8.6-1 Category A limits.	7 days
SR 3.8.6.2	Verify electrolyte temperature of the pilot cell is $\geq 60°F$.	31 days

SURVEILLANCE		FREQUENCY
SR 3.8.6.3	Verify battery cell parameters meet Table 3.8.6-1 Category B limits.	92 days <u>AND</u> Once within 24 hours after a battery discharge < 110 V <u>AND</u> Once within 24 hours after a battery overcharge > 145 V
SR 3.8.6.4	Verify average electrolyte temperature of representative cells is ≥ 60°F.	92 days

Table 3.8.6-1 (page 1 of 1)
Battery Cell Surveillance 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 ≤ 1/4 inch above maximum level indication mark[(a)]	> Minimum level indication mark, and ≤ 1/4 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)]	≥ 1.195	≥ 1.190 AND Average of all connected cells > 1.195	Not more than 0.020 below average connected cells AND Average of all connected cells ≥ 1.190

(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.

(c) 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 required Red Train and Green Train inverters shall be OPERABLE.

---NOTE---
One inverter may be disconnected from its associated DC bus for ≤ 2 hours to perform load transfer to or from the swing inverter, provided:

a. The associated 120 VAC vital bus is energized from its alternate AC source; and

b. All other 120 VAC vital buses are energized from their associated OPERABLE inverters.

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

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One required inverter inoperable. OR Two required inverters in the same electrical power distribution subsystem inoperable.	A.1 --------------NOTE-------------- Enter applicable Conditions and Required Actions of LCO 3.8.9, "Distribution Systems - Operating" with any 120 VAC vital bus de-energized. ------------------------------------- Restore inverter to OPERABLE status.	 72 hours
B. Required Action and associated Completion Time not met.	B.1 Be in MODE 3. AND B.2 Be in MODE 5.	12 hours 36 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.8.7.1	Verify correct inverter voltage, frequency and alignment to required 120 VAC vital buses.	7 days

3.8 ELECTRICAL POWER SYSTEMS

3.8.8 Inverters - Shutdown

LCO 3.8.8 One inverter shall be OPERABLE.

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

ACTIONS

--NOTE--
LCO 3.0.3 is not applicable.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One required inverter inoperable.	A.2.1 Suspend CORE ALTERATIONS.	Immediately
	AND	
	A.2.2 Suspend movement of 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
	AND	

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. (continued)	A.2.5 Enter applicable Conditions and Required Actions of LCO 3.4.11, "Low Temperature Overpressure Protection (LTOP) System," for LTOP features made inoperable by AC vital bus inverter(s).	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.8.8.1	Verify correct inverter voltage and alignments to required 120 VAC vital buses.	7 days

3.8 ELECTRICAL POWER SYSTEMS

3.8.9 Distribution Systems - Operating

LCO 3.8.9 Two AC, DC, and 120 VAC vital bus electrical power distribution subsystems shall be OPERABLE.

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

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
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 <u>AND</u> 16 hours from discovery of failure to meet LCO
B. One or more 120 VAC vital bus electrical power distribution subsystem(s) inoperable.	B.1 Restore 120 VAC vital bus electrical power subsystem(s) to OPERABLE status.	8 hours <u>AND</u> 16 hours from discovery of failure to meet LCO
C. One or more DC electrical power distribution subsystem(s) inoperable.	C.1 Restore DC electrical power distribution subsystem(s) to OPERABLE status.	8 hours <u>AND</u> 16 hours from discovery of failure to meet LCO
D. Required Action and associated Completion Time not met.	D.1 Be in MODE 3. <u>AND</u> D.2 Be in MODE 5.	12 hours 36 hours

CONDITION	REQUIRED ACTION	COMPLETION TIME
E. Two or more electrical power distribution subsystems inoperable that result in a loss of function.	E.1 Enter LCO 3.0.3.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.8.9.1	Verify correct breaker alignments to required AC, DC, and 120 VAC vital bus electrical power distribution subsystems.	7 days

3.8 ELECTRICAL POWER SYSTEMS

3.8.10 Distribution Systems - Shutdown

LCO 3.8.10 The necessary portion of AC, DC, and 120 VAC vital bus electrical power distribution subsystems shall be OPERABLE to support equipment required to be OPERABLE by the following specifications:

LCO 3.3.9, "Source Range Neutron Flux,"
LCO 3.4.3, "RCS Pressure and Temperature (P/T) Limits,"
LCO 3.4.7, "RCS Loops - MODE 5, Loops Filled,"
LCO 3.4.8, "RCS Loops - MODE 5, Loops Not Filled,"
LCO 3.4.11, "Low Temperature Overpressure Protection (LTOP) System,"
LCO 3.7.9, "Control Room Emergency Ventilation System (CREVS),"
LCO 3.7.10, "Control Room Emergency Air Conditioning System (CREACS),"
LCO 3.7.12, "Fuel Handling Area Ventilation System (FHAVS),"
LCO 3.9.2, "Nuclear Instrumentation," for one monitor,
LCO 3.9.4, "Decay Heat Removal (DHR) and Coolant Circulation - High Water Level," and
LCO 3.9.5, "Decay Heat Removal (DHR) and Coolant Circulation - Low Water Level."

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

ACTIONS

-----NOTE-----
LCO 3.0.3 is not applicable.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more required AC, DC, or 120 VAC vital bus electrical power distribution subsystems inoperable.	A.1 Declare associated supported required feature(s) inoperable.	Immediately
	<u>OR</u>	
	A.2.1 Suspend CORE ALTERATIONS.	Immediately
	<u>AND</u>	

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. (continued)	A.2.2 Suspend movement of irradiated fuel assemblies.	Immediately
	<u>AND</u>	
	A.2.3 Suspend operations involving positive reactivity additions that could result in loss of required SDM or boron concentration.	Immediately
	<u>AND</u>	
	A.2.4 Initiate actions to restore required AC, DC, and 120 VAC vital bus electrical power distribution subsystems to OPERABLE status.	Immediately
	<u>AND</u>	
	A.2.5 Declare associated required decay heat removal subsystem(s) inoperable.	Immediately
	<u>AND</u>	
	A.2.6 Enter applicable Conditions and Required Actions of LCO 3.4.11, "Low Temperature Overpressure Protection (LTOP) System," for LTOP features made inoperable by Electrical Power Distribution System.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.8.10.1	Verify correct breaker alignments to required AC, DC, and 120 VAC vital bus electrical power distribution subsystems.	7 days

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 alternates) and the onsite standby power sources (emergency diesel generators (DGs)). As required by SAR, Section 1.4, 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 Safeguards (ES) 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 five transmission lines. From the switchyard, two electrically and physically separated offsite circuits provide AC power, through either the Startup Transformers or the Unit Auxiliary Transformer, to the 4.16 kV ES buses. A detailed description of the offsite power network and the circuits to the Class 1E ES buses is found in the SAR, Chapter 8 (Ref. 2).

During typical on-line operation, power for unit equipment is provided from the Unit Auxiliary Transformer. When the unit is off-line, unit equipment is typically powered from a Startup Transformer or from the Unit Auxiliary Transformer back fed from the 500 kV switchyard. A unit trip (i.e., generator lockout) initiates an automatic transfer to an offsite power circuit (i.e., typically Startup Transformer No. 1). Startup Transformer No. 2 is normally not selected for automatic transfer since it is the backup for both Unit 1 and Unit 2. In the event of a loss of offsite power to the Startup Transformer, an undervoltage condition trips its associated bus feeder breakers. When the Startup Transformer bus feeder breakers open, the bus feeder breakers for the alternate Startup Transformer automatically close (if available) provided the generator lockout relays have not been reset. If the power source is transferred to Startup Transformer No. 2, sufficient loads are automatically shed to avoid a degraded voltage condition (since Startup Transformer No. 2 is not sufficient to simultaneously provide power for full loading from both units.)

With an Engineered Safeguards Actuation System (ESAS) signal present, certain required unit loads are placed in service in a predetermined sequence. Within 1 minute after the initiating signal is received by the load sequencing timers, all automatic and permanently connected loads needed to recover the unit or maintain it in a safe condition are in service.

The onsite standby power source for each 4.16 kV ES bus is a dedicated DG. DGs 1 and 2 are dedicated to ES buses A3 and A4, respectively. A DG starts automatically on an applicable Engineered Safeguards Actuation System (ESAS) signal or on an ES bus degraded voltage or undervoltage signal (see LCO 3.3.5, "Engineered Safeguards Actuation System (ESAS) Instrumentation" and LCO 3.3.8, "Diesel Generator (DG) Loss of Power Start (LOPS)"). After the DG has started, it will automatically tie to its respective bus after offsite power is tripped as a consequence of ES bus undervoltage or degraded voltage, independent of or coincident with an ESAS signal. The DGs will also start and operate in the standby mode without tying to the ES bus on an ESAS signal alone. Following the trip of offsite power, an undervoltage signal strips nonpermanent loads from the ES bus. When the DG is tied to the ES bus, loads are then sequentially connected to their respective ES bus by the automatic load sequencing timers. The sequencing timers control 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 ES electrical loads are automatically connected to the DGs in sufficient time to provide for safe reactor shutdown and to mitigate the consequences of a concurrent 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 by the load sequencing timers, all loads needed to recover the unit or maintain it in a safe condition are returned to service.

Ratings for emergency DGs 1 and 2 satisfy the guidance of Regulatory Guide 1.9 (Ref. 3). The continuous service rating of each DG is 2600 kW with 10% overload permissible for up to 2 hours in any 24 hour period. However, the “intended service” rating provided by the manufacturer is 2750 kW. This is the value used in postulated DG loading evaluations (Ref. 2). The ES loads that are powered from the 4.16 kV ES buses are listed in Reference 2.

APPLICABLE SAFETY ANALYSES

The initial conditions of DBA and transient analyses in the SAR, Chapter 14 (Ref. 4), assume ES 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 ES systems so that the fuel, Reactor Coolant System (RCS), and reactor building 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, “Reactor Building 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 that consider:

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

b. A worst-case single failure.

In MODES 1 and 2, the AC sources satisfy Criterion 3 of 10 CFR 50.36 (Ref. 5). In MODES 3 and 4, the AC sources satisfy Criterion 4 of 10 CFR 50.36.

LCO

Two qualified circuits between the offsite transmission network and the onsite Class 1E Electrical Power Distribution System and separate and independent DGs for each ES train (emergency DGs 1 and 2) ensure availability of the required power to shut down the reactor and maintain it in a safe shutdown condition after an abnormality or a postulated DBA.

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

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

The power sources for the two required offsite power circuits shall consist of:

a. Startup Transformer No. 1 and its 22 kV supply from the switchyard bus tie autotransformer, or the Unit Auxiliary Transformer and its supply from the switchyard bus tie autotransformer via the 22 kV overhead swing leads, and

b. Startup Transformer No. 2 and its supply from the 161 kV switchyard ring bus.

An offsite circuit includes the necessary breakers and equipment to properly align the circuit and transmit power from the transmission line source to a single 4160 V ES bus. One offsite source shall be capable of supplying 4160 V ES bus A3 via 4160 V bus A1 and the second offsite source shall be capable of supplying 4160 V ES bus A4 via 4160 V bus A2, at a minimum. Either source may be used to supply either ES bus. If bus A1 or A2 is not capable of supplying Bus A3 or A4, respectively, one of the offsite circuits must be considered inoperable.

One required offsite source shall be capable of accepting emergency loads in an automatic transfer. Reference 1 requires one circuit to be available within a few seconds following a LOCA to assure that core cooling, reactor building integrity, and other vital safety functions are maintained. The other required offsite source may be configured for manual transfer. In the event Startup Transformer No. 2 is configured for automatic transfer, the selective load-shed features for automatic shedding of loads to avoid a degraded voltage condition shall be OPERABLE.

For the offsite AC sources, separation and independence are maintained to the extent practical. An offsite source may be connected to more than one ES bus and not violate the separation criteria provided each OPERABLE required offsite source is capable of being aligned (manually or automatically, as appropriate) so that it is separate and independent of the other required offsite source.

When the main generator is synchronized to the 500 kV system, AC power for the ES loads may be supplied from either the Unit Auxiliary Transformer, Startup Transformer No. 1, Startup Transformer No. 2, or a combination of these transformers concurrently sharing the load. Power from the Unit Auxiliary Transformer is not credited with meeting the requirements of LCO 3.8.1.a since it cannot function under all conditions (i.e., following a turbine trip) except when connected in the alternate configuration described above. However, powering the ES buses from the Unit Auxiliary Transformer is permitted during normal unit operation.

Each DG (DG1 and DG2) must be capable of starting, accelerating to rated speed and voltage, and connecting to its respective ES bus on detection of bus undervoltage. This will be accomplished within 15 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 ES buses.

Proper sequencing of loads, including tripping of non-essential loads, is a required function for DG OPERABILITY. Should the time intervals between two or more loads be reduced such that the interval is less than that assumed in the SAR, the associated diesel generator is considered to be inoperable. If one or more time delays is inoperable (i.e., the associated component fails to load) then the associated component is considered inoperable, and the appropriate Condition for that component is entered.

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.

This LCO does not apply to the Alternate AC DG nor to the security DG.

APPLICABILITY

The AC sources 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 abnormalities or abnormal transients; and

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

The AC power requirements for MODES 5 and 6 are addressed by the definition of OPERABILITY for each required supported load.

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 being not met. However, if a second required circuit fails SR 3.8.1.1, the second offsite circuit is inoperable, and Condition C, for two offsite circuits inoperable, is entered.

The Completion Time provides for a prompt confirmation of the OPERABILITY of the remaining offsite circuit. This is considered to be acceptable because of other indications, which are available in the control room for loss of the remaining offsite circuit.

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.

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 available to supply 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 both trains 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

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 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 7 days. This could lead to a total of 10 days, 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 7 days (for a total of 17 days) allowed prior to complete restoration of the LCO. The 10 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 10 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.

Required Action A.3 has been modified by a Note extending the allowable outage time for Startup Transformer No. 2 only, for up to 30 days. The 30-day allowance is permitted not more than once in any 10-year period, which is considered sufficient for proper maintenance of the transformer. The 30-day window should permit extensive preplanned preventative maintenance without placing either unit in an action statement of short duration and would allow both units to be operating during such maintenance. Because this allowance assumes parts are prestaged, appropriate personnel are available, and proper contingencies have been established, it is not intended to be used for an unexpected loss of the transformer. Pre-established contingencies will consider the projected stability of the offsite electrical grid, the atmospheric stability projected for the maintenance window, the ability to adequately control other ongoing plant maintenance activities that coincide with the window, projected flood levels, and the availability of all other power sources. Since a station blackout is the most affected event that could occur when power sources are inoperable, the steam driven emergency feedwater pump will also be maintained available during the evolution.

B.1

To ensure a highly reliable power source remains with an inoperable DG, 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.

The Completion Time provides for a prompt confirmation of the OPERABILITY of the remaining offsite circuit. This is considered to be acceptable because of other indications, which are available in the control room for monitoring the status of the remaining offsite circuit.

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. 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:

a. An inoperable DG exists; and

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

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

<u>B.3.1 and B.3.2</u>

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 the other DG, the other DG would be declared inoperable upon discovery and Condition E 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, performance of 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 condition reporting 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.

According to Generic Letter 84-15 (Ref. 6), 24 hours is reasonable to confirm that the OPERABLE DG(s) is not affected by the same problem as the inoperable DG.

<u>B.4</u>

Operation may continue in Condition B for a period that should not exceed 7 days. In Condition B, the remaining OPERABLE DG and offsite circuits are adequate to supply electrical power to the onsite Class 1E Distribution System. The 7 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 10 days, 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 13 days) allowed prior to complete restoration of the LCO. The 10 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 Condition A and Condition B are entered concurrently. The "AND" connector between the 7 day and 10 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

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 a Completion Time of 24 hours is allowed 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.

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:

a. All required offsite circuits are inoperable; and

b. A required feature is inoperable.

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

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 would continue in accordance with Condition A.

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 (one or more trains), the Conditions and Required Actions for LCO 3.8.6, "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 3.8.6 provides the appropriate restrictions for a de-energized train.

In Condition D, individual redundancy is lost in both the offsite electrical power system and the onsite AC electrical power system. The 12 hour Completion Time takes into account the capacity and capability of the remaining AC sources, reasonable time for repairs, and the low probability of a DBA occurring during this period.

E.1

With Train A and Train B DGs 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 ES 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.

With both DGs inoperable, operation may continue for a period that should not exceed 2 hours.

F.1 and F.2

If the inoperable AC electrical 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 12 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.

G.1

Condition G 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 SAR, Section 1.4, GDC 18 (Ref. 7). Periodic component tests are supplemented by extensive functional tests during outages (under simulated accident conditions).

Where the SRs discussed herein specify "ready-to-load" a minimum output voltage of 3750 V (~90% of the nominal 4160 V output voltage) is applicable. This value 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 required minimum frequency for loading of the DG is 58.8 Hz (derived from Safety Guide 9); however, this value is not routinely monitored to be within limit within 15 seconds. Meeting minimum frequency is expected prior to the DG voltage reaching the required minimum. This is administratively confirmed on an 18 month interval.

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 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

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, this SR is modified by a Note to indicate that DG starts for this Surveillance 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 testing with application of the Note, the DGs are started from standby conditions. Standby conditions for a DG means that the diesel engine oil is being continuously circulated and temperature is being maintained consistent with manufacturer recommendations. The signal initiating the start of the DG is varied from one test to another (start with handswitch at control room panel and at DG local control panel) to verify all starting circuits are OPERABLE.

SR 3.8.1.2 requires that the DG starts from standby conditions and achieves "ready-to-load" conditions (i.e., minimum voltage) within 15 seconds. The 15 second start requirement supports the assumptions of the design basis LOCA analysis in the SAR, Chapter 14 (Ref. 4).

The 31 day Frequency provides 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 full rated load. The load test is conducted at 90 to 100 percent of the continuous rating, which is considered to be 90 to 100 percent of the intended service rating, or $\geq$ 2475 kW and $\leq$ 2750 kW. These parameter values contain all necessary allowances for instrument uncertainty. No additional allowances for instrument uncertainty are required to be incorporated in the implementing procedures. A minimum run time of 60 minutes ensures stabilized engine temperatures, while minimizing the time that the DG is connected to the offsite source.

The 31 day Frequency for this Surveillance provides adequate assurance of DG OPERABILITY, while minimizing degradation resulting from testing.

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 (e.g., because of changing bus loads) do not invalidate this test. Note 3 indicates that this Surveillance should be conducted on only one DG 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 DG start must precede this test to credit satisfactory performance.

SR 3.8.1.4

This SR provides verification that the level of fuel oil in the engine mounted day tank is being properly maintained. The level is expressed as an equivalent volume in gallons, and is selected to ensure adequate fuel , when combined with the volume contained in one fuel oil storage tank, for not less than 3.5 days operation of one DG loaded to full capacity (Ref. 2).

The 31 day Frequency is adequate to assure 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 3.8.1.5

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 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. 10). 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 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 intact, and the fuel delivery piping is not obstructed.

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 tanks during DG monthly testing. Therefore, a 31 day Frequency is specified to correspond to the interval for DG testing.

SR 3.8.1.7

Transfer of each 4.16 kV ES 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. Reference 1 requires that only one of the two offsite power circuits be capable of automatic transfer. The second (alternate) circuit must be capable of manual transfer, as a minimum. Typically, Startup Transformer No. 1 is aligned for automatic transfer and Startup Transformer No. 2 is aligned to allow manual transfer. In this alignment, the Surveillance verifies the automatic transfer of loads to Startup Transformer No. 1 and the manual transfer of loads to Startup Transformer No. 2. In the event that Startup Transformer No. 2 is aligned for automatic transfer and Startup Transformer No. 1 is aligned for manual transfer, the Surveillance verifies the automatic transfer of loads to Startup Transformer No. 2 and the manual transfer of loads to Startup Transformer No. 1.

For Startup Transformer No. 2, this test also demonstrates the selective load shedding interlock function. (Note: This load shedding function is only required when Startup Transformer No. 2 is selected for automatic transfer.) These features provide protection of required equipment from a sustained degraded grid voltage situation.

The 18 month Frequency of the Surveillance takes into consideration the unit conditions required to perform the Surveillance (i.e., during refueling shutdown), 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. 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. 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 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 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 a plant shutdown and startup to determine that plant safety is maintained or enhanced when portions of the Surveillance are performed in MODES 1 or 2. Risk insights or deterministic methods may be used for this assessment.

SR 3.8.1.8

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 non-essential loads and energization of the emergency buses and respective loads from the DG. It further demonstrates the capability of the DG to automatically achieve "ready-to-load" conditions (i.e., minimum required voltage) within the specified time.

The DG auto-start time of 15 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 has been achieved.

The requirement to verify the connection and power supply of permanent and auto-connected loads, e.g., the running service water pump(s), is intended to satisfactorily show the relationship of these loads to the DG loading logic. In certain circumstances, many of these loads can not actually be connected or loaded without undue hardship or potential for undesired operation. In lieu of actual demonstration of connection and loading of loads during this test, 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.

If the component start time delays are outside of those assumed by the SAR, component OPERABILITY and DG OPERABILITY must be evaluated.

The Frequency of 18 months 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 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 oil continuously circulated and temperature maintained consistent with manufacturer recommendations.

SR 3.8.1.9

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

This Surveillance demonstrates the DG operation, as discussed in the Bases for SR 3.8.1.7, during a loss of offsite power actuation test signal in conjunction with an ES actuation signal. This test is typically conducted by simulating an ESAS signal and either simultaneously or subsequently simulating a LOOP. In certain circumstances, many loads can not actually be connected or loaded without undue hardship or potential for undesired operation. For instance, DHR systems performing a DHR function are not desired to be interrupted from this mode of operation. In lieu of actual demonstration of connection and loading of loads during this test, 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.

Should the time intervals between two or more loads be reduced such that the interval is less than that assumed in the SAR, the associated DG is conservatively considered to be inoperable unless an evaluation of the condition shows the loading of the DG, with the reduced time interval, to be acceptable. If one or more time delays is inoperable (i.e., the associated component fails to load) or the time interval between two or more loads is greater than assumed in the SAR, then the associated component is considered inoperable, and the appropriate Condition for that component is entered.

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 a Note. The reason for the Note is to minimize wear and tear on the DGs during testing. For the purpose of this testing with application of the Note, the DGs are started from standby conditions, that is, with the engine oil continuously circulated and temperature maintained consistent with manufacturer recommendations for DGs.

REFERENCES

1. SAR, Section 1.4, GDC 17.

2. SAR, Chapter 8.

3. Regulatory Guide 1.9, "Selection, Design, and Qualification of Diesel Generator Units Used as Standby (Onsite) Electric Power Systems at Nuclear Power Plants," Rev. 3, July 1993.

4. SAR, Section 1.4, GDC 18.

5. SAR, Chapter 14.

6. 10 CFR 50.36.

7. Generic Letter 84-15, "Proposed Staff Actions to Improve and Maintain Diesel Generator Reliability," July 2, 1984 (0CNA078423).

8. Regulatory Guide 1.137, Rev. 1, October 1979.

B 3.8 ELECTRICAL POWER SYSTEMS

B 3.8.2 AC Sources - Shutdown

BASES

BACKGROUND

The unit shutdown Electrical Power Distribution System AC sources consist of the offsite power sources (preferred power sources, normal and alternates) and the onsite standby power sources (emergency diesel generators (DGs) and the Alternate AC (AAC) DG).

Offsite power is supplied to the unit switchyard from the transmission network by five transmission lines. From the switchyard, two electrically and physically separated offsite circuits provide AC power, through either the startup transformers or the unit auxiliary transformer, to the 4.16 kV ES buses. ES buses A3 and A4 may be cross-tied during operation in shutdown conditions. A description of the offsite power network and the circuits to the Class 1E ES buses is found in the SAR, Chapter 8 (Ref. 1).

When the unit is off-line, unit equipment is typically powered from a startup transformer or from the unit auxiliary transformer back fed from the 500 kV switchyard. If the power source is transferred to startup transformer No. 2, sufficient loads are automatically shed or procedurally limited to avoid a degraded voltage condition (since startup transformer No. 2 is not sufficient to simultaneously provide power for full loading from both units.)

The normal onsite standby power source for each 4.16 kV ES bus is a dedicated DG. DGs 1 and 2 are dedicated to ES buses A3 and A4, respectively. ES buses A3 and A4 may be cross-tied during operation in shutdown conditions. Ratings for emergency DGs 1 and 2 satisfy the guidance of Regulatory Guide 1.9 (Ref. 2). The continuous service rating of each DG is 2600 kW with 10% overload permissible for up to 2 hours in any 24 hour period. However, the "intended service" rating provided by the manufacturer is 2750 kW. This is the value used in postulated DG loading evaluations (Ref. 3).

The AAC DG is an additional onsite power source. The AAC DG was installed to meet the requirements of 10 CFR 50.63(c)(iii)(2) (Ref. 4). The AAC DG and its associated power supply system is designed to provide vital and non-vital 4160 V power to either ANO-1, ANO-2, or both units simultaneously. The design considerations for the AAC DG assumed the engine would be started from the control room and be at rated speed and voltage within 10 minutes after the onset of a station blackout condition. The AAC DG has a continuous rating of 4400 kW at 4160 V. The machines prime rating, which equates to a 2 hour rating is 4840 kW (110% of the continuous rating) (Ref. 5).

APPLICABLE SAFETY ANALYSES

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

a. The unit can be maintained in MODES 5 or 6 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 a postulated fuel handling accident.

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 and 2 have no specific analyses in MODES 3, 4, 5, and 6. Worst-case bounding events are deemed not credible in MODES 3, 4, 5 and 6 because the energy contained within the reactor coolant 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 and 2, 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 planned and administratively controlled. Relaxations from MODE 1, 2, 3, and 4 LCO 3.8.1 requirements are acceptable during shutdown MODES based on:

a. The fact that time in an outage is limited;

b. Requiring appropriate compensatory measures for certain conditions which 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; and

e. The unit, while in a shutdown condition, can not affect the power grid in a manner that would result in a loss of offsite power due to a turbine trip.

The shutdown Technical Specification requirements are designed to ensure that the unit has the capability to mitigate the consequences of certain postulated accidents. Worst case DBAs which are analyzed for operating MODES are generally viewed not to be a significant concern during shutdown MODES due to the lower energies involved. The Technical Specifications therefore require a lesser complement of electrical equipment to be available during shutdown than is required during operating MODES. More recent work completed on potential risks associated with shutdown, however, have found significant risk associated with certain shutdown evolutions. As a result, in addition to the requirements established in the Technical Specifications, the industry has adopted NUMARC 91-06, "Guidelines for Industry Actions to Assess Shutdown Management," as an industry initiative to manage shutdown tasks and associated electrical support to maintain risk at an acceptable low level. This may require the availability of additional equipment beyond that required by the shutdown Technical Specifications.

In MODES 5 and 6, the AC sources satisfy Criterion 4 of 10 CFR 50.36 (Ref. 6). During handling of irradiated fuel, the AC sources satisfy Criterion 3 of 10 CFR 50.36.

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 a distribution system train 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 DG ensures the availability of sufficient AC sources to operate the unit in a safe manner and to mitigate the consequences of a postulated fuel handling accident.

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 Safeguards (ES) bus(es). Qualified offsite circuits are those that are described in the SAR and are part of the licensing basis for the unit.

One offsite circuit consists of startup transformer No. 1, its supply from the switchyard bus tie autotransformer, either the 4160 V bus A1 or A2, and the feeder breaker providing power to the required 4160 V ES bus(es). An alternative for this offsite circuit consists of the unit auxiliary transformer, its supply from the switchyard bus tie autotransformer and the overhead swing leads, either the 4160 V bus A1 or A2, and the feeder breaker providing power to the required 4160 V ES bus(es). A second offsite circuit consists of startup transformer No. 2, its supply from the 161 kV switchyard ring bus, either the 4160 V bus A1 or A2, and the feeder breaker providing power to the required 4160 V ES bus(es). Another alternative for the above described offsite circuits consists of the unit auxiliary transformer, its supply from the 500 kV switchyard via backfeed through the main transformer (with the main generator disconnects removed), either the 4160 V bus A1 or A2, and the feeder breaker providing power to the required 4160 V ES bus(es). An offsite circuit includes the necessary breakers and equipment to properly align the circuit from the transmission line sources to the required 4160 V ES bus(es). Only one of the possible offsite circuits is "required" provided it can supply the required Class 1E AC electrical power distribution subsystem(s) required by LCO 3.8.10. If a single offsite circuit cannot provide all the required distribution subsystem(s), a second offsite circuit is also "required."

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

The DG (DG 1, DG 2, or AAC DG) must be capable of being started, accelerating to rated speed and voltage, and being connected to its respective ES bus on determination of a loss of offsite power. The DG must be capable of accepting all required loads, and must continue to operate until offsite power can be restored to the ES 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.

It is acceptable for trains to be cross tied during shutdown conditions, allowing a single onsite power source to supply the required equipment.

APPLICABILITY

The AC sources required to be OPERABLE in MODES 5 and 6 and during movement of irradiated fuel assemblies in either the reactor building or fuel handling area provide assurance that:

a. Systems to provide adequate decay heat removal are available for the irradiated fuel assemblies in the core;

b. Systems needed to mitigate a fuel handling accident involving handling irradiated fuel 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 MODE 5 or 6.

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

ACTIONS

LCO 3.0.3 is not applicable while in MODE 5 or 6. However, since irradiated fuel assembly movement can occur in MODE 1, 2, 3, or 4, the ACTIONS have been modified by a Note stating that LCO 3.0.3 is not applicable. If moving irradiated fuel assemblies while in MODE 5 or 6, LCO would not specify an action. If moving irradiated fuel assemblies while in MODE 1, 2, 3, or 4, the fuel movement is independent of reactor operations. Entering LCO 3.0.3, while in MODE 1, 2, 3, or 4 would require the unit to be shutdown unnecessarily.

A.1

An offsite circuit would be considered inoperable if it were not available to one required ES train. Although two trains may be 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 irradiated fuel movement. By the allowance of the option to declare 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 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 in both the reactor building and the fuel handling area, 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 that which 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 a fuel handling accident. 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 are not 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 ES 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 provides the appropriate restrictions for the situation involving a de-energized train.

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 3.8.1.4 is not required to be met since crediting manual start of the required DG provides sufficiently opportunity to ensure that the fuel oil transfer system is operating properly. SR 3.8.1.7 is not required to be met since only one offsite circuit is required to be OPERABLE. SR 3.8.1.8 and SR .8.1.9 are not required to be met because they provide for testing of engineered safeguards actuation signals which are not required to be OPERABLE except on MODES 1, 2, 3, and 4. Automatic actuation and loading of the DGs is not assumed in MODES 5 and 6.

This SR is modified by two Notes. The reason for Note 1 is to preclude requiring the OPERABLE DG from being paralleled with the offsite power network or otherwise rendered inoperable during performance of SRs, and to preclude deenergizing a required 4160 V ES bus or disconnecting a required offsite circuit during performance of this SR. With limited AC sources available, a single event could compromise both the required circuit and the DG. It is the intent that this SR must be capable of being met, but actual performance is not required during periods when the DG and offsite circuit are required to be OPERABLE. When Note 1 is considered, SR 3.8.2.1 requires the following:

SR 3.8.1.1 must be performed and met,
SR 3.8.1.2 must be performed and met,
SR 3.8.1.3 must be met, but does not have to be performed,
SR 3.8.1.4 does not have to be performed or met,
SR 3.8.1.5 must be performed and met,
SR 3.8.1.6 must be performed and met,
SR 3.8.1.7 does not have to be performed or met,
SR 3.8.1.8 does not have to be performed or met, and
SR 3.8.1.9 does not have to be performed or met.

Note 2 exempts the 15 second start acceptance criteria for SR 3.8.1.2. In MODES 5 and 6, there is sufficient time to manually start a DG in the event the offsite power source is lost. The required DG must be capable of being started from standby conditions and achieving ready-to-load conditions. Although the time to reach ready-to-load conditions is not a part of the acceptance criteria, this time is trended to help determine if a condition exists that is degrading the starting capabilities of the DG.

Refer to the corresponding Bases for LCO 3.8.1 for a discussion of each SR.

REFERENCES

1. SAR, Chapter 8.

2. Regulatory Guide 1.9, "Selection, Design, and Qualification of Diesel Generator Units used as Standby (Onsite) Electric Power Systems at Nuclear Power Plants," Rev. 3, July 1993.

3. Calculation 86-E-0002-01.

4. 10 CFR 50.63(c)(iii)(2).

5. ANO-2 SAR Section 8.3.3.

6. 10 CFR 50.36.

B 3.8 ELECTRICAL POWER SYSTEMS

B 3.8.3 Diesel Fuel Oil and Starting Air

BASES

BACKGROUND

Each diesel generator (DG) is provided with fuel oil storage capacity sufficient to operate that diesel for a period of 3.5 days while the DG is supplying maximum post loss of coolant accident load demand discussed in the SAR, Section 8.3 (Ref. 1). The maximum load demand is calculated using the assumption that at least two DGs are initially available. This onsite fuel oil capacity is sufficient to operate the DGs for longer than the time needed to replenish the onsite supply from outside sources.

Fuel oil is transferred from either storage tank to either day tank by either transfer pump (one pump is 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 required outside tanks, pumps, and piping are located underground.

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. 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. See Specification 5.5.13, "Diesel Fuel Oil Testing Program," for details.

Each DG has a designed air start system consisting of two redundant banks of two tanks (receivers) each. One bank of the two tanks contains adequate capacity (i.e., design margin) for five successive start attempts on the DG without recharging the air start receivers.

APPLICABLE SAFETY ANALYSES

The applicable Design Basis Accident (DBA) and transient analyses for the Diesel Fuel Oil and Starting Air systems are the same as for the DGs which they support. See the appropriate discussions in the Bases for LCO 3.8.1, "AC Sources – Operating" and LCO 3.8.2, "AC Sources – Shutdown."

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 (Ref. 3).

LCO

Stored diesel fuel oil is required to have sufficient supply for 3.5 days of full load operation. It is also required to meet specific standards for quality. This requirement supports the availability of DGs required to shut down the reactor and to maintain it in a safe condition for an abnormality 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 and 3.8.2.

The starting air system is required to have a minimum capacity for five successive DG start attempts 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 abnormality 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 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.

<u>A.1</u>

In this Condition, the required fuel oil supply for a DG of 20,000 gallons (i.e., 138 inches) is not available. However, the Condition is restricted to fuel oil level reductions, that maintain at least a 3 day supply of 17,140 gallons (i.e., 118 inches). These circumstances may be caused by events, such as full load operation required after an inadvertent start while at minimum required level. 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 (> 3 days), the fact that procedures will be initiated to obtain replenishment, and the low probability of an event during this brief period.

B.1

This Condition is entered as a result of a failure to meet the acceptance criterion of Specification 5.5.13. 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, 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.

C.1

With the new fuel oil properties 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, 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.

D.1

With starting air receiver pressure < 175 psig in the required receivers, sufficient capacity for five successive DG start attempts does not exist. However, as long as the receiver pressure is ≥ 158 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 the credited DG start is accomplished on the first attempt, and the low probability of an event during this brief period.

E.1

With a Required Action and associated Completion Time not met, or one or more DGs with fuel oil or required starting air subsystem not within limits for reasons other than addressed by Conditions A through D, the associated DG may be incapable of performing its intended function and must be immediately declared inoperable.

SURVEILLANCE REQUIREMENTS

SR 3.8.3.1

This SR provides verification that there is an adequate inventory of fuel oil in the storage tanks, when combined with the volume contained in the DG fuel oil day tanks, to support each DG's operation for 3.5 days at full load. The 3.5 day period is sufficient time to place the unit in a safe shutdown condition and to bring in replenishment fuel from an offsite location. An indicated tank level of 138 inches of fuel oil assures the required volume of 20,000 gallons for tanks T-57A and T-57B.

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 of fuel oil prior to addition to the storage tanks 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 operation. 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 sampling (and associated results) of new fuel and addition of new fuel oil to the storage tank(s) to exceed 31 days. The tests, limits, and applicable ASTM Standards for the tests listed in Specification 5.5.13, "Diesel Fuel Oil Testing Program," are as follows:

a. Sample the new fuel oil in accordance with ASTM D4057-88 (Ref. 4); and

b. Verify in accordance with the tests specified in ASTM D975-81 (Ref. 4) that the sample has:

    1. an absolute specific gravity at 60/60°F of ≥ 0.83 and ≤ 0.89 or an API gravity at 60°F of ≥ 27°, ≤ 39°,

    2. a kinematic viscosity at 40°C of ≥ 1.9 centistokes and ≤ 4.1 centistokes,
    3. a flash point of ≥ 125°F, and

    4. water and sediment within limits.

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 since the fuel oil is not added to the storage tanks.

Following the initial new fuel oil sample, the fuel oil is analyzed to establish that the other properties specified in Table 1 of ASTM D975-81 (Ref. 4) are met for new fuel oil when tested in accordance with ASTM D975-81 (Ref. 4), except that the analysis for sulfur may be performed in accordance with ASTM D1552-90 (Ref. 4) or ASTM D2622-87 (Ref. 4). These additional analyses are required by Specification 5.5.13, "Diesel Fuel Oil Testing Program," to be performed within 31 days following sampling and addition. This 31 days is intended to assure: 1) that the sample taken is not more than 31 days old at the time of adding the fuel oil to the storage tank, and 2) that the results of a new fuel oil sample (sample obtained prior to addition but not more than 31 days prior to) are obtained within 31 days after addition. For circumstances where multiple fuel oil additions are made within a short period of time, the samples taken for each batch added to the storage tank can be composited for a single follow-up analysis. 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 D2276-88, Method A (Ref. 4). 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 DG is available. The system design requirements provide for a minimum of five engine start cycles without recharging. The pressure specified in this SR is intended to reflect the lowest value at which the five starts 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 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 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. SAR, Section 8.3.
2. Regulatory Guide 1.137.
3. 10 CFR 50 36.
4. ASTM Standards: D4057-88; D975-81; D4176-86; D1552-90; D2622-87; D2276-88, Method A.

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 120 VAC vital bus power (via inverters). As required by SAR, Section 1.4, 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).

The 125 VDC electrical power system consists of two independent and redundant safety related Class 1E DC electrical power subsystems (Red Train and Green Train). Each subsystem consists of one 125 VDC battery, the associated battery charger for each battery, and all the associated control equipment and interconnecting cabling.

Additionally, there is one spare battery charger per subsystem, which provides backup service in the event that a battery charger is out of service. If the spare battery charger is substituted, then the requirements of independence and redundancy between subsystems are maintained.

During normal operation, each 125 VDC subsystem is powered from the inservice battery charger with the battery floating on the system. In case of a loss of normal power to the battery charger, the DC load is automatically powered from the station battery. This results in a discharge of the associated battery (and may affect both the system and cell parameters).

The Red Train and Green Train 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 120 VAC vital buses.

The DC power distribution system is described in more detail in Bases for LCO 3.8.6, "Distributions System – Operating."

Each battery has adequate storage capacity to carry the required load continuously for at least 2 hours in addition to supplying power for the operation of momentary loads during the 2 hour period as discussed in the SAR, 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 Red Train and Green Train 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. The Red Train and Green Train batteries are C&D type LCR-21 (58 cell). This size of battery was required before the black battery was added because of the large non-1E lift oil and seal oil pump motors fed from the 1E batteries. The LCR-21 batteries have 10 positive plates and with the present loads the calculated positive plate requirement for the Red Train battery is 6 and for the Green Train battery is 5 (this includes temperature correction for 60° F and 1.25 for end-of-life). This provides an approximate 65% design margin for Red Train battery and an approximate 100% design margin for the Green Train battery. IEEE 485 (Ref. 5) recommends a 10-15% design margin. IEEE 485 is used as a reference in the battery sizing calculation which is the document, along with the battery test procedure, used to determine that the batteries are adequately sized.

Each subsystem battery charger 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 is also designed with sufficient capacity to restore the battery from the design minimum charge to its fully charged state while supplying normal steady state loads.

APPLICABLE SAFETY ANALYSES

The initial conditions of Design Basis Accident (DBA) and transient analyses in the SAR, Chapter 14 (Ref. 6), assume that Engineered Safeguards (ES) systems are OPERABLE. The DC electrical power system provides normal and emergency DC electrical power for the DGs, emergency auxiliaries, and control and switching during all MODES of operation.

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 that consider:

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

b. A worst-case single failure.

In MODES 1 and 2, the DC sources satisfy Criterion 3 of 10 CFR 50.36 (Ref. 7). In MODES 3 and 4, the DC sources satisfy Criterion 4 of 10 CFR 50.36.

LCO

The DC electrical power subsystems, each subsystem consisting of one battery, one of two battery chargers 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 abnormality or a postulated DBA. Loss of any train DC electrical power subsystem does not prevent the minimum safety function from being performed (Ref. 4).

An OPERABLE DC electrical power subsystem requires the associated battery to be OPERABLE and connected to the associated DC bus and one of its respective chargers to be operating and connected to the associated DC bus.

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 abnormalities; and

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

The DC electrical power requirements for MODES 5 and 6 are addressed by the definition of OPERABILITY for each required supported load.

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 8 hour limit is consistent with the allowed time for an inoperable DC distribution system train.

If one of the required DC electrical power subsystems is inoperable (e.g., inoperable battery, inoperable battery chargers, or inoperable battery chargers 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 ES functions, continued power operation should not exceed 8 hours. The

8 hour Completion Time 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 12 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 3.8.4.1

Verifying battery terminal voltage while on float charge 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 and maintain the battery in a fully charged state. The voltage requirements are based on the nominal design voltage of the battery (2.15 V per cell average) and are consistent with IEEE-450 (Ref. 8). The 7 day Frequency is consistent with manufacturer recommendations and IEEE-450 (Ref. 8).

SR 3.8.4.2

A battery service test is a special test of the 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.

The Surveillance Frequency of 18 months is consistent with considerations that the battery service test should be performed during refueling outages, or at some other outage.

A modified performance discharge test may be performed in lieu of a service test.

The modified performance discharge test (Ref. 8) is a simulated duty cycle consisting of just two rates; 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 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 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.

A modified performance discharge test is a test of the battery capacity, as found, and its ability to provide a high rate, short duration load (usually the highest rate of the duty cycle). This will often 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 and the test discharge rate must envelope the duty cycle of the service test if the modified performance discharge test is performed in lieu of a service test.

SR 3.8.4.3

A battery performance discharge test is a test of constant current capacity of a battery 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 (Ref. 8).

A battery modified performance discharge test is described in the Bases for SR 3.8.4.2. Either the battery performance discharge test or the modified performance discharge test is acceptable for satisfying SR 3.8.4.3; however, only the modified performance discharge test may be used to satisfy SR 3.8.4.3 while satisfying the requirements of SR 3.8.4.2 at the same time.

The acceptance criteria for this Surveillance are consistent with IEEE-450 (Ref. 8), which recommends 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 ratings. Degradation is indicated, according to IEEE-450 (Ref. 8), 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. 8).

REFERENCES

1. SAR, Section 1.4, GDC 17.

2. Regulatory Guide 1.6, "Independence Between Redundant Standby (Onsite) Power Sources and Between Their Distribution Systems," March, 1971.

3. IEEE-308-1971, "Criteria for Class 1E Power Systems for Nuclear Power Generating Stations."

4. SAR, Chapter 8.

5. IEEE-485-1993, June 1983.

6. SAR, Chapter 14.

7. 10 CFR 50.36.

8. IEEE-450-1995, "Recommended Practice for Maintenance, Testing, and Replacement of Vented Lead-Acid Batteries for Stationary Applications."

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 DC electrical power system provides normal and emergency DC electrical power for the DGs, emergency auxiliaries, and control and switching.

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

In general, when the unit is shutdown, 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 and 2 have no specific analyses in MODES 3, 4, 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.

The shutdown Technical Specification requirements are designed to ensure that the unit has the capability to mitigate the consequences of certain postulated accidents. Worst case DBAs which are analyzed for operating MODES are generally viewed not to be a significant concern during shutdown MODES due to the lower energies involved. The Technical Specifications therefore require a lesser complement of electrical equipment to be available during shutdown than is required during operating MODES. More recent work completed on potential risks associated with shutdown, however, have found significant risk associated with certain shutdown evolutions. As a result, in addition to the requirements established in the Technical Specifications, the industry has adopted NUMARC 91-06, "Guidelines for Industry Actions to Assess Shutdown Management," as an industry initiative to manage shutdown tasks and associated electrical support to maintain risk at an acceptable low level. This may require the availability of additional equipment beyond that required by the shutdown Technical Specifications.

In MODES 5 and 6, the DC sources satisfy Criterion 4 of 10 CFR 50.36 (Ref. 1). During handling of irradiated fuel, the DC sources satisfy Criterion 3 of 10 CFR 50.36.

LCO

One DC electrical power subsystem consisting of one battery, one battery charger, and the corresponding control equipment and interconnecting cabling within the train, is required to be OPERABLE to support one train 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 a fuel handling accident.

An OPERABLE DC electrical power subsystem requires the associated battery to be OPERABLE and connected to the associated DC bus and one of its respective chargers to be OPERABLE and capable of being connected to the associated DC bus.

APPLICABILITY

The DC electrical power sources required to be OPERABLE in MODES 5 and 6 and during movement of irradiated fuel assemblies in either the reactor building or fuel handling area, provide assurance that:

a. Required features to provide adequate decay heat removal are available for the irradiated fuel assemblies in the core;

b. Required features needed to mitigate a fuel handling accident in either the reactor building or fuel handling area 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 MODE 5 or 6.

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

ACTIONS

LCO 3.0.3 is not applicable while in MODE 5 or 6. However, since irradiated fuel assembly movement can occur in MODE 1, 2, 3, or 4, the ACTIONS have been modified by a Note stating that LCO 3.0.3 is not applicable. If moving irradiated fuel assemblies while in MODE 5 or 6, LCO would not specify an action. If moving irradiated fuel assemblies while in MODE 1, 2, 3, or 4, the fuel movement is independent of reactor operations. Entering LCO 3.0.3, while in MODE 1, 2, 3, or 4 would require the unit to be shutdown unnecessarily.

A.1.1, A.1.2, A.1.3, A.1.4, and A.1.5

With the required DC electrical subsystem inoperable (e.g., inoperable battery, no OPERABLE battery charger, or both) there may be insufficient capability to mitigate the consequences of a fuel handling accident. Therefore, conservative actions must be taken (i.e., to suspend CORE ALTERATIONS, movement of irradiated fuel assemblies in both the reactor building and the fuel handling area, 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 that which 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 a fuel handling accident. It is further required to immediately initiate action to restore the required DC electrical power subsystem and to continue this action until restoration is accomplished in order to provide the necessary DC electrical power to the unit safety systems.

Notwithstanding performance of the above conservative Required Actions, a required low temperature overpressure protection (LTOP) System feature may be inoperable. In this case, Required Actions A.1.1 through A.1.4 do not adequately address the concerns relating to LTOP. Pursuant to LCO 3.0.6, the LTOP ACTIONS would not be entered. Therefore, Required Action A.1.5 is provided to direct entry into the appropriate LTOP Conditions and Required Actions, which results in taking the appropriate LTOP actions.

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

SURVEILLANCE REQUIREMENTS

SR 3.8.5.1

SR 3.8.5.1 requires the DC Sources to be capable of meeting the requirements of SR 3.8.4.1 through SR 3.8.4.3.

This SR is modified by a Note. The reason for the Note is to preclude requiring the OPERABLE DC source from being discharged below its 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 during periods when the DC Source is required to be OPERABLE. Refer to the corresponding Bases for LCO 3.8.4 for discussion of each SR.

When the Note is considered, SR 3.8.5.1 requires the following for an OPERABLE DC Source:

SR 3.8.4.1 must be performed and met,
SR 3.8.4.2 must be met, but does not have to be performed, and
SR 3.8.4.3 must be met, but does not have to be performed.

As an example, typical operation during a refueling shutdown (in MODES 5 and 6) requires only one OPERABLE battery. However, the SRs with an 18 month Frequency which are not required to be performed on the OPERABLE battery should be conducted on each battery during that portion of the refueling shutdown that it is not required to be OPERABLE so that the SRs are current when it is time to enter MODES 1, 2, 3, and 4. This is to allow continued OPERABILITY of the battery during MODES 5 and 6 even if the Frequency for SR 3.8.4.2 or SR 3.8.4.3 is not met.

REFERENCES

1. 10 CFR 50.36

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."

APPLICABLE SAFETY ANALYSES

The initial conditions of Design Basis Accident (DBA) and transient analyses in the SAR, Chapter 14 (Ref. 1), assume Engineered Safeguards systems are OPERABLE. The DC electrical power system provides normal and emergency DC electrical power for the DGs, emergency auxiliaries, and control and switching during all MODES of operation.

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 that consider:

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 Criterion 3 of 10 CFR 50.36 (Ref. 2).

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 abnormality or a postulated DBA. The limits are conservatively established, allowing continued DC electrical system function even with Category A and B limits not met.

APPLICABILITY

The battery cell parameters are required solely for the support of the associated DC electrical power subsystems. Therefore, battery cell parameters are only required to be within limits when the DC power source is required to be OPERABLE. See the Applicability discussion in Bases for LCO 3.8.4 and LCO 3.8.5.

ACTIONS

The Actions Table is modified by a Note, which indicates that separate Condition entry is allowed for each battery. This is acceptable, since the Required Actions for each Condition provide appropriate compensatory actions for each inoperable DC subsystem. Complying with the Required Actions for one inoperable DC subsystem may allow for continued operation, and subsequent inoperable DC subsystem(s) are governed by separate Condition entry and application of associated Required 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 or 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 still is 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 continued 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). These checks will provide a quick representative 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 cell. 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 within the Category A and B limits, the battery will still be capable of performing its intended function. A period of 24 hours is allowed to complete the initial verification because parameter 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 within Category A and B limits. This periodic verification is consistent with the increased potential to exceed these battery cell parameter limits during these conditions.

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 may not be available. Therefore, the battery must be immediately declared inoperable and the corresponding DC electrical power subsystem must be declared inoperable. Additionally, other potentially extreme conditions, such as the Required Actions and associated Completion Time of Condition A not met or average electrolyte temperature of representative cell falling below 60°F, are also cause for immediately declaring the associated DC electrical power subsystem inoperable.

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 and temperature of pilot cells.

SR 3.8.6.2 and SR 3.8.6.4

This Surveillance verification that the average temperature of representative cells is ≥ 60°F is consistent with a recommendation of IEEE-450 (Ref. 3), which states that the temperature of electrolytes in the pilot cell should be determined at least once per month and that the temperature in representative cells (~10% of all connected 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.

SR 3.8.6.3

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 > 145 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 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.

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, 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 1/4 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.

The Category A limit specified for float voltage is ≥ 2.13 V per cell. This value is based on a recommendation 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 ≥ 1.195 (0.020 below the manufacturer fully charged nominal specific gravity). 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. 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.

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. The Category B limit specified for specific gravity for each connected cell is ≥ 1.190 (0.025 below the manufacturer fully charged, nominal specific gravity) with the average of all connected cells > 1.195 (0.020 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 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 limits of average specific gravity ≥ 1.190 is based on manufacturer recommendations (0.025 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.

Footnotes (b) and (c) 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 temperature.

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 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.

REFERENCES

1. SAR, Chapter 14.

2. 10 CFR 50.36.

3. IEEE-450-1995, "Recommended Practice for Maintenance, Testing, and Replacement of Vented Lead-Acid Batteries for Stationary Applications."

B 3.8 ELECTRICAL POWER SYSTEMS

B 3.8.7 Inverters – Operating

BASES

BACKGROUND

The inverters are the preferred source of power for the 120 VAC vital buses because of the stability and reliability they achieve. The function of the inverter is to provide AC electrical power to the vital bus. The inverters are normally powered from the 125 VDC Electrical Power System. The inverters provide an uninterruptible power source for the safety significant instrumentation and controls, including the Reactor Protection System (RPS), the Engineered Safeguards Actuation System (ESAS), and the Emergency Feedwater Initiation and Control (EFIC) system. Additionally, there are two swing inverters (one per train) which provide backup service in the event that an inverter is out of service. If the swing inverter is placed in service, requirements of independence and redundancy between trains are maintained. Specific details on inverters and their operating characteristics are found in SAR, Chapter 8 (Ref. 1).

APPLICABLE SAFETY ANALYSES

The initial conditions of Design Basis Accident (DBA) and transient analyses in the SAR, Chapter 14 (Ref. 2), assume Engineered Safeguards 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 safety significant instrumentation and controls so that the fuel, Reactor Coolant System, and reactor building 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, "Reactor Building 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 that consider:

a. An assumed loss of all offsite AC electrical power or all onsite elecrtical 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 (Ref. 3) in MODES 1 and 2. In MODES 3 and 4, the inverters satisfy Criterion 4 of 10 CFR 50.36.

LCO

The inverters ensure the availability of AC electrical power for the instrumentation required to shut down the reactor and maintain it in a safe condition after an abnormality or a postulated DBA.

Maintaining the required inverters OPERABLE ensures that the redundancy incorporated into the design of the safety significant instrumentation and controls is maintained. The four required inverters (two per train) ensure an uninterruptible supply of AC electrical power to the 120 VAC vital buses even if the 4.16 kV safety buses are de-energized.

OPERABLE inverters require the associated 120 VAC vital bus to be powered by the inverter with output voltage within tolerances, and power input to the inverter from a 125 VDC Electrical Power System with associated OPERABLE station battery.

This LCO is modified by a Note that allows one required inverter to be disconnected from its associated DC bus for ≤ 2 hours to allow load transfer to or from a swing inverter, if the 120 VAC vital bus is powered from an alternate AC source during the period and all other inverters are OPERABLE.

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 abnormalities; and

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

Inverter requirements for MODES 5 and 6 are addressed by the definition of OPERABILITY for each required supported load.

ACTIONS

A.1

With a required inverter inoperable or two inverters in the same electrical distribution subsystem inoperable, the associated 120 VAC vital bus is automatically transferred to its alternate AC source and remains OPERABLE. In the event the automatic transfer fails, and the associated 120 VAC vital bus is deenergized, the 120 VAC vital bus is considered to be inoperable.

For this reason, a Note has been included in Condition A requiring entry into the Conditions and Required Actions of LCO 3.8.9, "Distribution Systems - Operating." This ensures the vital bus is re-energized within 8 hours. Required Action A.1 allows 72 hours to fix the inoperable inverter and return it to service. The 72 hour limit takes 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 120 VAC vital bus is powered from its alternate AC source, it is relying upon interruptible AC electrical power sources (offsite and onsite). The uninterruptible inverter source to the 120 VAC vital buses is the preferred source for powering instrumentation trip setpoint devices.

B.1 and B.2

If the Required Actions and associated Completion Time are not met, 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 12 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.

SURVEILLANCE REQUIREMENTS

SR 3.8.7.1

This Surveillance verifies that the inverters are functioning properly with all required circuit breakers closed and 120 VAC 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 120 VAC 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. SAR, Chapter 8.
2. SAR, Chapter 14.
3. 10 CFR 50.36.

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 DC to AC inverters are designed to provide the required capacity, capability, and reliability to ensure the availability of necessary power to safety significant instrumentation and controls.

The OPERABILITY of the inverters is consistent with the requirements for the supported systems' OPERABILITY.

The OPERABILITY of the required inverters to each required 120 VAC vital bus during MODES 5 and 6 ensures that:

a. The unit can be maintained in MODE 5 or 6 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 a postulated fuel handling accident.

In general, when the unit is shutdown, 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 and2 have no specific analyses in MODES 3, 4, 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.

The shutdown Technical Specification requirements are designed to ensure that the unit has the capability to mitigate the consequences of certain postulated accidents. Worst case DBAs which are analyzed for operating MODES are generally viewed not to be a significant concern during shutdown MODES due to the lower energies involved. The Technical Specifications therefore require a lesser complement of electrical equipment to be available during shutdown than is required during operating MODES. More recent work completed on potential risks associated with shutdown, however, have found significant risk associated with certain shutdown evolutions. As a result, in addition to the requirements established in the Technical Specifications, the industry has adopted NUMARC 91-06, "Guidelines for Industry Actions to Assess Shutdown Management," as an industry initiative to manage shutdown tasks and associated electrical support to maintain risk at an acceptable low level. This may require the availability of additional equipment beyond that required by the shutdown Technical Specifications.

In MODES 5 and 6, the inverters are part of the distribution system and, as such, satisfy Criterion 4 of 10 CFR 50.36 (Ref. 1). During handling of irradiated fuel, the inverters satisfy Criterion 3 of 10 CFR 50.36.

LCO

The inverter provides an uninterruptible supply of AC electrical power to its 120 VAC vital bus even if the 4.16 kV safety buses are de-energized. This ensures the availability of sufficient inverter power sources to operate the unit in a safe manner and to mitigate the consequences of a postulated fuel handling accident.

An OPERABLE inverter must be supplied power from its associated Class 1E 125 VDC electrical power system, and supplying the associated AC vital bus with acceptable output AC voltage.

APPLICABILITY

The inverter required to be OPERABLE in MODES 5 and 6, and during movement of irradiated fuel assemblies in either the reactor building or fuel handling area provides assurance that:

a. Systems to provide adequate decay heat removal are available for the irradiated fuel in the core;

b. Systems needed to mitigate a fuel handling accident 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 MODE 5 or 6.

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

ACTIONS

LCO 3.0.3 is not applicable while in MODE 5 or 6. However, since irradiated fuel assembly movement can occur in MODE 1, 2, 3, or 4, the ACTIONS have been modified by a Note stating that LCO 3.0.3 is not applicable. If moving irradiated fuel assemblies while in MODE 5 or 6, LCO would not specify an action. If moving irradiated fuel assemblies while in MODE 1, 2, 3, or 4, the fuel movement is independent of reactor operations. Entering LCO 3.0.3, while in MODE 1, 2, 3, or 4 would require the unit to be shutdown unnecessarily.

A.1.1, A.1.2, A.1.3, A.1.4, and A.1.5

With the required inverter inoperable, there may be insufficient capability to mitigate the consequences of a fuel handling accident. Therefore, conservative actions must be taken (i.e., to suspend CORE ALTERATIONS, movement of 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 that which 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 a fuel handling accident. It is further required to immediately initiate action to restore the required inverter and to continue this action until restoration is accomplished in order to provide the necessary inverter power to the unit safety systems.

Notwithstanding performance of the above conservative Required Actions, a required low temperature overpressure protection (LTOP) system feature may be inoperable. In this case, Required Actions A.1.1 through A.1.4 do not adequately address the concerns relating to LTOP. Pursuant to LCO 3.0.6, the LTOP ACTIONS would not be entered. Therefore, Required Action A.1.5 is provided to direct entry into the appropriate LTOP Conditions and Required Actions, which results in taking the appropriate LTOP actions.

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

SURVEILLANCE REQUIREMENTS

SR 3.8.8.1

This Surveillance verifies that the inverters are functioning properly with all required circuit breakers closed and 120 VAC 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 120 VAC 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. 10 CFR 50.36.

B 3.8 ELECTRICAL POWER SYSTEMS

B 3.8.9 Distribution Systems – Operating

BASES

BACKGROUND

The onsite Class 1E AC, DC, and 120 VAC vital bus electrical power distribution systems are divided by train into two redundant and independent AC, DC, and 120 VAC vital bus electrical power distribution subsystems.

Each AC electrical power subsystem consists of an Engineered Safeguards (ES) 4.16 kV bus and 480 V buses. Each 4.16 kV ES bus has two offsite sources of power as well as a dedicated onsite diesel generator (DG) source as described in the Bases for LCO 3.8.1, "AC Sources - Operating." If all offsite sources are unavailable, the onsite emergency DG supplies power to the 4.16 kV ES bus. Control power for the 4.16 kV breakers is supplied from the Class 1E batteries.

The secondary AC electrical power distribution system for each train includes the safety related load centers and motor control centers shown in Table B 3.8.9-1. Motor control center B55 is fed from motor control center B56. These motor control centers are swing components, in that motor control center B56 may be energized from either load center B5 or load center B6. Normally, motor control center B56, and thus B55, are energized from load center B6. However, this alignment may be switched to energize these motor control centers from load center B5, if needed to support the configuration of the unit.

The 120 VAC vital distribution panels are arranged in two load groups per subsystem and are normally powered from the inverters. Upon loss of the DC supply, or in the event of an inverter failure, a static transfer switch automatically transfers the 120 VAC vital load to an ES motor control center, and its use is governed by LCO 3.8.7, "Inverters - Operating."

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

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 SAR, Chapter 14 (Ref. 1), assume ES systems are OPERABLE. The AC, DC, and 120 VAC vital bus electrical power distribution systems are designed to provide sufficient capacity, capability, redundancy, and reliability to ensure the availability of necessary power to ES systems so that the fuel, Reactor Coolant System, and reactor building 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, "Reactor Building Systems."

The OPERABILITY of the AC, DC, and 120 VAC 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 that consider:

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

b. A worst-case single failure.

In MODES 1 and 2, the distribution systems satisfy Criterion 3 of 10 CFR 50.36 (Ref. 2). In MODES 3 and 4, the distribution systems satisfy Criterion 4 of 10 CFR 50.36.

LCO

The required power distribution subsystems listed in Table B 3.8.9-1 ensure the availability of AC, DC, and 120 VAC vital bus electrical power for the systems required to shut down the reactor and maintain it in a safe condition after abnormality or a postulated DBA. The AC, DC, and 120 VAC vital bus electrical power distribution subsystems are required to be OPERABLE.

Maintaining the AC, DC, and 120 VAC vital bus electrical power distribution subsystems OPERABLE ensures that the redundancy incorporated into the design of ES 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. OPERABLE AC electrical power distribution subsystems require the associated buses, load centers, and motor control 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 120 VAC vital electrical power distribution subsystems require the associated distribution panels to be energized to their proper voltage from the associated inverter via inverted DC voltage or from its alternate AC source.

In addition, cross-tie breakers between redundant safety related AC, DC, and AC vital bus power distribution subsystems 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 cross-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 abnormalities; and

b. Adequate core cooling is provided, and reactor building 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 required AC electrical power distribution subsystems inoperable, the remaining OPERABLE portions of the AC electrical power distribution subsystem(s) may be 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 ES functions not being supported. Therefore, the required AC buses, load centers, and motor control centers must be restored to OPERABLE status within 8 hours.

Condition A worst case 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 8 hours. This could lead to a total of 16 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.

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.

B.1

With one or more 120 VAC vital bus electrical power distribution subsystems inoperable, the remaining OPERABLE portions of the 120 VAC vital bus subsystem(s) may be 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 ES functions not being supported. Therefore, the 120 VAC vital bus subsystem(s) must be restored to OPERABLE status within 8 hours by powering the affected bus(es) from the associated inverter via inverted DC or from its alternate AC source.

Condition B represents one or more 120 VAC vital bus subsystem(s) without power; potentially both the DC source and the associated alternate AC source are nonfunctioning. In this situation the unit is significantly more vulnerable to a complete loss of all un-interruptible 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 bus subsystem(s) and restoring power to the affected vital bus subsystem(s).

This 8 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 8 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 8 hour Completion Time takes into account the importance to safety of restoring the 120 VAC vital bus subsystem(s) to OPERABLE status, the redundant capability afforded by the other OPERABLE vital bus subsystem, 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 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 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 16 hours, since initial failure of the LCO, to restore the 120 VAC vital bus subsystem(s). At this time, an AC train could again become inoperable, and 120 VAC vital bus subsystem(s) restored to 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.

C.1

With one or more DC subsystems inoperable, the remaining OPERABLE portions of the DC electrical power distribution subsystems may be 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 ES functions not being supported. Therefore, the DC buses must be restored to OPERABLE status within 8 hours by powering the bus from the associated battery or one of the two associated chargers.

Condition C represents one or more DC subsystem(s) 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 8 hour limit is more conservative than Completion Times allowed for the vast majority of components that are without power. Taking exception to LCO 3.0.2 for components without adequate DC power, which would have Required Action Completion Times shorter than 8 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 to restore power to the affected train; and

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

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 16 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 and D.2

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 12 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.

E.1

Condition E corresponds to a level of degradation in the electrical distribution system that causes a required safety function to be lost. 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 120 VAC 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. The 7 day Frequency takes into account the redundant capability of the AC, DC, and 120 VAC vital bus electrical power distribution subsystems, and other indications available in the control room that alert the operator to subsystem malfunctions.

REFERENCES

1. SAR, Chapter 14.

2. 10 CFR 50.36.

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

TYPE	VOLTAGE	RED TRAIN	GREEN TRAIN
AC safety buses	4160 V	ES Bus A3	ES Bus A4
	480 V	Load Center B5	Load Center B6
	480 V	Motor Control Centers B51, B52, B53, B57	Motor Control Centers B61, B62, B63, B65, B56** and B55
DC buses	125 V	Bus D01	Bus D02
		Bus RA1	Bus RA2
		Distribution Panel D11	Distribution Panel D21
120 VAC Vital distribution panels	120 V	Panel RS1	Panel RS2
		Panel RS3	Panel RS4

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

** Swing bus (normally associated with Green Train). Bus B55 is powered from Bus B56.

B 3.8 ELECTRICAL POWER SYSTEMS

B 3.8.10 Distribution Systems - Shutdown

BASES

BACKGROUND

A description of the AC, DC and 120 VAC vital bus electrical power distribution systems is provided in the Bases for LCO 3.8.9, "Distribution Systems - Operating."

APPLICABLE SAFETY ANALYSES

The AC, DC, and 120 VAC vital bus electrical power distribution systems are designed to provide sufficient capacity, capability, and reliability to ensure the availability of necessary power to ES systems.

The OPERABILITY of the minimum AC, DC, and 120 VAC 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 MODE 5 or 6 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 a postulated fuel handling accident.

In MODES 5 and 6, the AC and DC electrical power distribution systems satisfy Criterion 4 of 10 CFR 50.36 (Ref. 1). During handling of irradiated fuel, the AC and DC electrical power distribution systems satisfy Criterion 3 of 10 CFR 50.36.

LCO

Various combinations of subsystems, equipment, and components are required OPERABLE by LCO 3.3.9, "Source Range Neutron Flux," LCO 3.3.16, "RCS Pressure and Temperature (P/T) Limits," LCO 3.4.7, "RCS Loops - MODE 5, Loops Filled," LCO 3.4.8, "RCS Loops - MODE 5, Loops Not Filled," LCO 3.4.11, "Low Temperature Overpressure (LTOP) Protection System," LCO 3.7.9, "Control Room Emergency Ventilation System (CREVS)," LCO 3.7.10, "Control Room Emergency Air Conditioning System (CREACS)," LCO 3.7.12, "Fuel Handling Area Ventilation System (FHAVS)," LCO 3.9.2, "Nuclear Instrumentation" (for one monitor only), LCO 3.9.4, "Deacy Heat Removal (DHR) and Coolant Circulation," and LCO 3.9.5, "Deacy Heat Removal (DHR) and Coolant Circulation - Low Water Level" depending on the specific plant condition. Implicit in those requirements is the required OPERABILITY of necessary support features. This LCO 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 OPERABLE ensures the availability of sufficient power to operate the unit in a safe manner.

APPLICABILITY

The AC and DC electrical power distribution subsystems required to be OPERABLE in MODES 5 and 6, and during movement of irradiated fuel assemblies in either the reactor building or fuel handling area, provide assurance that:

a. Systems to provide adequate decay heat removal are available for the irradiated fuel in the core;

b. Systems needed to mitigate a fuel handling accident in either the reactor building or fuel handling area 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 MODES 5 or 6.

The AC, DC, and 120 VAC vital bus electrical power distribution subsystem requirements for MODES 1, 2, 3, and 4 are covered in LCO 3.8.9.

ACTIONS

LCO 3.0.3 is not applicable while in MODE 5 or 6. However, since irradiated fuel assembly movement can occur in MODE 1, 2, 3, or 4, the ACTIONS have been modified by a Note stating that LCO 3.0.3 is not applicable. If moving irradiated fuel assemblies while in MODE 5 or 6, LCO would not specify an action. If moving irradiated fuel assemblies while in MODE 1, 2, 3, or 4, the fuel movement is independent of reactor operations. Entering LCO 3.0.3, while in MODE 1, 2, 3, or 4 would require the unit to be shutdown unnecessarily.

<u>A.1, A.2.1, A.2.2, A.2.3, A.2.4, A.2.5, and A.2.6</u>

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 subsystems 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 in both the reactor building and the fuel handling area, 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 that which 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 a fuel handling accident. 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 decay heat removal (DHR) subsystem or a required low temperature overpressure protection (LTOP) feature 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, heat removal and LTOP. Pursuant to LCO 3.0.6, the DHR ACTIONS and LTOP ACTIONS would not be entered. Therefore, Required Action A.2.5 is provided to direct declaring DHR inoperable, which results in taking the appropriate DHR actions and Required Action A.2.6 is provided to direct entry into the appropriate LTOP Conditions and Required Actions, which results in taking the appropriate LTOP 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 120 VAC vital bus electrical power distribution subsystems are functioning properly, with all the buses energized. 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. 10 CFR 50.36.

CTS DISCUSSION OF CHANGES

ITS Section 3.8: Electrical Power Systems

ADMINISTRATIVE

A1 The designated change represents a non-technical, non-intent change to the Arkansas Nuclear One, Unit 1 Current Technical Specifications (CTS) made to make the ANO-1 Improved Technical Specifications (ITS) consistent with the B&W Standard Technical Specification (RSTS), NUREG-1430, Revision 1. This change does not alter the requirements of the CTS or RSTS. Examples of this type of change include: wording preference; convention adoption; editorial, numbering and formatting changes; and hierarchy structure.

A2 The ANO-1 CTS Bases will be administratively deleted in their entirety in favor of the NUREG-1430 RSTS Bases. The CTS Bases will be reviewed for technical content that will be identified for retention in the ITS Bases.

3.8.1-01 A3 A portion of CTS 3.0.5, which indicates that CTS 3.0.5 is not applicable in Cold Shutdown or Refueling, has been incorporated into each of the Electrical Power Systems Specifications applicable during MODES 5 and 6, by requiring that the associated features be declared inoperable, or imposing Required Actions consistent with or more conservative than those currently required for those features.

A4 This information is out of date and no longer represents a requirement or a relaxation of the requirements. Omitting this information has no impact on the assumptions of the safety analysis or any equipment used to mitigate any design basis event.

A5 Not used.

A6 Not used.

3.8.1-25 A7 Not used

A8 Not used.

3.8.1-15 A9 CTS 4.6.1.1 requires load testing the DGs at "full rated load." The DGs ratings include: 2600 kW continuous service, 2750 kW intended service, 2850 kW for 2000 hours, and 3000 kW for 4 hours. Regulatory Guide 1.9, Section C.2.2 indicates that the full load testing is to be conducted between 90% to 100% of the continuous load rating. Since the intended service rating is used for load rating of the ANO-1 DGs, the minimum test loading is based on 90% of the intended service full load, or 2475 kW. This also results in a maximum test loading of 2750 kW. This is considered to be consistent with the ANO-1 interpretation of the current license basis and therefore, the change is administrative.

A10 Not used.

A11 Not used.

CTS DISCUSSION OF CHANGES

A12 CTS 3.7.1 established an Applicability of > 200°F for the Auxiliary Electrical Systems Specifications. This is equivalent to ITS MODES 1, 2, 3 and 4 and is consistent with the stated Applicability established for ITS 3.8.1 and 3.8.9.

TECHNICAL CHANGE -- MORE RESTRICTIVE

M1 Specific requirements are included for inverters during operation in MODES 1, 2, 3, and 4. These inverters provide emergency power for AC vital buses which in turn power the reactor protection system and engineered safeguards actuation system instrumentation and controls. These are additional restrictions on unit operation. These changes are consistent with NUREG-1430.

3.8.2-01, 3.8.5-01, 3.8.8-01, 3.8.10-01

M2 Specifications (i.e., ITS 3.8.2, 3.8.5, 3.8.8 and 3.8.10) have been proposed for electrical power system requirements during Cold Shutdown and Refueling (ITS MODES 5 and 6), as well as during movement of irradiated fuel assemblies. The required electrical power systems support maintaining the unit in the shutdown or refueling condition, and mitigating any events postulated to occur during shutdown, such as a fuel handling accident. In addition, extending the requirements for OPERABILITY of required supports systems (i.e., ITS 3.8.3) into MODES 5 and 6 is similarly an additional restriction on unit operation consistent with NUREG-1430.

M3 The default actions in CTS 3.7.2.A for not meeting the requirements of any of the other conditions in CTS 3.7.2 are revised to omit the allowed delay of 24 hours in Hot Shutdown. This change revises the default conditions for proposed LCO 3.8.1 to be consistent with other default conditions, e.g., LCO 3.0.3, for failure to meet the ACTIONS and/or a loss of function. This change represents an additional restriction on unit operation.

3.8.1-06

M4 An additional Required Action (ITS 3.8.1 RA A.1) is included for an inoperable required offsite circuit, which requires prompt and periodic verification of the appropriate breaker alignment and indicated power availability for the remaining OPERABLE required offsite circuit. The prompt verification is consistent with CTS (in order to determine that only one offsite circuit is inoperable). The periodic verification is an additional restriction on unit operation. This change provides additional knowledge of the status of the remaining offsite circuit in order to ensure a highly reliable power source is available should the unit trip. This is consistent with NUREG-1430.

In addition, CTS 3.7.2.C states that a diesel generator is allowed to be inoperable for 7 days, in part, due to a verification that both offsite power sources are operable. However, the CTS does not provide a time limit for the completion of this action. ITS 3.8.1 R.A. B.1 will require this verification to be completed within 1 hour, and every 12 hours, thereafter. This change provides additional knowledge of the status of the remaining offsite circuit in order to ensure a highly reliable power source is available should the unit trip. This is consistent with NUREG-1430.

M5 In the event of concurrent diesel generator and offsite circuit inoperabilities, the existing CTS Actions appear to allow independent application of allowed repair times. When a subsequent inoperability occurs just prior to restoration of the previous inoperability and close to the expiration of the allowed 72 hours, when taken to extreme, this independent application can provide an unlimited time of operation with an inoperable AC source. While these simultaneous inoperabilities are expected to be rare, a maximum restoration time limit is not imposed in the CTS. The proposed ITS 3.8.1 RA A.3 and RA B.4 format presents a maximum restoration time as an additional Completion Time of "10 days from discovery of failure to meet the LCO." A similar Completion Time of "16 hours from discovery of failure to meet the LCO" is also incorporated for the various electrical power distribution subsystems in proposed ITS 3.8.9 (refer to ITS 3.8.9 RA A.1, B.1 and C.1). These additional Completion Times represent additional restrictions on unit operation. This change is consistent with NUREG-1430.

M6 Not used.

M7 Not used.

M8 CTS 3.7.1.G requires the selective load-shed features associated with startup transformer No. 2 (ST2) to be OPERABLE, but only "if selected for auto transfer." It is noted for reference that ST2 is considered the secondary offsite circuit, which is allowed to be manually connected if desired, and still be considered OPERABLE. Auto connection of ST2 is also allowed but only with the selective load-shed feature OPERABLE. CTS 3.7.2.H provides actions for inoperability of this feature with two options: Option (1) requires that the ST2 feeder breakers be placed in "pull-to-lock" within one hour; and that the interlock be restored within 30 days, or a Special Report be submitted within 30 days. Option (2) allows 72 hours for restoration and then requires hot shutdown in the next 6 hours and cold shutdown in the following 30 hours per Note 14 of Table 3.5.1-1. Option (2) is essentially equivalent to considering the offsite circuit inoperable in ITS.

To evaluate Option (1), "if selected for auto transfer" is first understood to refer to being "capable of auto transfer." With ST2 feeder breakers not in pull-to-lock, it is continuously capable of auto transfer – whether or not ST2 is "selected" ("selected" only affects the order in which auto transfer is attempted). As such, the CTS action of 3.7.2.H Option (1) (which requires ST2 feeder breakers be placed in pull-to-lock) removes the capability for auto transfer and effectively eliminates the requirement for any further completion of the Action (to submit a Special Report). It also allows ST2 to be considered OPERABLE (based on the capability of manual connection after manual load shedding).

Given these discussions, ST2 is considered to be an inoperable offsite circuit during the time that the selective load-shed features are inoperable and the feeder breakers are available for auto transfer. CTS 3.7.2.H allows 1 hour to establish the feeder breakers in pull-to-lock before imposing a 72 hour restoration time. The ITS action for an inoperable offsite circuit allows only 72 hours. Therefore, this change eliminates the additional CTS allowed 1 hour time. This is a more restrictive change with no impact on safety since 72 hours remains a reasonable time to reestablish the OPERABILITY of ST2 (which, in this scenario, can be accomplished by placing the feeder breakers in pull-to-lock if desired).

M9 A new surveillance of offsite power circuits is included to provide additional assurance of power availability. A weekly verification of proper breaker alignment and indicated power availability for each required offsite circuit is being included as proposed ITS SR 3.8.1.1. This is an additional restriction on unit operation consistent with NUREG-1430.

M10 Not used.

M11 CTS 4.6.1.4.e is supplemented to explicitly include new fuel oil testing in ITS SR 3.8.3.2. The sampling of new fuel oil prior to addition to the storage tanks provide a means of determining whether the 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 operation. Additionally, Action C is included to provide a limited restoration time in the event new fuel oil is added and subsequent tests of the new fuel oil are discovered to be out of limits. This is an additional restriction on unit operation consistent with NUREG-1430.

M12 Specific acceptance criteria for proper operation following a loss of offsite power and following a concurrent loss of offsite power and engineered safety features actuation are included in the proposed SRs for the diesel generator tests, proposed ITS
3.8.1-19 SR 3.8.1.8 and SR 3.8.1.9. CTS 4.6.1.2 provides only requirements that the diesel generator be tested under these conditions. Specific acceptance criteria will assure that the parameters are evaluated against the assumptions used for the parameters in the safety analysis. These acceptance criteria represent an additional restriction on unit operation consistent with NUREG-1430.

M13 Not used.

M14 A periodic verification of proper breaker alignment and indicated power availability on safeguards and instrument buses is being added to the ITS, as SR 3.8.9.1. This verification provides a specific surveillance to verify compliance with CTS 3.7.1.B. This is an additional restriction on unit operations based on NUREG-1430 which considers the installed instrumentation.

M15 CTS 4.6.1.1 requires that the diesel generator be run following the monthly start test "until diesel generator operating temperatures have stabilized." Proposed SR 3.8.1.3 dictates that DG operation continue for one hour. This is a more explicit presentation, but generally consistent with the current requirement. Experience has shown that 60 minutes is the maximum time the diesel generator requires to reach operating temperature. Since shorter times may be acceptable under the CTS, this change is considered more restrictive on unit operations. This change is consistent with NUREG-1430.

M16 CTS 3.0.5 identifies additional system, subsystem, train, component or device OPERABILITY criteria when either its emergency AC power or normal AC power source is inoperable. Once a system, subsystem, train, component or device redundant to one associated with the inoperable AC source is determined to be concurrently inoperable, the CTS allows 2 hours to initiate a required shutdown which is equivalent to the CTS 3.0.3 times. If ITS LCO 3.0.3 is required to be entered (see DOC L1), the resulting actions would be more restrictive than the CTS as described in Section 3.0 DOC M2. This is considered to be an additional restriction on unit operation consistent with NUREG-1430.

ANO-363 M17 CTS 3.7.2.C provides an allowance that in the event one diesel generator is inoperable, the operability of the remaining diesel generator is not required to be demonstrated if it is currently operating or has been demonstrated operable within the previous 24 hours, even if a determination that a common cause failure does not exist has not been made. NUREG 3.8.1 Condition B does not provide an allowance for a diesel demonstrated operable within the previous 24 hours. The CTS allowance would only be applicable under a very remote sequence of events. Therefore, this allowance is not retained.

3.8.1-19 M18 CTS 4.6.1 has been revised to include NUREG SR 3.8.1.5. This SR requires that each diesel generator fuel oil day tank be checked for the presence of accumulated water, and any accumulated water removed, every 31 days. Although this check is not specifically required by the CTS, it is currently performed under administrative controls. This results in a more restrictive requirement.

3.8.1-19, 3.8.1-25 M19 CTS 4.6.1.1 is revised to include a Note with ITS SR 3.8.1.2 (NUREG SR 3.8.1.2) that allows for DG starts to be preceded by an engine prelube period and followed by a warmup period prior to loading. CTS 4.6.1.2 is revised to include a Note with ITS SR 3.8.1.8 and SR 3.8.1.9 (NUREG SR 3.8.1.11 and SR 3.8.1.19) that allows for DG starts to be preceded by an engine prelube period and followed by a warmup period prior to loading. This is consistent with current application of the CTS (which neither requires nor prohibits prelube and warmup periods), with the recommendations of Generic Letter 84-15, and with NUREG-1430. Also, SR 3.8.1.3, Notes 1, 2, 3 & 4, are included to reflect current practice that are not specifically addressed in the current requirements. Although the proposed Notes reflect current operating practices and philosophies, incorporating these Notes in the ITS results in more restrictive requirements. All of these Notes are consistent with allowances provided in NUREG-1430.

3.8.3-01 M20 CTS 4.6.1 is revised to incorporate NUREG SR 3.8.3.5 (ITS SR 3.8.3.4). This SR requires the fuel oil storage tanks to be checked for water, and to remove any accumulated water, once per 31 days. Although this check is consistent with current operating practices, it is not required by the CTS. Therefore, the incorporation of this Surveillance results in a more restrictive requirement.

CTS DISCUSSION OF CHANGES

TECHNICAL CHANGE -- LESS RESTRICTIVE

L1 CTS 3.0.5 describes how system, subsystem, train, component or device OPERABILITY is determined when either its emergency AC power or normal AC power source is inoperable. The CTS determination is generally expected to be a "prompt" determination, even though no specific limit on the time frame is identified. When compared to CTS 3.0.3, there would appear to be a one hour allowance to determine if a loss of function exists, before entering the CTS 3.0.3 time frames of 1, 6, 6, & 24 hours. The proposed ACTIONS for inoperable AC Sources specify time limits longer than that provided by the CTS for completing this initial determination and declaring the system, subsystem, train, component or device associated with the inoperable AC source inoperable. Twenty-four hours has been provided if an offsite circuit is inoperable, 12 hours has been provided if both unit-specific circuits are inoperable, and 4 hours if one diesel generator is inoperable. These times provide a reasonable time to restore the feature or AC source to OPERABLE status commensurate with the level of degradation of unit systems. This change is consistent with NUREG-1430.

The ACTIONS in CTS 3.0.5 ultimately require the unit be placed in a MODE in which the Specification is not applicable, down to and including Cold Shutdown within a set Completion Time. A similar requirement is also imposed in the proposed ITS 3.8.1 Required Actions for an inoperable offsite circuit, for two inoperable offsite circuits, and for an inoperable diesel generator, for the Required Actions not met. However, the intermediate step to be in Hot Standby within 6 hours is omitted. This minor change allows the operations staff additional flexibility in determining the preferred rate and method of performing the shutdown. This change is also consistent with NUREG-1430.

The ITS does not always require a shutdown if a loss of function is identified. Rather, it requires that both redundant components be declared inoperable and the corresponding ACTIONS of the LCO applicable for those components be entered. These ACTIONS may provide for other compensatory measures that have been
3.8.4-02 determined to be appropriate for the condition. Therefore, the CTS 3.7.2.C statement regarding opposite train component verification of OPERABILITY is unnecessary and duplicative of the CTS 3.0.5 requirements (which become ITS 3.8.1 Required Action A.2) and are shown as deleted. This change is consistent with NUREG-1430.

L2 Actions for ITS LCO 3.8.3 will allow time for restoration of parameters that do not result in immediate inability of the diesel generators to perform their function. These parameters, while supporting diesel generator OPERABILITY, contain substantial margin in addition to the limits, which would be absolutely necessary for diesel generator OPERABILITY. Therefore, certain levels of degradation in these parameters are justified to extend the allowances for restoration. During the proposed extended periods for restoration of these parameters, the diesel generator would still be capable of performing its intended function. For example, the fuel oil volume may be allowed to be less than the CTS 20,000 gal for up to 48 hours, provided 6/7 of the required supply continues to be available. The reduced limits provide a high level of assurance that the AC Sources will be available when needed. These changes are consistent with NUREG-1430.

ANO-363 L3 The ITS would allow several new Conditions which allow concurrent inoperabilities of the equipment required by CTS 3.7.1. CTS 3.7.2.A allows only one of the subordinate conditions (i.e., CTS 3.7.2.B through 3.7.2.H) to exist and several of the allowed outage times are dependent on the OPERABILITY of other electrical equipment. These are discussed separately below.

CTS 3.7.2.B for one inoperable offsite circuit implies a verification that the other offsite circuit is available. Proposed ITS 3.8.1 Condition C will allow two inoperable offsite circuits for 24 hours, and proposed ITS 3.8.1 Condition D will allow a combination of one offsite circuit and one diesel generator (DG) to be inoperable for 12 hours. CTS 3.7.2.C similarly allows for only one DG to be inoperable and only if both offsite circuits are verified available. In addition to the combination proposed in ITS 3.8.1 Condition D, Condition E will allow both DGs to be inoperable for 2 hours. These allowed Completion Times are consistent with Regulatory Guide 1.93. Further, inoperability of the AC distribution systems is totally separated from dependence on the OPERABILITY of the DGs. These conditions of concurrent inoperabilities have been generically determined to be acceptable temporary conditions partially due to the high improbability of such a condition existing concurrently with the need for the equipment to perform its safety functions and partially due to the abilities of the remaining equipment. This improbability is supported by allowing only short duration for such conditions. However, concurrent inoperabilities beyond those identified will continue to result in unit shutdown because application of proposed ITS 3.8.1 Condition G and ITS 3.8.9 Condition E will result in unit shutdown in accordance with LCO 3.0.3. This change is consistent with NUREG-1430.

CTS 3.7.2.C and 3.7.2.D also require demonstrations of OPERABILITY of diesel generators when other AC Sources are inoperable. These demonstrations are no longer required if the inoperability is other than a diesel generator, and the demonstration is not required if the inoperability is a diesel generator if it can be determined that the inoperability is not caused by a common mode failure. These conditions present no basis for questioning the OPERABILITY of a diesel generator for which the surveillances are current. Therefore, these requirements for demonstration of

OPERABILITY are omitted. This change is also consistent with NUREG-1430 and with several previously approved changes for other plants' Technical Specifications.

L4 The CTS 3.7.2.B Completion Time for restoration of an inoperable offsite circuit is extended from 24 hours to 72 hours consistent with NUREG 3.8.1 RA A.3. The proposed Completion Time is based on a reasonable time for repairs of an offsite circuit, the capacity and capability of the remaining sources, and the low probability of a design basis event occurring during this period. This change is also consistent with the completion time of other CTS Specifications (e.g., Table 3.5.1-1, Note 14 referenced from CTS 3.7.2.H(2)) also pertaining to offsite power (switchyard) component inoperability. This change is consistent with NUREG-1430.

Additionally, the allowed Completion Time provided by CTS Table 3.5.1-1, Note 14, (referenced from CTS 3.7.2.H(2)) to reach hot shutdown following a 72 hour restoration period is increased from 6 hours to 12 hours consistent with NUREG 3.8.1 RA G.1. This is a reasonable time to achieve the required unit conditions from full power considering the degraded power sources. This change is consistent with NUREG-1430.

L5 NUREG 3.8.6 contains and ACTIONS Note that allows separate condition entry for each battery. The CTS requirements do not explicitly allow the separate condition entry, nor do they prohibit separate condition entry. ITS 3.8.6 provides for separate condition entry. This recognizes the fact that although both batteries may be in a degraded condition, they still have sufficient capacity to perform their function. This change is consistent with NUREG-1430.

ANO-363 L6 Not used

L7 CTS 4.6.1.2.d requires that the diesel generators operate "for ≥ 1 hour after operating temperatures have stabilized" following the loss of offsite power testing. The proposed ITS SR 3.8.1.8 and SR 3.8.1.9 require that the diesel generator operate for only 5 minutes. Capability for the diesel generator extended operation is adequately demonstrated by SR 3.8.1.3. Any additional operation following the loss of offsite power tests is for maintenance purposes only and is therefore, not required by the surveillance. This change is consistent with NUREG-1430. 3.8.1-19

3.8.1-32 L8 CTS 4.6.1.2.c is not included in ITS. By letter dated June 3, 1977 (1CNA067708) the NRC requested that ANO apply for an amendment to incorporate comparable technical specifications to those presented in the letter. These included at least once per 18 months simulating a loss of offsite power in conjunction with a safety injection actuation test signal, and:

1) verifying de-energization of the emergency busses and load shedding from the emergency buses,
2) Verifying the diesel starts from ambient condition on the auto-start signal, energizes the emergency busses with permanently connected loads, energizes the auto-connected emergency loads through the load sequencer and operates for ≥ 5 minutes while its generator is loaded with the emergency loads, and

3) Verifying that on diesel generator trip, the loads are shed from the emergency busses and the diesel re-starts on the auto-start signal, the emergency busses are energized with permanently connected loads, the auto-connected emergency loads are energized through the load sequencer and the diesel operates for ≥ 5 minutes while its generator is loaded with the emergency loads.

Item 3 did involve a hot restart. However, in a letter dated December 17, 1979 (1CNA127919), which approved modifications needed to respond to the June 3, 1977 letter, the Staff required that the Technical Specifications to be submitted should address testing of the emergency power system using the following steps:

1) Simulating a loss of off-site power,
2) Simulating a loss of off-site power in conjunction with an ESF signal, and
3) Simulating interruption of off-site power and subsequent reconnection of the onsite power source to their respective buses.

The technical specifications approved by the Staff in Amendment 60, dated October 23, 1981, required a test to be conducted once every 18 months to demonstrate the ability of the diesel generators to perform as designed by:

1) simulating a loss of off-site power,
2) simulating a loss of off-site power in conjunction with an ESF signal,
3) simulating interruption of off-site power and subsequent reconnection of the on-site power source to their respective busses, and
4) operating the diesel generator for ≥ 1 hour after operating temperatures have stabilized.

However, CTS 4.6.1.2.c does not simulate an activity assumed in the safety analysis beyond the loss of offsite power at the initiation of the event. Further, connection of the DG to the bus following a loss of offsite power, i.e., initial interruption of offsite power, is tested every 18 months, both alone and in conjunction with an engineered safeguards signal. Therefore, an additional test is either duplicative (if done for offsite power) or beyond the assumptions of the safety analysis (if done for onsite power), and is not included in ITS. This change is also consistent with NUREG-1430.

L9 The air compressors in the diesel generator air start system (CTS 3.7.1.C.4 and 4.6.1.4.a) are not specifically assumed to operate to mitigate any design basis accident. Rather the air start system receiver tank is assumed to contain sufficient air to start the diesel generator when necessary. Additional margin is provided by increasing the air supply 17 psig above that sufficient to start the DG. Typically, the diesel generator is assumed to start on the first attempt, or it is considered to be the single failure. The safety analysis does not require the compressor to run to recharge the receiver, only that the air start system be prepared to provide the start attempt when called upon, regardless of the source of the air pressure. This change is consistent with NUREG-1430.

L10 Not used

3.8.1-17 L11 CTS 4.6.1.4 requires that several tests be conducted during the monthly diesel generator start test. Most of this testing is not required to be conducted in conjunction with the DG monthly start test in the ITS. Although testing in conjunction with the DG start test may be convenient, it is not required. Testing separately from the start test is sufficient to verify capability of the support systems to perform their respective safety functions. Specifically, tests required by CTS 4.6.1.4.a, CTS 4.6.1.4.c, CTS 4.6.1.4.d, and CTS 4.6.1.4.e will no longer be required to be performed in conjunction with the monthly DG tests. The fuel oil transfer system test required by CTS 4.6.1.4.b will continue to be performed in conjunction with the DG test. This change is consistent with NUREG-1430.

L12 CTS 3.7.1.B requires that the ESAS AC distribution systems be powered from either the startup transformers or the unit auxiliary transformer in order to be considered OPERABLE (i.e., not allowing the distribution system to be considered OPERABLE if powered solely by the DG). The requirement for powering bus A3 and A4 from bus A1 and A2 is relocated to ITS 3.8.1, AC source OPERABILITY versus the CTS association with distribution system OPERABILITY. The specific power source is not related to the capability of the distribution system to perform its required safety function; an OPERABLE emergency diesel generator is also an acceptable power source for the AC distribution system to be considered OPERABLE. This change is consistent with NUREG-1430, and its definition of OPERABILITY, which, as applied to the distribution system, requires only the normal or emergency power source, but not both. Placing the requirement for bus A3 and A4 to be powered from bus A1 and A2 with the OPERABILITY of offsite sources, continues to impose the requirement and limitations if/when not met.

L13 Not used.

L14 CTS Table 4.1-1, item 32 requires a Monthly channel check and Quarterly channel test of the diesel generator protective relaying starting interlocks and circuitry. These are proposed to be incorporated into the 18 month start and load testing for loss of offsite power (NUREG SR 3.8.1.11), and for a loss of offsite power in conjunction with an engineered safeguards actuation signal (NUREG SR 3.8.1.19). This Frequency is consistent with the recommendations of Regulatory Guide 1.108, and takes into consideration unit conditions preferred for the performance of such testing.

3.8.1-04 L15 CTS 3.7.1.G requires the selective load-shed features associated with startup transformer No. 2 (ST2) to be OPERABLE, but only "if selected for auto transfer." CTS 3.7.2.H provides actions for inoperability of this feature with two options. Option (1) requires that the ST2 feeder breakers be placed in "pull-to-lock" within one hour; and that the interlock be restored within 30 days, or a Special Report be submitted within 30 days. Option (2) allows 72 hours for restoration and then requires hot shutdown in the next 6 hours and cold shutdown in the following 30 hours per Note 14 of Table 3.5.1-1. Option (2) is essentially equivalent to considering the offsite circuit inoperable in ITS. To evaluate changes to Option (1), consider the three following scenarios:

Scenario A: If startup transformer No. 1 (ST1) is OPERABLE, it is normally selected for auto transfer, and the load shed feature of ST2 is not required. CTS 3.7.2.H is not applicable under this condition. There is no change in this scenario.

Scenario B: If ST1 is OPERABLE, but ST2 is selected, and the load shed feature of ST2, while selected, becomes inoperable, CTS provides several options: (a) ST1 is selected (at which point the load shed feature is no longer required); (b) ST2 is placed in "pull-to-lock," and maintained as such for up to 30 days, or beyond 30 days with submittal of a Special Report (in accordance with CTS 6.12.5.j); or (c) the condition may be maintained for up to 72 hours, following which the unit must be shutdown. (Note: option (a) is a de facto option always available in the CTS, options (b) and (c) are given in CTS 3.7.2.H.) These latter two options are typically not used per administrative controls; ST1 is selected for auto transfer if it is OPERABLE. In ITS, the identified conditions will be considered as an inoperable offsite circuit, with 72 hours provided for restoration per LCO 3.8.1, Required Action A.3. Loss of other functions is addressed by Required Action A.2. As before, administrative controls will typically prevent the utilization of ST2 as the selected offsite circuit for automatic transfer if ST1 is OPERABLE. However, because option (b) is not available in ITS, this portion of the change is more restrictive {and identified as DOC M8.}

Scenario C: If ST1 is inoperable, and the load shed feature of ST2, while selected, becomes inoperable, ST2 is considered inoperable whether placed in "pull-to-lock" or not since it is either not available for auto transfer to pick up the loads on a dead bus, or if auto transfer remains available, it may not appropriately shed the loads and a degraded voltage situation may develop. In CTS, this results in loss of function and a condition not addressed by the Specifications. Therefore, LCO 3.0.3 is entered. In ITS, both offsite circuits are also inoperable, but 24 hours are provided for restoration of at least one offsite circuit per LCO 3.8.1, Required Action C.2. Loss of other functions is addressed by Required Action C.1. This change is less restrictive. The proposed Completion Times to restore multiple inoperable AC Sources to OPERABLE status prior to requiring a unit shutdown is acceptable based on the overall probability of an event requiring the inoperable AC Sources during this time period. Providing Completion Times will minimize the potential for plant transients that can occur during shutdown by providing some time to restore the affected AC Sources to OPERABLE status prior to requiring a unit shutdown.

3.8.1-21 L16. CTS Table 4.1-1, Item 33 requires the test of the selective load shedding features associated with startup transformer No. 2 to be demonstrated during refueling shutdown (ITS MODE 6). The Note associated with ITS 3.8.1.7 states that this Surveillance is not normally performed in MODE 1 or 2. This is a relaxation of the Modes in which the testing may be performed. In addition, the Note will allow portions of the Surveillance to be performed in MODE 1 or 2, provided an assessment determines that the safety of the plant is maintained or enhanced. This change is acceptable because, for testing in MODES 3, 4, and 5, other Technical Specifications and procedural guidance ensure that the appropriate equipment will remain in service during the performance of the test. If the performance of a surveillance during plant operation would adversely affect safety, EOI/ANO-1 has postponed, and will continue to postpone, the surveillance until the unit is in a condition or mode that is consistent with the safe conduct of that surveillance. The allowance to perform portions of the Surveillance in MODE 1 or 2 is acceptable, because the allowance is expected to be used infrequently, and because an assessment must be performed prior to the performance of the testing to determine that the safety of the plant is maintained or enhanced. This change is consistent with NUREG-1430, as modified by generic change TSTF-283, Rev. 3.

3.8.9-01 L17 CTS 3.7.2.D provides a requirement that in the event any 4160V, 480V, or 120V switchgear, load center, motor control center, or distribution panel is inoperable, all components of the operable distribution system are operable. CTS 3.7.2.A would require a shutdown if a potential loss of safety function were discovered. The ITS does not always require a shutdown if a loss of function is identified. Rather, it requires that both redundant components be declared inoperable and the corresponding ACTIONS of the LCO applicable for those components be entered. These ACTIONS may provide for other compensatory measures that have been determined to be appropriate for the condition. Therefore, this CTS requirement is more appropriately addressed with the added Safety Function Determination Program of ITS 5.5.15, as required by ITS LCO 3.0.6. Components of the electrical distribution system, inverters, and DC subsystems are considered to be support system for other systems contained in the Technical Specifications. LCO 3.0.6 requires that cross train checks to identify a loss of safety function be performed for those systems that support multiple and redundant safety systems. This cross train check verifies that the supported systems of the remaining OPERABLE support system are OPERABLE, thereby ensuring safety function is retained. If the cross train check determines that a loss of safety function exists, the appropriate Conditions and Required Actions of the LCO in which the loss of safety function exists are required to be entered. Therefore, the CTS requirement is embodied in the ITS in LCO 3.0.6 and the SFDP. This change is consistent with NUREG-1430.

3.8.4-02 CTS 3.7.3.A.2 provides a requirement for a redundant subsystem verification for the purpose of identifying a potential loss of safety function. CTS 3.7.3.B would require a shutdown if a potential loss of safety function were discovered. The ITS does not always require a shutdown if a loss of function is identified. Rather, it requires that both redundant components be declared inoperable and the corresponding ACTIONS of the LCO applicable for those components be entered. These ACTIONS may provide for other compensatory measures that have been determined to be appropriate for the condition. Therefore, this CTS requirement is more appropriately addressed with the added Safety Function Determination Program of ITS 5.5.15, as required by ITS LCO 3.0.6. This change is consistent with NUREG-1430.

CTS DISCUSSION OF CHANGES

LESS RESTRICTIVE -- ADMINISTRATIVE DELETION OF REQUIREMENTS

LA1 The description of the equipment to which the requirements are applicable has been moved to the licensee controlled Bases. This information provides details of the method of implementation, which are not directly pertinent to the actual requirement. Since these details are not necessary to adequately describe the actual regulatory requirement, they can be moved to a licensee controlled document without a significant impact on safety. Placing these details in controlled documents provides adequate assurance that they will be maintained. The Bases will be controlled by the process identified in Chapter 5 of the proposed ITS. The CTS location and ITS location for each of these items is listed below. This change is consistent with NUREG-1430.

	CTS Location	New Location
	3.7.1.A	Bases 3.8.1, LCO
3.8.1-03 3.8.1-19	3.7.1.G	Bases 3.8.1, SR 3.8.1.7
	Table 4.1-1, item 32	Bases 3.8.1, SR 3.8.1.8, SR 3.8.1.9
	Table 4.1-1, item 33	Bases 3.8.1, SR 3.8.1.7
3.8.1-16	4.6.1.1	Bases 3.8.1, SR 3.8.1.2

LA2 The ambiguous limitation for inoperability of a diesel generator of "7 days in any month" in CTS 3.7.2.C is removed from the proposed Completion Time for an inoperable diesel generator. Such limitations on total time of inoperability are based on reliability concerns and are not addressed in the RSTS. This limitation will be addressed by the maintenance program in accordance with 10 CFR 50.63. The programmatic controls on diesel generator unavailability are sufficient to ensure the diesel generator receives adequate attention to maintain high reliability. Removal of these details from the Technical Specifications will have no significant effect on diesel generator OPERABILITY. Placing these details in controlled documents provides adequate assurance that they will be maintained. Changes to the program and procedures will be controlled by 10 CFR 50.59. This change is consistent with NUREG-1430.

LA3 The description of the equipment to which the requirements are applicable has been moved to the licensee controlled Technical Requirements Manual (TRM). This information provides details of the method of implementation, which are not directly pertinent to the actual requirement. Since these details are not necessary to adequately describe the actual regulatory requirement, they can be moved to a licensee controlled document without a significant impact on safety. Placing these details in controlled documents provides adequate assurance that they will be maintained. The TRM will be controlled by 10 CFR 50.59. The CTS location and ITS location for each of these items is listed below. This change is consistent with NUREG-1430.

	CTS Location	New Location
3.8.1-03	Table 4.1-1, item 33	TRM
	4.6.1.1	TRM
3.8.1-16	4.6.1.3	TRM

LA4 The CTS 4.6.1.5 Surveillance is not specifically detailed in the proposed ITS. Programmatic controls on the Inservice Testing Program (IST) are sufficient to ensure the diesel generator fuel oil transfer pumps receive the required testing. Removal of these details from the Technical Specifications will have no effect on diesel generator OPERABILITY. The testing will be maintained in the IST and procedures. Placing these details in controlled documents provides adequate assurance that they will be maintained. Changes to the IST and the procedures will be controlled by 10 CFR 50.55a and 10 CFR 50.59. This change is consistent with NUREG-1430.

LA5 CTS 4.6.2.4 requires that any battery "which has not been loaded while connected to its 125 VDC distribution system" to be loaded for 30 minutes each quarter. The associated Bases provide the added confirmation that this loading is simply "supplying the connected loads while maintaining the battery fully charged." This requirement is obviously being met for any connected battery charger by virtue of satisfying CTS 4.6.2.1, "Verify battery terminal voltage is $\geq$ 124.7 V on float charge," which is retained as ITS SR 3.8.4.1. As such, this single Surveillance adequately and completely encompasses CTS 4.6.2.4 (30 minute loading). The remaining purpose of CTS 4.6.2.4 is to imply alternating each battery charger with the spare charger each quarter. This operational maintenance practice is relocated from the Technical Specifications to the TRM. Since these details are not necessary to maintain or confirm OPERABILITY of the in-service charger, it can be moved to a licensee controlled document without a significant impact on safety. The TRM will be controlled by 10 CFR 50.59. This change is consistent with NUREG-1430.

LIMITING CONDITION FOR OPERATION (continued)

3.8.1 RA A.2
3.8.1 RA B.2
3.8.1 RA C.1

3.0.5 When a system, subsystem, train, component or device is determined to be inoperable solely because its emergency power source is inoperable, or solely because its normal power source is inoperable, it may be considered OPERABLE for the purpose of satisfying the requirements of its applicable Limiting Condition for Operation, provided: (1) its corresponding normal or emergency power source is OPERABLE; and (2) all of its redundant system(s), subsystem(s), train(s), component(s) and device(s) are OPERABLE; or likewise satisfy the requirements of this specification. Unless both conditions (1) and (2) are satisfied, ~~within 2 hours~~ action shall be initiated to place the unit in an OPERATING CONDITION in which the applicable Limiting Condition for Operation does not apply by placing it, as applicable, in: L1 M16

1. ~~At least HOT STANDBY within the next 6 hours.~~

3.8.1 RA F.1

2. At least ~~HOT SHUTDOWN~~ MODE 3 within ~~the following 6~~ 12 hours, and A1

3.8.1 RA F.2

3. At least ~~COLD SHUTDOWN~~ MODE 5 within ~~the subsequent 24~~ 36 hours.

This Specification is not applicable in ~~Cold Shutdown or Refueling Shutdown~~ MODE 5 or 6. A3

BASES

A2

~~3.0.1 through 3.0.4 Establish the general requirements applicable to Limiting Conditions for Operation. These requirements are based on the requirements for Limiting Conditions for Operation stated in the Code of Federal Regulations, 10 CFR 50.36(c)(2):~~

~~"Limiting conditions for operation are the lowest functional capability or performance levels of equipment required for safe operation of the facility. When a limiting condition for operation of a nuclear reactor is not met, the licensee shall shutdown the reactor or follow any remedial Action permitted by the Technical Specification until the condition can be met."~~

~~3.0.1 Establishes the Applicability statement within each individual Specification as the requirement for when (i.e., in which operational modes or other specified conditions) conformance to the Limiting Conditions for Operation is required for safe operation of the facility. The Action requirements establish those remedial measures that must be taken within specified time limits when the requirements of a Limiting Condition for Operation are not met.~~

~~There are two basic types of Action requirements. The first specifies the remedial measures that permit continued operation of the facility which is not further restricted by the time limits of the Action requirements. In this case, conformance to the Action requirements provides an acceptable level of safety for unlimited continued operation as long as the Action requirements continue to be met. The second type of Action requirement specifies a time limit in which conformance to the conditions of the Limiting Condition for Operation must be met. This time limit is the allowable outage time to~~

A2

BASES (continued)

initiated or that higher modes of operation are not entered when corrective action is being taken to obtain compliance with a specification by restoring equipment to OPERABLE status or parameters to specified limits. Compliance with Action requirements that permit continued operation of the facility for an unlimited period of time provides an acceptable level of safety for continued operation without regard to the status of the plant before or after a mode change. Therefore, in this case, if the requirements for continued operation have been met in accordance with the requirements of the specification, then entry into that mode of operation is permissible. The provisions of this specification should not, however, be interpreted as endorsing the failure to exercise good practice in restoring systems or components to OPERABLE status before plant startup.

When a shutdown is required to comply with Action requirements, the provisions of Specification 3.0.4 do not apply because they would delay placing the facility in a lower mode of operation. For the purpose of compliance with this specification the term 'shutdown' is defined as a required reduction in the REACTOR OPERATING CONDITION.

3.0.5 Delineates what additional conditions must be satisfied to permit operation to continue when a normal or emergency power source is not OPERABLE. It specifically prohibits operation when one division is inoperable because its normal or emergency power source is inoperable and a system, subsystem, train, component or device in another division is inoperable for another reason.

The provisions of this specification permit the Limiting Condition for Operation statements associated with individual systems, subsystems, trains, components or devices to be consistent with the Limiting Condition for Operation statements of the associated electrical power source. It allows operation to be governed by the time limits of the Limiting Condition for Operation for the normal or emergency power source, not the individual Limiting Condition for Operation statements for each system, subsystem, train, component or device that is determined to be inoperable solely because of the inoperability of its normal or emergency power source.

For example, Specification 3.7.2.C provides for a 7 day out-of-service time when one emergency diesel generator is not OPERABLE. If the definition of OPERABLE were applied without consideration of Specification 3.0.5, all systems, subsystems, trains, components and devices supplied by the inoperable emergency power source would also be inoperable. This would dictate invoking the applicable Action statements for each of the applicable Limiting Conditions for Operation. However, the provisions of Specification 3.0.5 permit the time limits for continued operation to

AZ

be consistent with the Limiting Condition for Operation statement for the inoperable emergency diesel generator instead, provided the other specified conditions are satisfied. In this case, this would mean that the corresponding normal power source must be OPERABLE, and all redundant systems, subsystems, trains, components and devices must be OPERABLE, or otherwise satisfy Specification 3.0.5 (i.e., be capable of performing their design function and have at least one normal or one emergency power source OPERABLE). If they are not satisfied, shutdown is required in accordance with this specification.

As a further example, Specification 3.7.1.A requires in part that two physically independent circuits between the offsite transmission network and the onsite Class IE distribution system be OPERABLE. Specification 3.7.2.B provides a 24 hour out-of-service time when both required offsite circuits are not OPERABLE. If the definition of OPERABLE were applied without consideration of Specification 3.0.5, all systems, subsystems, trains, components and devices supplied by the inoperable normal power sources, both of the offsite circuits would also be inoperable. This would dictate invoking the applicable Limiting Condition for Operation statements for each of the applicable LCOs. However, the provisions of Specification 3.0.5 permit the time limits for continued operation to be consistent with the Limiting Condition for Operation statement for the inoperable normal power sources instead, provided the other specified conditions are satisfied. In this case, this would mean that for one division the emergency power source must be OPERABLE (as must be the components supplied by the emergency power source) and all redundant systems, subsystems, trains, components and devices in the other division must be OPERABLE, or likewise satisfy Specification 3.0.5 (i.e., be capable of performing their design functions and have an emergency power source OPERABLE). In other words, both emergency power sources must be OPERABLE and all redundant systems, subsystems, trains, components and devices in both divisions must also be OPERABLE. If these conditions are not satisfied, shutdown is required in accordance with this specification.

During Cold Shutdown and Refueling Shutdown, Specification 3.0.5 is not applicable and thus the individual Action statements for each applicable Limiting Condition for Operation in these MODES must be adhered to.

{NOTE 14 referenced from CTS 3.7.2.H(2), PAGE 57}

TABLE 3.5.1-1 (Cont'd)

<LATER> (3.3 D)

12. With the number of operable channels less than required, either return the indicator to operable status within 24 hours, or verify the block valve closed and power removed within an additional 24 hours. If the block valve cannot be verified closed within the additional 24 hours, de-energize the electromatic relief valve power supply within the following 12 hours. — LATER

<LATER> (3.3 D)

13. Channels may be bypassed for not greater than 30 seconds during reactor coolant pump starts. If the automatic bypass circuit or its alarm circuit is inoperable, the undervoltage protection shall be restored within 1 hour, ~~otherwise, Note 14 applies.~~ — LATER

3.8.1 RA A.3, F.1, F.2 <LATER> (3.3 D)

14. With the number of channels less than required, restore the inoperable channels to operable status within 72 hours or be in HOT SHUTDOWN within the next 8 12 hours and in COLD SHUTDOWN within the following 30 hours. — & LATER L4

<LATER> (3.3.A & 3.3 C)

15. This trip function may be bypassed at up to 10% reactor power. — LATER

<LATER> (3.3 A)

16. This trip function may be bypassed at up to 45% reactor power. — LATER

<LATER> (3.3 D)

17. With no channel operable, within 1 hour initiate and maintain operation of the control room emergency ventilation system in the recirculation mode of operation.

18. With one channel inoperable, restore the inoperable channel to operable status within 7 days or within the next 6 hours initiate and maintain operation of the control room emergency ventilation system in the recirculation mode of operation. — LATER

<LATER> (3.3 C)

19. This function may be bypassed below 750 psig OTSG pressure. Bypass is automatically removed when pressure exceeds 750 psig. — LATER

<LATER> (3.3 D)

20. With one channel inoperable, (1) either restore the inoperable channel to operable status within 7 days, or (2) prepare and submit a Special Report to the Commission pursuant to Specification 6.12.5 within 30 days following the event, outlining the action taken, the cause of the inoperability, and the plans and schedule for restoring the system to operable status. With both channels inoperable, initiate alternate methods of monitoring the containment radiation level within 72 hours in addition to the actions described above.

21. With one channel inoperable, restore the inoperable channel to operable status within 30 days or be in hot shutdown within 72 hours unless containment entry is required. If containment entry is required, the inoperable channel must be restored by the next refueling outage. If both channels are inoperable, restore the inoperable channels within 30 days or be in HOT SHUTDOWN within 12 hours. — LATER

3.8.1

3.8.2-01
3.8.5-01
3.8.8-01

3.8.1
3.8.3
3.8.9

3.7 Auxiliary Electrical Systems

~~Applicability~~

~~Applies to the auxiliary electrical power systems.~~

~~Objectives~~

~~To specify conditions of operation for plant station power necessary to ensure safe reactor operation and combined availability of the engineered safety features.~~ A.1

Specifications

3.8.1 APPL
3.8.3 APPL
3.8.9 APPL

3.7.1 ~~The reactor shall not be heated or maintained above 200°F unless the following conditions are met (except as permitted by Paragraph 3.7.2)~~ MODES 1, 2, 3, & 4 A12

3.8.1.a LCO

A. ~~Any one of the following combinations of power sources operable:~~

1. ~~Startup Transformer No. 1 and Startup Transformer No. 2.~~

2. ~~Startup Transformer No. 2 and Unit Auxiliary Transformer provided that the latter one is connected to the 22KV line from the switchyard rather than to the generator bus.~~ LA1 BASES

3.8.9 LCO

B. All 4160 V switchgear, 480 V load centers, 480 V motor control centers and 120 V AC distribution panels in both of the ESAS distribution systems are operable ~~and are being powered from either one of the two startup transformers or the unit auxiliary transformer~~. L12

3.8.1.b LCO
3.8.3 LCO

C. Both diesel generator sets are operable each with:

SR 3.8.1.4

1. a separate day tank containing a minimum of 160 gallons of fuel,

SR 3.8.3.1

2. a separate emergency storage tank containing a minimum of 138 inches (20,000 gallons) of fuel, L2

3.8.1-19

SR 3.8.1.6

3. a separate fuel transfer pump, and

3.8.3 LCO

4. a separate starting air ~~compressor~~. subsystem L9

D. DELETED

E. DELETED

3.8.1-03

<LATER> (3.3D)

F. ~~The off-site power undervoltage and protective relaying interlocks associated with required startup transformer power sources shall be operable per Table 3.5.1-1.~~ LATER

3.8.1.a LCO

G. ~~The selective load-shed features associated with Startup Transformer No. 2 shall be operable if selected for auto transfer.~~ LA1 BASES

<INSERT CTS 56A>

<CTS INSERT CTS56A>

	Add ITS 3.8.3 Actions & Actions Note	Diesel Fuel Oil and Starting Air	L2
	Add ITS 3.8.7	Inverters - Operating	M1
3.8.2-01	Add ITS 3.8.2	AC Sources – Shutdown	M2
3.8.5-01	Add ITS 3.8.5	DC Sources – Shutdown	M2
3.8.8-01	Add ITS 3.8.8	Inverters – Shutdown	M2
3.8.10-01	Add ITS 3.8.10	Distribution Systems – Shutdown	M2

3.8.2-01
3.8.5-01
3.8.8-01
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3.8.1
3.8.9

<INSERTS CTS 57A + 57B>

3.8.1 Appl
3.8.9 Appl
3.8.9 RA D.1, D.2, E.1
3.8.1 RA F.1, F.2
3.8.1 RA G.1

3.7.2

A. The specifications in 3.7.1 may be modified to allow one of the following conditions to exist after the reactor has been heated above 200F. (MODES 1-4) Except as indicated in the following conditions, if any of these conditions are not met, a hot shutdown shall be initiated within 12 hours. If the condition is not cleared within 24 hours, the reactor shall be brought to cold shutdown (MODE 5) within an additional 24 hours. (L3) (A1) (M3) (A1)

3.8.1 RA A.3 — B. In the event that one of the offsite power sources specified in 3.7.1.A (1 or 2) is inoperable, reactor operation may continue for up to 24 (72) hours. Startup Transformer No. 2 may be removed from service for up to 30 days as part of a preplanned preventative maintenance schedule. The 30-day allowance may be applied not more than once in any 10-year period. The provisions of Specification 3.0.4 are not applicable to Startup Transformer No. 2 during the 30-day preventative maintenance period. (L4)

3.8.1 RA A.3 NOTE —

(LA2)

3.8.1-06

3.8.1 RA B.4 — C. Either one of the two diesel generators may be inoperable for up to 7 days (in any month) provided that there are no inoperable ESF components associated with the operable diesel generator and provided that the two sources of off-site power specified in 3.7.1.A(1) or 3.7.1.A(2) are available. The operability of the remaining diesel generator shall be demonstrated within 24 hours unless it is determined that a common cause failure does not exist or, unless it is currently in operation or has been demonstrated operable within the previous 24 hours. (L1) (M4) (M17)

3.8.1 RA B.2 —
3.8.1 RA B.1 —
3.8.1 RA B.3.2 —
3.8.1 RA B.3.1 —

3.8.9-01

3.8.9 RA A.1 + B.1 — D. Any 4160V, 480V, or 120V switchgear, load center, motor control center, or distribution panel in one of the two ESF distribution systems may be inoperable for up to 8 hours, provided that the operability of the diesel generator associated with the operable ESF distribution system is demonstrated immediately and all of the components of the operable distribution system are operable. If the ESF distribution system is not returned to service at the end of the 8 hour period, Specification 3.7.2.A shall apply. (L3) (L17)

3.8.9 RA D.1 + D.2 —

E. DELETED

F. DELETED

G. DELETED

3.8.1-04

H. If the requirements of Specification 3.7.1.G cannot be met, either: (M8)

(1) place all Startup Transformer No. 2 feeder breakers in "pull-to-lock" within 1 hour, restore the inoperable interlocks to operable status within 30 days, or submit within 30 days a Special Report pursuant to Specification 6.12.5 outlining the cause of the failure, proposed corrective action and schedule for implementation; or (L15)

3.8.1 RA F.1 + F.2
<See CTS pg 45f>

(2) apply the action requirements of Table 3.5.1-1, Note 14. (A1)

<CTS INSERT CTS57A>

for ITS 3.8.1 AC Sources - Operating

Add Required Action A.1 M4

Add "10 day" Completion Time for Required Action A.3
and for Required Action B.4 M5

Add Required Action C.2 and Conditions D and E L3

<CTS INSERT CTS57B>

for ITS 3.8.9 Distribution Systems - Operating

Add "16 hour" Completion Time for Required Action A.1
and for Required Action B.1
and for Required Action C.1 M5

3.8.2-01
3.8.5-01
3.8.8-01

3.8.1
3.8.3
3.8.4
3.8.6
3.8.9

<INSERT 3.8.6 ACTIONS NOTE> L5

3.8.4 LCO
3.8.4 APPL
3.8.6 APPL

3.7.3 Both 125 VDC electrical power subsystems shall be operable ~~when the unit is above the cold shutdown condition.~~ MODES 1, 2, 3 & 4 A1

A. With one 125 VDC electrical power subsystem inoperable:

<LATER> (5.0) 3.8.4-01 3.8.4-02

1. ~~verify that there are no inoperable safety related components associated with the operable 125 VDC electrical subsystem which are redundant to the inoperable 125 VDC electrical power subsystem,~~ LATER

2. ~~verify the operability of the diesel generator associated with the operable 125 VDC electrical subsystem immediately, and~~ L17

3.8.4 RA A.1 3. restore the 125 VDC electrical subsystem to operable status within 8 hours.

3.8.4 RA B.1, B.2 B. With one 125 VDC electrical power subsystem inoperable, and unable to satisfy the requirements or allowable outage times of 3.7.3.A.1, 3.7.3.A.2, or 3.7.3.A.3, the unit shall be placed in ~~hot shutdown~~ MODE 3 within 12 hours and in ~~cold shutdown~~ MODE 5 within an additional 24 hours. A1

3.8.6 LCO 3.7.4 Battery cell parameters shall be within limits when the associated DC electrical power subsystems are required to be operable.

3.8.6 COND A A. With one or more batteries with one or more battery cell parameters not within Table ~~4.6-1~~ 3.8.4-1 Category A or B limits:

3.8.6 RA A.1 1. Within 1 hour, verify pilot cell electrolyte level and float voltage meet Table 4.6-1 Category C limits,

3.8.6 RA A.2 2. Within 24 hours and once per 7 days thereafter, verify battery cell parameters meet Table ~~4.6-1~~ 3.8.4-1 Category C limits, and

3.8.6 RA A.3 3. Within 31 days, restore battery cell parameters to Table ~~4.6-1~~ Category A and B limits. A1

3.8.6 COND B & RA B.1

B. With one or more batteries with one or more battery cell parameters not within Table ~~4.6-1~~ Category A or B limits and unable to satisfy the requirements or allowable outage times of 3.7.4.A.1, 3.7.4.A.2, or 3.7.4.A.3, declare the associated battery inoperable immediately and perform the required actions of 3.7.3.A. 3.8.4-1 A1

C. With one or more batteries with electrolyte temperature of the pilot cell not within the limits of Specification 4.6.2.8, electrolyte temperature of representative cells not within the limits of Specification 4.6.2.6 or with one or more batteries with one or more battery cell parameters not within Table ~~4.6-1~~ Category C limits, declare the associated battery inoperable immediately and perform the required actions of 3.7.3.A.

~~Bases~~

~~The electrical system is designed to be electrically self-sufficient and provide adequate, reliable power sources for all electrical equipment during startup, normal operation, safe shutdown and handling of all emergency situations. To prevent the concurrent loss of all auxiliary power, the various sources of power are independent of and isolated from each other.~~ A2

3.8.2-01
3.8.5-01
3.8.8-01
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3.8.1
3.8.3
3.8.4
3.8.6
3.8.9

In the event that the offsite power sources specified in 3.7.1.A (1 or 2) are inoperable, the required capacity of one emergency storage tank plus one day tank (20, 160 gallons) will be sufficient for not less than three and one-half days operation for one diesel generator loaded to full capacity. (ANO-1 FSAR 8.2.2.3) The underground emergency storage tanks are gravity fed from the bulk storage tank and are normally full, while the day tanks are fed from transfer pumps which are capable of being cross connected at their suction and discharges and automatically receive fuel oil when their inventory is less than 180 gallons. Thus, at least a seven day total diesel oil inventory is available onsite for emergency diesel generator operation during complete loss of electric power conditions.

Technical Specification 3.7.2 allows for the temporary modification of the specifications in 3.7.1 provided that backup system(s) are operable with safe reactor operation and combined availability of the engineered safety features ensured. The requirements for diesel generators are consistent with Generic Letter 84-15, "Proposed Staff Actions to Improve And Maintain Diesel Generator Reliability" and the Revised Standard Technical Specifications (NUREG 1430). The evaluation of a common cause failure (degradation that may affect the operability of the remaining diesel generator) should be completed within 24 hours from when the affected diesel generator is determined to be inoperable. A2

Technical Specifications 3.7.1.F and 3.7.1.G provide assurance that the Startup Transformer No. 2 loads will not contribute to a sustained degraded grid voltage situation. This will protect ESF equipment from damage caused by sustained undervoltage.

The 125 VDC electrical power system consists of two independent and redundant safety related class 1E DC electrical subsystems. Each subsystem consists of one 100% capacity 125 VDC battery, its associated battery charger, and its distribution network. 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 one of the required DC electrical power subsystems is inoperable (e.g., inoperable battery, no operable battery charger, or inoperable battery and no operable associated battery charger), 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 ES functions, continued power operation should not exceed 8 hours.

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 event or a postulated design basis accident. Cell parameter limits are conservatively established, allowing continued DC electrical system function even with Table 4.6-1 Category A and B limits not met.

With one or more cells in one or more batteries not within limits (i.e., Table 4.6-1 Category A limits not met, or Category B limits not met, or Category A and B limits not met) but within the Table 4.6-1 Category C limits, the battery is degraded but has sufficient capacity to perform its intended function. Therefore, the battery is not required to be considered inoperable solely as a result of Category A or B limits not met, and continued operation is permitted for a limited period of time. The pilot cell electrolyte level and float voltage are required to be verified to meet the Table 4.6-1 Category C limits within 1 hour (TS 3.7.4.A.1). These checks will provide a quick representative status of the remainder of the battery cells. Verification that the Table 4.6-1 Category C limits are met (TS 3.7.4.A.2) provides assurance that

3.8.2-01
3.8.5-01
3.8.8-01
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during the time needed to restore the parameters to within the Category A and B limits, the battery will still be capable of performing its intended function. This verification is repeated at 7 day intervals until the parameters are restored to within Category A and B limits. This periodic verification is consistent with the increased potential to exceed these battery parameter limits during these conditions.

A2

With one or more batteries with one or more battery cell parameters outside the Table 4.6-1 Category C limit for any connected cell, sufficient capacity to supply the maximum expected load requirement is not assured. Therefore, the battery must be immediately declared inoperable and the corresponding DC electrical power subsystem must be declared inoperable.

Additionally, other potentially extreme conditions, such as electrolyte temperature of the pilot cell falling below 60°F, average electrolyte temperature of representative cells falling below 60°F or battery terminal voltage below the limit are also cause for immediately declaring the associated DC electrical power subsystem inoperable.

An allowance has been provided, extending the allowable outage time for Startup Transformer No. 2 only, for up to 30 days. The 30-day allowance is permitted not more than once in any 10-year period, which is considered sufficient for proper maintenance of the transformer. The 30-day window should permit extensive preplanned preventative maintenance without placing either unit in an action statement of short duration and would allow both units to be operating during such maintenance. Because this allowance assumes parts are prestaged, appropriate personnel are available, and proper contingencies have been established, it is not intended to be used for an unexpected loss of the transformer. Pre-established contingencies will consider the projected stability of the offsite electrical grid, the atmospheric stability projected for the maintenance window, the ability to adequately control other ongoing plant maintenance activities that coincide with the window, projected flood levels, and the availability of all other power sources. Since a station blackout is the most affected event that could occur when power sources are inoperable, the steam driven emergency feedwater pump will also be maintained available during the evolution.

3.8 FUEL LOADING AND REFUELING

Applicability

Applies to fuel loading and refueling operations.

Objective

To assure that fuel loading, refueling and fuel handling operations are performed in a responsible manner.

Specification

3.8.1 Radiation levels in the reactor building refueling area shall be monitored by instrument RE-8017. Radiation levels in the spent fuel storage area shall be monitored by instrument RE-8009. If any of these instruments become inoperable, portable survey instrumentation, having the appropriate ranges and sensitivity to fully protect individuals involved in refueling operation, shall be used until the permanent instrumentation is returned to service.

3.8.2 Core subcritical neutron flux shall be continuously monitored by at least two neutron flux monitors, each with continuous indication available, whenever core geometry is being changed. When core geometry is not being changed, at least one neutron flux monitor shall be in service.

3.8.3.a. At least one decay heat removal loop shall be in operation.* Otherwise, suspend all operations involving an increase in the reactor decay heat load or a reduction in boron concentration of the reactor coolant system, and close all containment penetrations providing access from the containment atmosphere to the outside atmosphere within 4 hours.

b. When the water level above the top of the irradiated fuel assemblies seated within the reactor pressure vessel is less than 23 feet, two decay heat removal loops shall be operable.**

Otherwise, immediately initiate corrective action to return the required loops to operable status as soon as possible.

3.8.4 During reactor vessel head removal and while loading and unloading fuel from the reactor, the boron concentration shall be maintained at not less than that required for refueling shutdown.

3.8.5 Direct communications between the control room and the refueling personnel in the reactor building shall exist whenever changes in core geometry are taking place.

*The decay heat removal loop may be removed from operation for up to 1 hour per 8 hour period during the performance of core alterations.

**The normal or emergency power source may be inoperable for each shutdown cooling loop.

Table 4.1-1 (Cont.)

	Channel Description	Check	Test	Calibrate	Remarks	
<LATER> (3.3 D)	29. High and Low Pressure Injection Systems: Flow Channels	NA	NA	R		LATER
<LATER> (3.4 B)	30. Decay heat removal system isolation valve automatic closure and interlock system	S(1)(2)	M(1)(3)	R	(1) Includes RCS Pressure Analog Channel (2) Includes CFT Isolation Valve Position (3) At least once every refueling shutdown, with Reactor Coolant System Pressure greater than or equal to 200 psig, but less than 300 psig, verify automatic isolation of the decay heat removal system from the Reactor Coolant System on high Reactor Coolant System pressure.	LATER
	31. Deleted					A1
SR 3.8.1.8 SR 3.8.1.9	32. Diesel generator protective relaying starting interlocks and circuitry	M	~~Q~~ R	NA		L14 LA1 Bases LA3 TRM
SR 3.8.1.7 + Note	33. Off-site power undervoltage and protective relaying interlocks and circuitry	W	R(1)	R(1)	(1) Shall be tested during refueling shutdown to demonstrate selective load shedding interlocks function during manual or automatic transfer of Unit 1 auxiliary load to Startup Transformer No. 2.	L16 LA1 Bases
<LATER> (3.3 D)	34. Borated water storage tank level indicator	W	NA	R		LATER
<LATER> (3.3 A)	35. Reactor trip upon loss of main feedwater circuitry	M	PC	R		LATER

3.8.1-19
3.8.1-21

3.8.1

3.8.1-19
3.8.2-01

4.6 AUXILIARY ELECTRICAL SYSTEM TESTS

~~Applicability~~ A1

~~Applies to the periodic testing and surveillance requirements of the auxiliary electrical system to ensure it will respond promptly and properly when required.~~

~~Specification~~

4.6.1 Diesel Generators

LA3 TRM

SR 3.8.1.2 1. Each diesel generator shall be manually started each month and demonstrated to be ready for loading within 15 seconds. ~~The signal initiating the start of the diesel shall be varied from one test to another (start with handswitch at control room panel and at diesel local control panel) to verify all starting circuits are operable.~~ A7 LA1 Bases

SR3.8.1.3 The generator shall be synchronized from the control room and loaded to full rated load and allowed to run ~~until diesel generator operating temperatures have stabilized.~~ ≥ 1 hour A9 M15

SR 3.8.1.8
SR 3.8.1.9 2. A test shall be conducted once every 18 months to demonstrate the ability of the diesel generators to perform as designed by: A7 M12

SR 3.8.1.8 a. simulating a loss of off-site power,

SR 3.8.1.9 b. simulating of loss of off-site power in conjunction with an ESF signal,

~~c. simulating interruption of off-site power and subsequent reconnection of the on-site power source to their respective busses, and~~ L8

SR3.8.1.8
SR 3.8.1.9 d. operating the diesel generator for ~~≥1 hour after operating temperatures have stabilized.~~ 5 minutes L7

3.8.1-16

3. ~~Each diesel generator shall be given an inspection once every 18 months following the manufacturer's recommendations for this class of standby service. (A one-time extension of this interval is allowed so that these may be performed during the 1R9 refueling outage, and completed no later than December 1, 1990.)~~ LA1 TRM A4

3.8.1-17

& (LATER)
(5.0)
SR3.8.1.6 4. During the monthly diesel generator test specified in paragraph ~~1 above~~, the following shall be performed: L11 & LATER

SR 3.8.3.3 a. The diesel generator starting air compressors shall ~~be checked for operation and their ability to recharge the~~ air receivers. L9

SR 3.8.1.6 b. The diesel oil transfer pumps shall be checked for operability and their ability to transfer oil to the day tank.

SR 3.8.1.4 c. The day tank fuel level shall be verified.

SR 3.8.3.1 d. The emergency storage tank fuel level shall be verified.

3.8.2-01
3.8.5-01

3.8.3
3.8.4
3.8.6

<ADD LCO 3.8.3 ACTION B,C & SR 3.8.3.2 for New fuel oil> M11

SR 3.8.3.2 & <LATER>(5.0)

e. Diesel fuel from the emergency storage tank shall be sampled and found to be within acceptable limits specified in Table 1 of ASTM D975-68 when checked for viscosity, water, and sediment. LATER

SR 3.8.3.3 5. Once every 31 days the pressure in the required starting air receiver tanks shall be verified to be ≥ 175 psig.

~~Once every 18 months, the capacity of each diesel oil transfer pump shall be verified to be at least 10 gpm.~~ LA4

4.6.2 DC Sources and Battery Cell Parameters

SR 3.8.4.1 1. Verify battery terminal voltage is ≥ 124.7 V on float charge once each 7 days.

SR 3.8.4.2 2. Verify battery capacity is adequate to supply, and maintain in operable status, the required emergency loads for the design duty cycle when subjected to either a battery service test or a modified performance discharge test once every 18 months.

SR 3.8.4.3 3. Verify battery capacity is ≥ 80% of the manufacturers rating when subjected to a performance discharge test or a modified performance discharge test once every 60 months, once every 24 months when battery has reached 85% of the service life with capacity ≥ 100% of the manufacturers rating and showing no degradation, and once every 12 months when battery shows degradation or has reached 85% of the service life and capacity is < 100% of the manufacturer's rating.

~~4. Any battery charger which has not been loaded while connected to its 125V d-c distribution system for at least 30 minutes during every quarter shall be tested and loaded while connected to its bus for 30 minutes.~~ LA5

SR 3.8.6.1 5. Verify battery pilot cell parameters meet Table 4.6-1 Category A limits once per 7 days.

SR 3.8.6.4 6. Verify average electrolyte temperature of representative cells is ≥ 60°F once per 92 days.

SR 3.8.6.3 7. Verify battery cell parameters meet Table 4.6-1 Category B limits once per 92 days and once within 24 hours after a battery discharge to < 110 V and once within 24 hours after a battery overcharge to > 145 V.

SR 3.8.6.2 8. Verify electrolyte temperature of pilot cell is ≥ 60°F once per 31 days.

~~4.6.3 Emergency Lighting~~

~~The correct functioning of the emergency lighting system shall be verified once every 18 months.~~ R TRM

<Add SR 3.8.1.5> M18

<Add SR 3.8.3.4> M20

3.8.1-19
3.8.3-01

<INSERT CTS100aA>

for ITS 3.8.1 AC Sources - Operating

Add SR 3.8.1.1 M9

Add SR 3.8.1.2 NOTE M19

Add SR 3.8.1.3 NOTE 1 M19

Add SR 3.8.1.3 NOTE 2 M19

Add SR 3.8.1.3 NOTE 3 M19

Add SR 3.8.1.3 NOTE 4 M19

Add SR 3.8.1.7 NOTE M19

Add SR 3.8.1.8 NOTE M19

<INSERT CTS100aB>

for ITS 3.8.9 Distribution Systems - Operating

Add SR 3.8.9.1 M14

3.8.2-01
3.8.5-01

TABLE 3.8.6-1

3.8.6-1 A1

Table ~~4.6-1~~ 3.8.6-1 (page 1 of 1)
Battery Cell Surveillance 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 ≤ 1/4 inch above maximum level indication mark[a]	> Minimum level indication mark, and ≤ 1/4 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]	≥ 1.195	≥ 1.190 AND Average of all connected cells > 1.195	Not more than 0.020 below average connected cells AND Average of all connected cells ≥ 1.190

(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.

(c) 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.

3.8.2-01
3.8.5-01

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3.8.4
3.8.6

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Bases

The emergency power system provides power requirements for the engineered safety features in the event of a DBA. Each of the two diesel generators is capable of supplying minimum required engineered safety features from independent buses. This redundancy is a factor in establishing testing intervals. The monthly tests specified above will demonstrate operability and load capacity of the diesel generator. The fuel supply and diesel starter motor air pressure are continuously monitored and alarmed for abnormal conditions. Starting on complete loss of off-site power will be verified by simulated loss-of-power tests once every 18 months.

The SR 4.6.2.1 verification of battery terminal voltage while on float charge 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 battery charger is supplying the continuous charge required to overcome the internal losses of a battery and maintain the battery in a fully charged state. The voltage requirements are based on the nominal design voltage of the battery (2.15 V per cell average) and are consistent with the battery vendor allowable minimum volts per cell. The inability to meet this requirement constitutes an inoperable battery.

The SR 4.6.2.2 battery service test is a special test of the 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. A modified performance discharge test may be performed in lieu of a service test. The inability to meet this requirement constitutes an inoperable battery.

The modified performance discharge test is a simulated duty cycle consisting of just two rates; 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 battery. 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 remain above the minimum battery voltage specified in the battery service test for the duration of time equal to that of the 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 often 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 and the test discharge rate must envelope the duty cycle of the service test if the modified performance discharge test is performed in lieu of a service test.

The SR 4.6.2.3 battery performance discharge test is a test of constant current capacity of a battery 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. The inability to meet this requirement constitutes an inoperable battery.

Either the battery performance discharge test or the modified performance discharge test, described above, is acceptable for satisfying SR 4.6.2.3; however, only the modified performance discharge test may be used to satisfy SR 4.6.2.3 while satisfying the requirements of SR 4.6.2.2 at the same time.

3.8.2-01
3.8.5-01

3.8.4
3.8.6

The acceptance criteria for this surveillance are consistent with IEEE-450. This reference recommends 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 frequency for this test is normally 60 months. If the battery shows signs of degradation, or if the battery has reached 85% of its service life and capacity is < 100% of the manufacturer's rating, the frequency is reduced to 12 months. However, if the battery shows no degradation but has reached 85% of its service life, the frequency is only reduced to 24 months for batteries that retain ≥ 100% of the manufacturer's ratings. Degradation is indicated, according to IEEE-450, 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. A2

SR 4.6.2.4 requires that each required battery charger be capable of supplying the connected loads while maintaining the battery fully charged. This is based on the assumption that the batteries are fully charged at the beginning of a design basis accident, and on the safety function of providing adequate power for the design basis accident loads.

SR 4.6.2.5 verifies that the Table 4.6-1 Category A battery cell parameters are consistent with vendor recommendations and IEEE-450, which recommend regular battery inspections (at least once per month) including voltage, specific gravity, and electrolyte level of pilot cells.

The SR 4.6.2.6 verification that the average temperature of representative cells is ≥ 60°F is consistent with a recommendation of IEEE-450, which states that the temperature of electrolytes in representative cells (~10% of all connected cells) should be determined on a quarterly basis. Lower than normal temperatures act to inhibit or reduce battery capacity. This surveillance ensures that the operating temperatures remain within an acceptable operating range. This limit is based on manufacturer recommendations.

SR 4.6.2.7 verifies that the Table 4.6-1 Category B battery cell parameters are consistent with vendor recommendations and IEEE-450, which recommend regular battery inspections (at least once per quarter) including voltage, specific gravity, and electrolyte level of each connected cell. In addition, within 24 hours after a battery discharge to < 110 V or a battery overcharge to > 145 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 battery terminal voltage and float current return to pre-transient values. This inspection is also consistent with IEEE-450, 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.

The SR 4.6.2.8 verification that the temperature of the pilot cell is ≥ 60°F is consistent with a recommendation of IEEE-450, which states that the temperature of electrolytes in pilot cells should be determined on a monthly basis. Lower than normal temperatures act to inhibit or reduce battery capacity. This surveillance ensures that the operating temperatures remain within an acceptable operating range. This limit is based on manufacturer recommendations.

Table 4.6-1 delineates the limits on electrolyte level, cell 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, voltage and electrolyte specific gravity approximate the state of charge of the entire battery.

3.8.2-01
3.8.5-01

3.8.4
3.8.6

The Category A limits specified for electrolyte level are based on manufacturer recommendations and are consistent with the guidance in IEEE-450, with the extra 1/4 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 4.6-1 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 recommends that electrolyte level readings should be made only after the battery has been at float charge for at least 72 hours.

A2

The Category A limit specified for float voltage is ≥ 2.13 V per cell. This value is based on the battery vendor allowable minimum cell voltage and on a recommendation of IEEE-450, 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 ≥ 1.195. This value is characteristic of a charged cell with adequate capacity. According to IEEE-450, the specific gravity readings are based on a temperature of 77°F (25°C).

The specific gravity readings are corrected for actual electrolyte temperature. 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 is 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. The Category B limit specified for specific gravity for each connected cell is ≥ 1.190 with the average of all connected cells > 1.195. 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 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 limit for float voltage is based on IEEE-450, 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 limits of average specific gravity ≥ 1.190 is based on manufacturer recommendations. 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.

3.8.2-01
3.8.5-01

3.8.6

Footnotes (b) and (c) to Table 4.6-1 are ~~applicable to Category A, B, and C~~ specific gravity. Footnote (b) to Table 4.6-1 requires the above mentioned correction for electrolyte temperature. The value of 2 amps used in footnote (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. 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. Footnote (c) to Table 4.6-1 allows the float charge current to be used as an alternate to specific gravity for up to 7 days following a 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.

The SR 4.6.3 testing of the emergency lighting is scheduled every 18 months and is subject to review and modification if experience demonstrates a more effective test schedule.

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TRM

REFERENCE

FSAR, Section 8

6.12.5 Special Reports

<LATER> (5.0)

Special reports shall be submitted to the Administrator of the appropriate Regional Office within the time period specified for each report. These reports shall be submitted covering the activities identified below pursuant to the requirements of the applicable reference specification. — LATER

a. Deleted

<LATER> (3.3 D)

b. Inoperable Containment Radiation Monitors, Specification 3.5.1, Table 3.5.1-1. — LATER

c. Deleted

<LATER> (5.0)

d. Steam Generator Tubing Surveillance - Category C-3 Results, Specification 4.18. — LATER

<LATER> (3.7)

e. Miscellaneous Radioactive Materials Source Leakage Tests, Specification 3.12.2. — LATER

f. Deleted

g. Deleted

h. Deleted

i. Deleted

j. Degraded Auxiliary Electrical Systems, Specification 3.7.2.H. — M8

<LATER> (3.3 D)

~~k. Inoperable Reactor Vessel Level Monitoring Systems, Table 3.5.1-1~~

l. Inoperable Hot Leg Level Measurement Systems, Table 3.5.1-1

m. Inoperable Main Steam Line Radiation Monitors, Specification 3.5.1, Table 3.5.1-1. — LATER

NO SIGNIFICANT HAZARDS CONSIDERATIONS
GENERIC EVALUATIONS

"R" - Relocation of requirements:

Relocating requirements which do not meet the Technical Specification selection criteria to documents with an established control program allows the Technical Specifications to be reserved only for those conditions or limitations upon reactor operation which are necessary to adequately limit the possibility of an abnormal situation or event giving rise to an immediate threat to the public health and safety, thereby focusing the scope of Technical Specifications.

Therefore, requirements which do not meet the Technical Specification selection criteria in 10 CFR 50.36 have been relocated to other controlled license basis documents. This regulation addresses the scope and purpose of Technical Specifications. In doing so, it establishes a specific set of objective criteria for determining which regulatory requirements and operating restrictions should be included in Technical Specifications. These criteria are as follows:

Criterion 1: Installed instrumentation that is used to detect and indicate in the control room a significant abnormal degradation of the reactor coolant pressure boundary.

Criterion 2: A process variable that is an initial condition of a design basis accident (DBA) or transient analysis that either assumes the failure of or presents a challenge to the integrity of a fission product barrier.

Criterion 3: A structure, system or component that is part of the primary success path and which functions or actuates to mitigate a design basis accident or transient that either assumes the failure of or presents a challenge to the integrity of a fission barrier.

Criterion 4: A structure, system or component which operating experience or probabilistic safety assessment has shown to be significant to public health and safety.

The application of these criteria is provided in the "Application of Selection Criteria to the ANO-1 Technical Specifications." Requirements which met the criteria have been included in the proposed improved Technical Specifications. Entergy Operations proposes to remove the requirements which do not meet the criteria from the Technical Specifications and relocate the requirements to a suitable owner controlled document. The requirements in the relocated Specifications will not be affected by this Technical Specification change. Entergy Operations will initially continue to perform the required operation and maintenance to assure that the requirements are satisfied. Relocating specific requirements for systems or variables will have no impact on the system's operability or the variable's maintenance, as applicable.

NO SIGNIFICANT HAZARDS CONSIDERATIONS
GENERIC EVALUATIONS

License basis document control mechanisms, such as 10 CFR 50.59, 10 CFR 50.54(a)(3), and ITS Section 5, "Administrative Controls," will be utilized for the relocated Specifications as they will be placed in other controlled license basis documents. This would allow Entergy Operations to make changes to these requirements, without NRC approval, as allowed by the applicable regulatory requirements. These controls are considered adequate for assuring structures, systems and components in the relocated Specifications are maintained operable and variables in the relocated Specifications are maintained within limits.

Entergy Operations has evaluated this proposed Technical Specification change and has determined that it involves no significant hazards consideration. This determination has been performed in accordance with the criteria set forth in 10 CFR 50.92(c) as indicated below:

1. **Does the change involve a significant increase in the probability or consequences of an accident previously evaluated?**

   The proposed change relocates requirements and surveillances for structures, systems, components or variables which did not meet the criteria for inclusion in Technical Specifications as identified in the Application of Selection Criteria to the ANO-1 Technical Specifications. The affected structures, systems, components or variables are not assumed to be initiators of analyzed events and are not assumed to mitigate accident or transient events. The requirements and surveillances for these affected structures, systems, components or variables will be relocated from the Technical Specifications to an appropriate administratively controlled license basis document and maintained pursuant to the applicable regulatory requirements. Therefore, this change does not involve a significant increase in the probability or consequences of an accident previously evaluated.

2. **Does the change create the possibility of a new or different kind of accident from any accident previously evaluated?**

   The proposed change does not necessitate a physical alteration of the plant (no new or different type of equipment will be installed) or change in parameters governing normal plant operation. The proposed change will not impose any different requirements and adequate control of information will be maintained. Thus, this change does not create the possibility of a new or different kind of accident from any accident previously evaluated.

3. **Does this change involve a significant reduction in a margin of safety?**

   The proposed change will not reduce a margin of safety because it has no impact on any safety analysis assumptions. In addition, the affected requirement will be relocated to an owner controlled license basis document for which future changes will be evaluated pursuant to the requirements of the applicable regulatory requirements. Therefore, this change does not involve a significant reduction in a margin of safety.

NO SIGNIFICANT HAZARDS CONSIDERATIONS
GENERIC EVALUATIONS

"A" - Administrative changes to requirements:

Reformatting and rewording the remaining requirements in accordance with the style of the improved Babcock & Wilcox Standard Technical Specifications in NUREG-1430 will make the Technical Specifications more readily understandable to plant operators and other users. Application of the format and style will also assure consistency is achieved between specifications. As a result, the reformatting and rewording of the Technical Specifications has been performed to make them more readily understandable by plant operators and other users. During this reformatting and rewording process, no technical changes (either actual or interpretational) to the Technical Specifications were made unless they were identified and justified.

Entergy Operations has evaluated this proposed Technical Specification change and has determined that it involves no significant hazards consideration. This determination has been performed in accordance with the criteria set forth in 10 CFR 50.92(c) as indicated below:

1. **Does the change involve a significant increase in the probability or consequences of an accident previously evaluated?**

   The proposed change involves reformatting and rewording of the existing Technical Specifications. The reformatting and rewording process involves no technical changes to existing requirements. As such, this change is administrative in nature and does not impact initiators of analyzed events or assumed mitigation of accident or transient events. Therefore, this change does not involve a significant increase in the probability or consequences of an accident previously evaluated.

2. **Does the change create the possibility of a new or different kind of accident from any accident previously evaluated?**

   The proposed change does not necessitate a physical alteration of the plant (no new or different type of equipment will be installed) or changes in parameters governing normal plant operation. The proposed change will not impose any different requirements. Thus, this change does not create the possibility of a new or different kind of accident from any accident previously evaluated.

3. **Does this change involve a significant reduction in a margin of safety?**

   The proposed change will not significantly reduce the margin of safety because it has no impact on any safety analysis assumptions. This change is administrative in nature. As such, there is no technical change to the requirements and therefore, there is no significant reduction in the margin of safety.

"LA" - Less restrictive, Administrative deletion of requirements:

Portions of some Specifications provide information that is descriptive in nature regarding the equipment, system(s), actions or surveillances. This information is proposed to be deleted from the specification and relocated to other license basis documents which are under licensee control. These documents include the TS Bases, Safety Analysis Report (SAR), Technical Requirements Manual, and Programs and Manuals identified in ITS Section 5, "Administrative Controls." The removal of descriptive information is permissible, because the documents containing the relocated information will be controlled through the applicable process provided by the regulatory requirements, e.g., 10 CFR 50.59, 10 CFR 50.54(a)(3), and ITS Section 5, "Administrative Controls." This will not impact the actual requirements but may provide some flexibility in how the requirement is conducted. Therefore, the descriptive information that has been moved continues to be maintained in an appropriately controlled manner.

Entergy Operations has evaluated this proposed Technical Specification change and has determined that it involves no significant hazards consideration. This determination has been performed in accordance with the criteria set forth in 10 CFR 50.92(c) as indicated below:

1. **Does the change involve a significant increase in the probability or consequences of an accident previously evaluated?**

   The proposed change relocates requirements from the Technical Specifications to other license basis documents which are under licensee control. The documents containing the relocated requirements will be maintained using the provisions of applicable regulatory requirements. Therefore, this change does not involve a significant increase in the probability or consequences of an accident previously evaluated.

2. **Does the change create the possibility of a new or different kind of accident from any accident previously evaluated?**

   The proposed change does not necessitate a physical alteration of the plant (no new or different type of equipment will be installed) or changes in parameters governing normal plant operation. The proposed change will not impose any different requirements and adequate control of the information will be maintained. Thus, this change does not create the possibility of a new or different kind of accident from any accident previously evaluated.

3. Does this change involve a significant reduction in a margin of safety?

The proposed change will not reduce a margin of safety because it has no impact on any safety analysis assumptions. In addition, the requirements to be transposed from the Technical Specifications to other license basis documents, which are under licensee control, are the same as the existing Technical Specifications. The documents containing the relocated requirements will be maintained using the provisions of applicable regulatory requirements. Therefore, this change does not involve a significant reduction in a margin of safety.

NO SIGNIFICANT HAZARDS CONSIDERATIONS
GENERIC EVALUATIONS

"M" - More restrictive changes to requirements:

The ANO-1 Technical Specifications are proposed to be modified in some areas to impose more stringent requirements than previously identified. These more restrictive modifications are being imposed to be consistent with the improved Babcock & Wilcox Standard Technical Specifications. Such changes have been made after ensuring the previously evaluated safety analysis was not affected. Also, other more restrictive technical changes have been made to achieve consistency, correct discrepancies, and remove ambiguities from the specification.

The modification of the ANO-1 Technical Specifications and the changes made to achieve consistency within the specifications have been performed in a manner such that the most stringent requirements are imposed, except in cases which are individually evaluated.

Entergy Operations has evaluated this proposed Technical Specification change and has determined that it involves no significant hazards consideration. This determination has been performed in accordance with the criteria set forth in 10 CFR 50.92(c) as quoted below:

1. **Does the change involve a significant increase in the probability or consequences of an accident previously evaluated?**

   The proposed change provides more stringent requirements for the ANO-1 Technical Specifications. These more stringent requirements are not assumed to be initiators of analyzed events and will not alter assumptions relative to mitigation of accident or transient events. The change has been confirmed to ensure no previously evaluated accident has been adversely affected. The more stringent requirements are imposed to ensure process variables, structures, systems and components are maintained consistent with the safety analyses and licensing basis. Therefore, this change does not involve a significant increase in the probability or consequences of an accident previously evaluated.

2. **Does the change create the possibility of a new or different kind of accident from any accident previously evaluated?**

   The proposed change does not necessitate a physical alteration of the plant (no new or different type of equipment will be installed) or changes in parameters governing normal plant operation. The proposed change does impose different requirements. However, these changes do not impact the safety analysis and licensing basis. Thus, this change does not create the possibility of a new or different kind of accident from any accident previously evaluated for ANO-1.

3. Does this change involve a significant reduction in a margin of safety?

The imposition of more stringent requirements prevents a reduction in the margin of plant safety by:

a) Increasing the analytical or safety limit,
b) Increasing the scope of the specification to include additional plant equipment,
c) Increasing the applicability of the specification,
d) Providing additional actions,
e) Decreasing restoration times,
f) Imposing new surveillances, or
g) Decreasing surveillance intervals.

The change is consistent with the safety analysis and licensing basis. Therefore, this change does not involve a reduction in a margin of safety.

NO SIGNIFICANT HAZARDS CONSIDERATIONS STATEMENTS

ITS Section 3.8: Electrical Power Systems

Entergy Operations has evaluated these proposed Technical Specification changes and has determined that they involve no significant hazards consideration. This determination has been performed in accordance with the criteria set forth in 10CFR 50.92(c) as indicated below:

3.8 L1

1. Does the change involve a significant increase in the probability or consequences of an accident previously evaluated?

The AC Sources are used to support mitigation of the consequences of an accident and can be involved in the initiation of the accident analyzed in SAR section 14.1.2.8. Equipment powered by the AC Sources, which may be considered as an initiator, continues to be evaluated for loss of function and previously determined appropriate ACTIONS for such inoperabilities continue to be required. Experience with the reliability of the AC sources indicates that the proposed increase in the Completion Time will not significantly increase the probability of a loss of electric power accident or of any other accident previously evaluated. The proposed ACTION continues to provide adequate assurance of OPERABLE required equipment and therefore, does not involve a significant increase in the consequences of any accident previously evaluated.

2. Does the change create the possibility of a new or different kind of accident from any accident previously evaluated?

The proposed change does not necessitate a physical alteration of the plant (no new or different type of equipment will be installed) or changes in parameters governing normal plant operation. The proposed change will still ensure corrective actions are taken to restore plant systems to OPERABLE status, as assumed in the safety analysis. Thus, this change does not create the possibility of a new or different kind of accident from any accident previously evaluated.

3. Does this change involve a significant reduction in a margin of safety?

This change does not involve a significant reduction in a margin of safety since the OPERABILITY of the equipment and loss of function continue to be evaluated in the same manner. The increase in time allowed for such an evaluation and restoration is minimal and provides additional potential for the preferred action of restoration of the equipment to OPERABLE status, rather than requiring a shutdown transient.

NO SIGNIFICANT HAZARDS CONSIDERATIONS STATEMENTS

3.8 L2

1. Does the change involve a significant increase in the probability or consequences of an accident previously evaluated?

The AC Sources are used to support mitigation of the consequences of an accident and can be involved in the initiation of the accident analyzed in SAR section 14.1.2.8. Equipment powered by the AC Sources, which may be considered as an initiator, continues to be assured of electrical power. The proposed increased restoration time involves parameters unrelated to initiating the failure of the AC Sources. As such the proposed time allowance for restoration will not increase the probability of any accident previously evaluated. The proposed changes allow additional time for restoration of parameters that have been identified as not immediately affecting the capability of the power source to provide its required safety function. The identified parameters are capable of being replenished during operation of the diesel generators and batteries, and the short additional Completion Time continues to provide adequate assurance of OPERABLE required equipment. Therefore, this change does not involve a significant increase in the consequences of any accident previously evaluated.

2. Does the change create the possibility of a new or different kind of accident from any accident previously evaluated?

The proposed change does not necessitate a physical alteration of the plant (no new or different type of equipment will be installed) or changes in parameters governing normal plant operation. The proposed change will continue to ensure operable safety equipment is available. Thus, this change does not create the possibility of a new or different kind of accident from any accident previously evaluated.

3. Does this change involve a significant reduction in a margin of safety?

The parameter limits provide substantial margin to the parameter values that would be absolutely necessary for diesel generator and battery operability. When the parameters are less than their limits this margin is reduced. However, the availability of AC Sources continues to be assured since the allowed time for parameters to be less than their limits is short and the allowed levels for the parameters are adequate to provide the immediately needed power availability. Further, the parameters can be restored to within limits during the time provided by the reduced level of the parameter should they be required. Therefore, the reduction in margin is not a significant one.

NO SIGNIFICANT HAZARDS CONSIDERATIONS STATEMENTS

3.8 L3

1. Does the change involve a significant increase in the probability or consequences of an accident previously evaluated?

The diesel generators (DGs) and offsite circuits are used to support mitigation of the consequences of an accident and can be involved in the initiation of the accident analyzed in SAR section 14.1.2.8. They provide multiple sources of power to multiple trains of mitigating systems and components. The proposed conditions of concurrent inoperabilities retain sufficient sources of power for the necessary mitigating systems and components and do not initiate the loss of the remaining sufficient sources of power. As such the proposed conditions of concurrent inoperabilities will not increase the probability of any accident previously evaluated. Neither will the change allow continued operation without sufficient AC Sources to power the necessary safety equipment, or with any complete loss of safety function. The consequences of an event occurring during the proposed conditions of concurrent inoperabilities are the same as the consequences of an event occurring under the current ACTIONS. Therefore, the proposed change does not involve a significant increase in the consequences of any accident previously evaluated.

2. Does the change create the possibility of a new or different kind of accident from any accident previously evaluated?

The proposed change does not necessitate a physical alteration of the plant (no new or different type of equipment will be installed) or changes in parameters governing normal plant operation. The proposed change will still ensure proper actions are required, consistent with applicable regulatory guidance. Thus, this change does not create the possibility of a new or different kind of accident from any accident previously evaluated.

3. Does this change involve a significant reduction in a margin of safety?

The proposed Completion Times to restore multiple inoperable AC Sources to OPERABLE status will minimize the potential for plant transients that can occur during the process of a plant shutdown by providing some time to restore the affected AC Sources to OPERABLE status prior to requiring a unit shutdown. Any reduction in the margin provided by having multiple sources of power to multiple trains of mitigating systems and components will be non-risk significant because of the proven reliability of the remaining sources of power. This reliability, indicated by experience, leads to a high improbability of the proposed conditions of concurrent inoperabilities existing concurrently with the need for the equipment to perform it safety functions and concurrent with the failure of the remaining equipment. This improbability is supported by allowing only short durations for such conditions. Further, component inoperability unrelated to the DGs provides no basis for questioning the OPERABILITY of the opposite train components for which the surveillances are current. Therefore, the reduced requirements for verification of opposite train component OPERABILITY will not result in a significant reduction in a margin of safety.

NO SIGNIFICANT HAZARDS CONSIDERATIONS STATEMENTS

3.8 L4

1. Does the change involve a significant increase in the probability or consequences of an accident previously evaluated?

The offsite circuits can be used to support mitigation of the consequences of an accident and can be involved in the initiation of the accident analyzed in SAR section 14.1.2.8. Equipment powered by the offsite circuits, which may be considered as an initiator, continues to be evaluated for loss of function and previously determined appropriate ACTIONS for such inoperabilities continue to be required. Experience with the reliability of the offsite circuits and the diesel generators which back them up indicates that the proposed increase in the Completion Time will not significantly increase the probability of a loss of electric power accident or of any other accident previously evaluated. As such the proposed increases in the Completion Times will not increase the probability of any accident previously evaluated. The consequences of an event occurring during the proposed Completion Times are the same as the consequences of an event occurring under the current ACTIONS. Therefore, the proposed change does not involve a significant increase to the consequences of any accident previously evaluated.

2. Does the change create the possibility of a new or different kind of accident from any accident previously evaluated?

The proposed change does not necessitate a physical alteration of the plant (no new or different type of equipment will be installed) or changes in parameters governing normal plant operation. The proposed change will still ensure proper actions are required, consistent with applicable regulatory guidance. Thus, this change does not create the possibility of a new or different kind of accident from any accident previously evaluated.

3. Does this change involve a significant reduction in a margin of safety?

The extended Completion Time to restore a required offsite circuit to OPERABLE status prior to requiring a unit shutdown is acceptable based on the overall probability of an event requiring the inoperable AC Sources during this time period. The extended Completion Time will minimize the potential for plant transients that can occur during shutdown by providing some time to restore the affected AC Sources to OPERABLE status prior to requiring a unit shutdown. Any reduction in the margin provided by having multiple sources of power to multiple trains of mitigating systems and components will be insignificant because of the proven reliability of the remaining sources of power. This reliability, indicated by experience, leads to a high improbability of the need for the equipment to perform it safety functions concurrent with an inoperable offsite circuit and concurrent with the failure of the remaining power source equipment. This improbability is still supported by allowing only short durations for such conditions.

NO SIGNIFICANT HAZARDS CONSIDERATIONS STATEMENTS

3.8 L5

1. Does the change involve a significant increase in the probability or consequences of an accident previously evaluated?

Although the batteries may be in a degraded condition, allowing separate condition entry does not alter accident initiation assumptions nor does it alter component availability for accident mitigation as both batteries are capable of fulfilling their function. In the event a battery is determined to be inoperable, Actions exist to ensure that the appropriate activities occur. Therefore, this change does not involve a significant increase in the probability or consequences of any accident previously evaluated.

2. Does the change create the possibility of a new or different kind of accident from any accident previously evaluated?

The proposed change does not necessitate a physical alteration of the plant (no new or different type of equipment will be installed) or changes in parameters governing normal plant operation. The proposed change will still ensure proper ACTIONS are taken for battery inoperability. Thus, this change does not create the possibility of a new or different kind of accident from any accident previously evaluated.

3. Does this change involve a significant reduction in a margin of safety?

Due to the conservative nature of battery calculations, operation with two batteries in a degraded condition does not result in a significant reduction in the margin of safety. The margin provided by this conservatism is reduced by the degraded condition but such temporary reduction is already permitted for one battery at a time. The change proposed is to allow the possibility of both trains to experience this non-significant margin reduction at the same time rather than only one at a time. The two trains provide a redundancy margin for single failure. Since both trains still have sufficient capacity to perform their function, there is no reduction in the redundancy margin by allowing separate condition entry. Should a battery be determined to be inoperable, proper guidance is provided to ensure the appropriate actions are taken. Therefore, this change does not involve a significant reduction in a margin of safety.

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3.8 L6

Not used.

NO SIGNIFICANT HAZARDS CONSIDERATIONS STATEMENTS

3.8 L7

1. Does the change involve a significant increase in the probability or consequences of an accident previously evaluated?

The diesel generators are used to support mitigation of the consequences of an accident; and can be involved in the initiation of the accident analyzed in SAR section 14.1.2.8. Demonstration of the capability of the diesel generator for extended operation is still provided by other surveillances. The proposed revision of the method of performing the Surveillance on the diesel generator will reduce diesel generator run time and, therefore, reduce accumulation of run time generated wear. Therefore, the proposed revision of the method of performing the Surveillance on the diesel generator will reduce the probability of the occurrence of the loss of electric power accident. Since the function of the diesel generator continues to be verified, and continues to be required to be OPERABLE, the change of the method of performance of the Surveillance will not reduce the capability of required equipment to mitigate the event. Therefore, this change does not involve a significant increase in the consequences of any accident previously evaluated.

2. Does the change create the possibility of a new or different kind of accident from any accident previously evaluated?

The proposed change does not necessitate a physical alteration of the plant (no new or different type of equipment will be installed) or changes in parameters governing normal plant operation. The proposed change will still ensure proper surveillances are required for all equipment considered in the safety analysis. Thus, this change does not create the possibility of a new or different kind of accident from any accident previously evaluated.

3. Does this change involve a significant reduction in a margin of safety?

The margin of safety for diesel generator is based on availability and capacity of OPERABLE sources. The availability and capacity of the diesel generator continue to be confirmed with the required Surveillances. The revision of the method of performance of the Surveillance still provides assurance that the diesel generator will perform its required function when needed. Therefore, this change does not involve a significant reduction in a margin of safety.

NO SIGNIFICANT HAZARDS CONSIDERATIONS STATEMENTS

3.8 L8

1. Does the change involve a significant increase in the probability or consequences of an accident previously evaluated?

The diesel generators (DGs) are used to support mitigation of the consequences of an accident, and can be involved in the initiation of the accident analyzed in SAR section 14.1.2.8. Eliminating a test that is either duplicative (if done for offsite power) or beyond the assumptions of the safety analysis (if done for onsite power) results in eliminating electrical perturbations that could lead to a loss of power. As such, this elimination will not significantly increase the probability of any accident previously evaluated. The remaining Surveillances continue to provide adequate assurance of OPERABLE DGs. Therefore, this change does not involve a significant increase to the consequences of any accident previously evaluated.

2. Does the change create the possibility of a new or different kind of accident from any accident previously evaluated?

The proposed change does not necessitate a physical alteration of the plant (no new or different type of equipment will be installed) or changes in parameters governing normal plant operation. The proposed change will still ensure adequate surveillances are performed to assure availability of the DGs. Thus, this change does not create the possibility of a new or different kind of accident from any accident previously evaluated.

3. Does this change involve a significant reduction in a margin of safety?

The OPERABILITY of the DGs continues to be determined in the same manner as before. Since the elimination of a test that is either duplicative (if done for offsite power) or beyond the assumptions of the safety analysis (if done for onsite power) results in eliminating electrical perturbations that could lead to a loss of power, this change will increase the availability of the DGs. Furthermore, there is no impact on the assurance of the capability of the DGs to perform their safety function. Therefore, this change does not involve a significant reduction in a margin of safety.

3.8 L9

1. Does the change involve a significant increase in the probability or consequences of an accident previously evaluated?

The diesel generators (DGs) are used to support mitigation of the consequences of an accident, and require adequate starting air to provide this function. However, the source of the air is not designated in the safety analysis. Therefore, the DG air start compressors are not assumed to operate in response to a design basis event. Neither are they considered as the initiator of any previously analyzed accident. As such, the removal of the air compressors from the required equipment does not involve a significant increase in the probability or consequences of any accident previously evaluated.

2. Does the change create the possibility of a new or different kind of accident from any accident previously evaluated?

The proposed change does not necessitate a physical alteration of the plant (no new or different type of equipment will be installed) or changes in parameters governing normal plant operation. The proposed change will still ensure air start capability is available for the DGs. Thus, this change does not create the possibility of a new or different kind of accident from any accident previously evaluated.

3. Does this change involve a significant reduction in a margin of safety?

The source of the DG starting air is not pertinent to the safety analysis, only that adequate starting air is available. This continues to be required. Therefore, this change does not involve a significant reduction in a margin of safety.

3.8 L10 Not Used

NO SIGNIFICANT HAZARDS CONSIDERATIONS STATEMENTS

3.8 L11

1. **Does the change involve a significant increase in the probability or consequences of an accident previously evaluated?**

The diesel generators (DGs) are used to support mitigation of the consequences of an accident and can be involved in the initiation of the accident analyzed in SAR section 14.1.2.8. The efficacy of the testing of the diesel generator support systems is not reduced by performing the tests separately from the diesel generator start test. Since the function of the DG, and associated support components, continues to be verified, and continues to be required to be OPERABLE, the change in the grouping of these surveillances will not reduce the capability of required equipment to mitigate a postulated event nor increase the likelihood that the required equipment will fail as part of a loss of electric power event. Therefore, this change does not involve a significant increase in the consequences of any accident previously evaluated nor a significant increase in the probability of an accident previously evaluated..

2. **Does the change create the possibility of a new or different kind of accident from any accident previously evaluated?**

The proposed change does not necessitate a physical alteration of the plant (no new or different type of equipment will be installed) or changes in parameters governing normal plant operation. The proposed change will still ensure proper surveillances are required for all equipment considered in the safety analysis. Thus, this change does not create the possibility of a new or different kind of accident from any accident previously evaluated.

3. **Does this change involve a significant reduction in a margin of safety?**

The margin of safety for the DG is based on the OPERABILITY of the DG which requires OPERABLE support systems. The capacity of the DG support systems continues to be confirmed with the required Surveillances. Therefore, this change does not involve a significant reduction in a margin of safety.

NO SIGNIFICANT HAZARDS CONSIDERATIONS STATEMENTS

3.8 L12

1. Does the change involve a significant increase in the probability or consequences of an accident previously evaluated?

The Engineered Safeguards Actuation System (ESAS) AC distribution system is used to support mitigation of the consequences of an accident; however, it is not considered the initiator of any previously analyzed accident. As such the proposed revision of the requirements for determining OPERABILITY of the distribution system will not significantly increase the probability of any accident previously evaluated. Since the function of the system continues to be available regardless of the AC Source providing the power which is being distributed, the system continues to be capable of performing its safety function and therefore, OPERABLE. The change will not reduce the capability of required equipment to mitigate the event. Therefore, this change does not involve a significant increase in the consequences of any accident previously evaluated.

2. Does the change create the possibility of a new or different kind of accident from any accident previously evaluated?

The proposed change does not necessitate a physical alteration of the plant (no new or different type of equipment will be installed) or changes in parameters governing normal plant operation. The proposed change will not revise the requirements for OPERABLE offsite circuits, but will only revise the dependency of the distribution systems on the offsite circuit for OPERABILITY. Thus, this change does not create the possibility of a new or different kind of accident from any accident previously evaluated.

3. Does this change involve a significant reduction in a margin of safety?

The margin of safety for AC Distribution systems is based on capability of the system to provide adequate power to the components required to operate for prevention and mitigation of a transient or accident. This capability is not affected by the choice of AC Source which is providing the power. Thus, the choice of power source should not affect the administrative determination of OPERABILITY of the distribution system. Since the distribution system will perform its required function when powered from any required AC Source, this change does not involve a significant reduction in a margin of safety.

3.8 L13 **Not Used.**

3.8 L14

1. Does the change involve a significant increase in the probability or consequences of an accident previously evaluated?

The diesel generator starting and protective circuitry are used to support mitigation of the consequences of an accident and can be involved in the initiation of the accident analyzed in SAR section 14.1.2.8. Experience with the reliability of the diesel generator starting and protective circuitry indicates that the proposed increase in the surveillance interval will not significantly increase the probability of a loss of electric power accident or of any other accident previously evaluated. Since the function of the diesel generator continues to be verified, and continues to be required to be OPERABLE, the change of the Surveillance Frequency will not reduce the capability of required equipment to mitigate the event. Therefore, this change does not involve a significant increase in the consequences of any accident previously evaluated.

2. Does the change create the possibility of a new or different kind of accident from any accident previously evaluated?

The proposed change does not necessitate a physical alteration of the plant (no new or different type of equipment will be installed) or changes in parameters governing normal plant operation. The proposed change will still ensure proper surveillances are required for all equipment considered in the safety analysis. Thus, this change does not create the possibility of a new or different kind of accident from any accident previously evaluated.

3. Does this change involve a significant reduction in a margin of safety?

The margin of safety for diesel generator is based on availability and capacity of OPERABLE sources. The availability and capacity of the diesel generator continue to be confirmed with the required Surveillances. The revision of the Surveillance Frequency still provides assurance that the diesel generator will perform its required function when needed. Therefore, this change does not involve a significant reduction in a margin of safety.

3.8.1-04

3.8 L15

1. **Does the change involve a significant increase in the probability or consequences of an accident previously evaluated?**

This change does not result in any hardware changes or changes in normal operating controls. The offsite circuits are used to support mitigation of the consequences of an accident, but they are not considered as the initiator of any previously analyzed accident. As such the proposed increases in the Completion Times will not significantly increase the probability of any accident previously evaluated. Neither will the change allow significant continuous operation without sufficient AC Sources to power the necessary safety equipment, or with any complete loss of safety function. The consequences of an event occurring during the proposed Completion Times are the same as the consequences of an event occurring under the current ACTIONS. Therefore, the proposed change does not involve a significant increase in the consequences of any accident previously evaluated.

2. **Does the change create the possibility of a new or different kind of accident from any accident previously evaluated?**

The proposed change does not necessitate a physical alteration of the plant (no new or different type of equipment will be installed) or changes in parameters governing normal plant operation. The proposed change will still ensure proper actions are required, consistent with applicable regulatory guidance. Thus, this change does not create the possibility of a new or different kind of accident from any accident previously evaluated.

3. **Does this change involve a significant reduction in a margin of safety?**

The proposed Completion Times to restore multiple inoperable AC Sources to OPERABLE status prior to requiring a unit shutdown is acceptable based on the overall probability of an event requiring the inoperable AC Sources during this time period. Providing Completion Times will minimize the potential for plant transients that can occur during shutdown by providing some time to restore the affected AC Sources to OPERABLE status prior to requiring a unit shutdown. In addition, the NRC (in Regulatory Guide 1.93 and NUREG-1430) has previously evaluated these proposed Completion Times and found them acceptable. As such, any reduction in a margin to safety with the addition of these Completion Times will be offset with the benefit gained in avoiding an unnecessary plant transient by providing time to restore the inoperable AC Source.

3.8.1-21

3.8 L16

1. **Does the change involve a significant increase in the probability or consequences of an accident previously evaluated?**

This change does not result in any hardware changes or changes in normal operating controls. Administrative controls provide assurance that the risk associated with the performance of this Surveillance above the refueling shutdown condition is evaluated to provide assurance that the reactor core is protected. When portions of the Surveillance are performed in MODE 1 or 2, an assessment of the risks associated with the performance of the Surveillance must be performed. This assessment must show that plant safety is maintained or enhanced. The load shed features associated with startup transformer No. 2 remain available during the performance of the Surveillance. Therefore, the proposed change does not involve a significant increase in the consequences of any accident previously evaluated.

2. **Does the change create the possibility of a new or different kind of accident from any accident previously evaluated?**

The proposed change does not necessitate a physical alteration of the plant (no new or different type of equipment will be installed) or changes in parameters governing normal plant operation. The proposed change will still ensure proper actions are required, consistent with applicable regulatory guidance. Thus, this change does not create the possibility of a new or different kind of accident from any accident previously evaluated.

3. **Does this change involve a significant reduction in a margin of safety?**

The proposed Surveillance Note will allow performance of the Surveillance in MODES besides refueling shutdown (ITS MODE 6). Performance of the Surveillance in some conditions could result in the loss of necessary equipment. However, Technical Specifications associated with these necessary components , administrative controls associated with surveillance testing, and assessment of risks, provide assurance that the impact of the testing is evaluated to ensure that there is no significant reduction in a margin to safety.

3.8.4-02, 3.8.9-01

3.8 L17

1. Does the change involve a significant increase in the probability or consequences of an accident previously evaluated?

The 4160V, 480V, and 120V switchgear, load centers, motor control centers, and distribution panels, and the DC Sources are used to support mitigation of the consequences of an accident. Equipment powered by the DC Sources, and by means of the electrical distribution system, continues to be evaluated for loss of function, and previously determined appropriate actions for such inoperabilities continue to be required. Since the evaluation required by CTS 3.7.3.A.2 will still be performed as required by ITS LCO 3.0.6 and ITS 5.5.15, "Safety Function Determination Program," the proposed change does not involve a significant increase in the probability or consequences of any accident previously evaluated.

2. Does the change create the possibility of a new or different kind of accident from any accident previously evaluated?

The proposed change does not necessitate a physical alteration of the plant (no new or different type of equipment will be installed) or changes in parameters governing normal plant operation. The proposed change will still ensure proper actions are required, consistent with applicable regulatory guidance. Thus, this change does not create the possibility of a new or different kind of accident from any accident previously evaluated.

3. Does this change involve a significant reduction in a margin of safety?

The operability of the supported equipment will still be evaluated per ITS LCO 3.0.6 and ITS 5.5.15. Therefore, this change results in no significant reduction in a margin of safety.