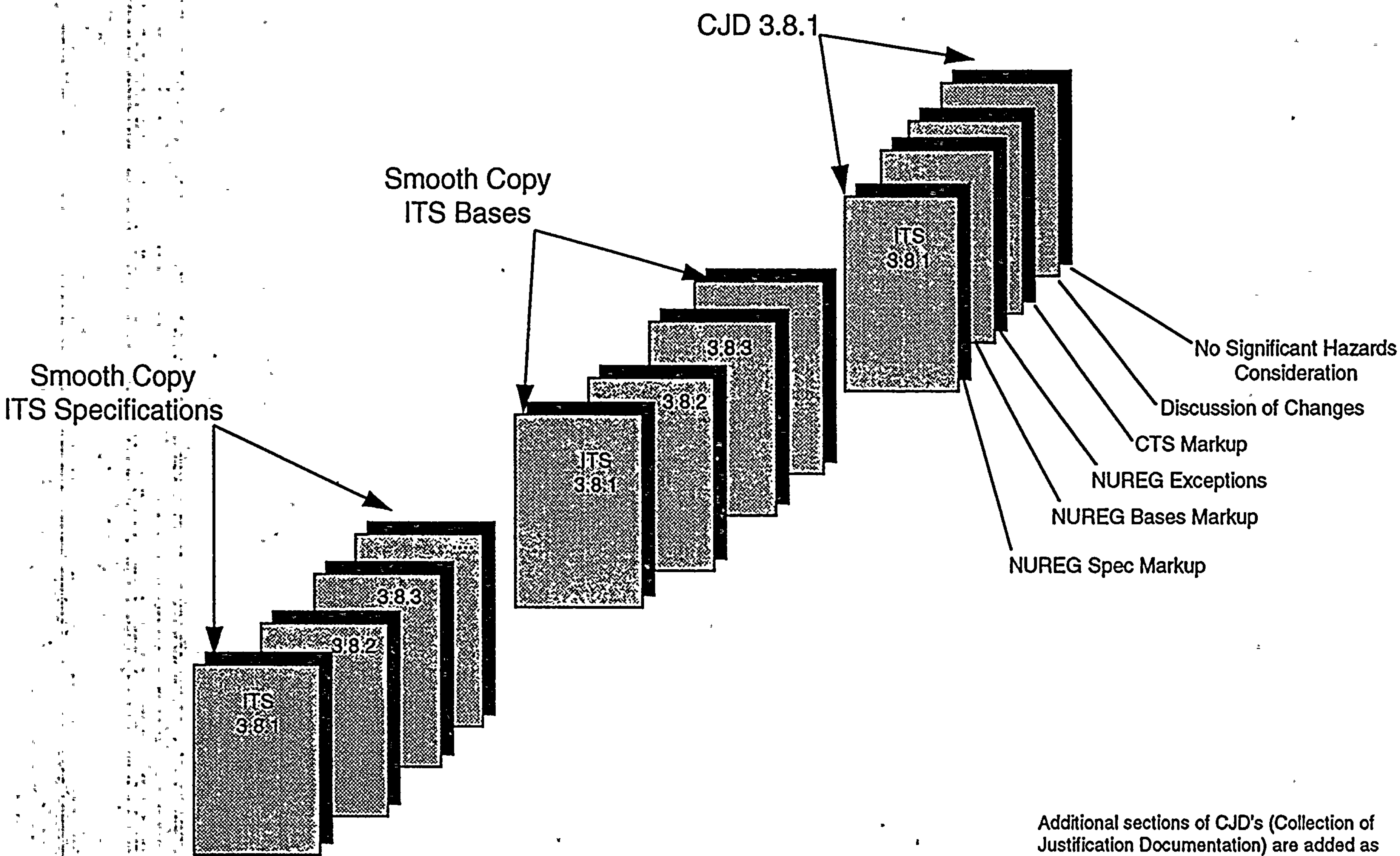
PVNGS

Palo Verde Nuclear Generating Station
Units 1, 2, and 3

Improved Technical Specifications

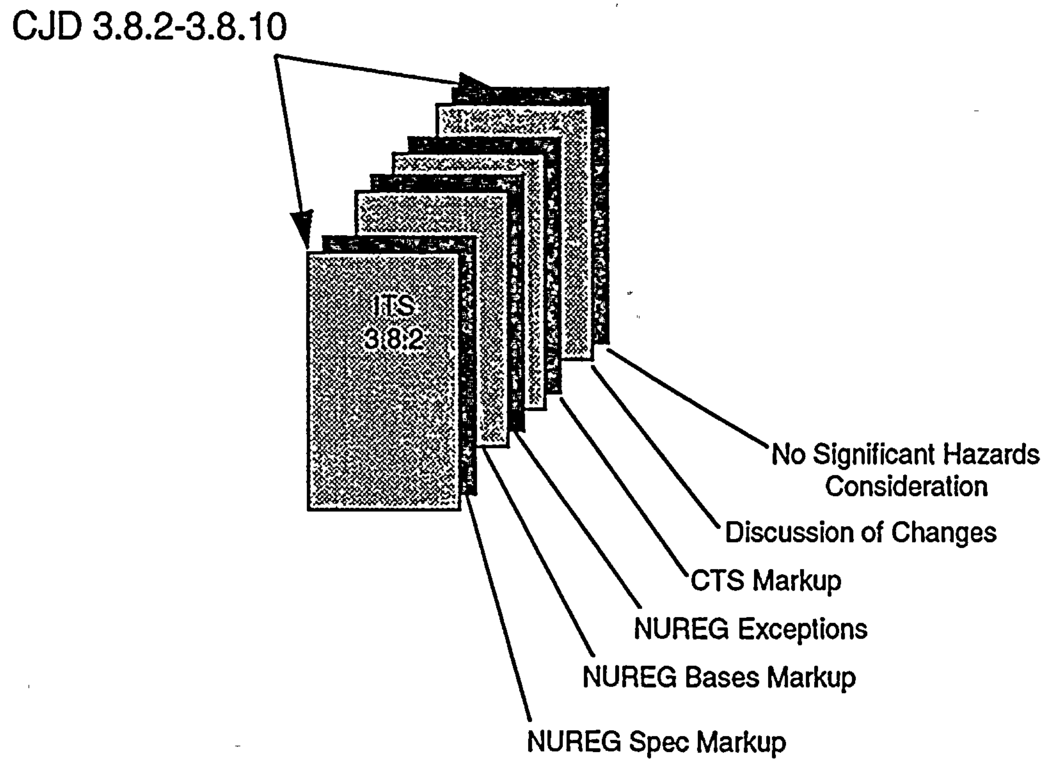
PVNGS ITS
SECTION 3.8 - ELECTRICAL POWER SYSTEMS

ITS REVIEW PACKAGE CONTENTS
(Volume 15)



Additional sections of CJD's (Collection of Justification Documentation) are added as necessary to complete the specific ITS Section/Chapter.

ITS REVIEW PACKAGE CONTENTS
(Volume 16, continued from Volume 15)



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ITS SECTION 3.8

3.8 ELECTRICAL POWER SYSTEMS

3.8.1 AC Sources – Operating

LCO 3.8.1 The following AC electrical sources shall be OPERABLE:

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

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

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

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 required OPERABLE offsite circuit.	1 hour <u>AND</u> Once per 8 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>		
			(continued)

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. (continued)	A.3	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 the OPERABLE required offsite circuit(s).	1 hour <u>AND</u> Once per 8 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.	24 hours
	<u>OR</u>		
	B.3.2	Perform SR 3.8.1.2 for OPERABLE DG.	24 hours
	<u>AND</u>		
			(continued)

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
B. (continued)	B.4	Restore DG to OPERABLE status.	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.	12 hours from discovery of Condition C concurrent with inoperability of redundant required feature(s)
	<u>AND</u>		
	C.2	Restore one required offsite circuit to OPERABLE status.	24 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
D. One required offsite circuit inoperable. AND One DG inoperable.	------------NOTE------------ Enter applicable Conditions and Required Actions of LCO 3.8.9, "Distribution Systems – Operating," when Condition D is entered with no AC power source to a train. ----------------------------	
	D.1 Restore required offsite circuits to OPERABLE status.	12 hours
	OR	
	D.2 Restore DG to OPERABLE status.	12 hours
E. Two DGs inoperable.	E.1 Restore one DG to OPERABLE status.	2 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
F. One automatic load sequencer inoperable.	F.1	Restore automatic load sequencer to OPERABLE status.	72 hours
G. Electrical Distribution System input voltage less than limits.	G.1.1	Block both trains of Fast Bus Transfer.	1 hour
	<u>OR</u>		
	G.1.2	Block one train of Fast Bus Transfer and start, load, and separate the opposite train DG from offsite power.	1 hour
	<u>AND</u>		
	G.2	Restore Electrical Distribution System input voltage to within limits.	72 hours
H. Required Action and Associated Completion Time of Condition A, B, C, D, E, F, or G not met.	H.1	Be in MODE 3.	6 hours
	<u>AND</u>		
	H.2	Be in MODE 5.	36 hours
I. Three or more required AC sources inoperable.	I.1	Enter LCO 3.0.3.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.8.1.1	Verify correct breaker alignment and indicated power availability for each required offsite circuit.	7 days
SR 3.8.1.2	------------------NOTES------------------ 1. Performance of SR 3.8.1.7 satisfies this SR. 2. All DG starts may be preceded by an engine prelube period and followed by a warmup period prior to loading. 3. A modified DG start involving idling and gradual acceleration to synchronous speed may be used for this SR as recommended by the manufacturer. When modified start procedures are not used, the time, voltage, and frequency tolerances of SR 3.8.1.7 must be met. --- Verify each DG starts from standby condition and achieves steady state voltage ≥ 3740 V and ≤ 4580 V, and frequency ≥ 58.8 Hz and ≤ 61.2 Hz.	 31 days

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
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 immediately follow without shutdown a successful performance of SR 3.8.1.2 or SR 3.8.1.7. --- Verify each DG is synchronized and loaded, and operates for ≥ 60 minutes at a load ≥ 4950 kW and ≤ 5500 kW.	31 days
SR 3.8.1.4	Verify each day tank contains ≥ 550 gal of fuel oil (minimum level of 2.75 feet).	31 days
SR 3.8.1.5	Check for and remove accumulated water from each day tank.	92 days
SR 3.8.1.6	Verify the fuel oil transfer system operates to automatically transfer fuel oil from the storage tank to the day tank.	31 days

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.8.1.7	------------------NOTE------------------ All DG starts may be preceded by an engine prelube period. -- Verify each DG starts from standby condition and achieves, in ≤ 10 seconds, voltage ≥ 3740 V and ≤ 4580 V, and frequency ≥ 59.7 Hz and ≤ 61.2 Hz.	184 days
SR 3.8.1.8	------------------NOTE------------------ This Surveillance shall not be performed in MODE 1 or 2. However, credit may be taken for unplanned events that satisfy this SR. -- Verify manual transfer of AC power sources from the normal offsite circuit to each alternate offsite circuit.	18 months

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.8.1.9	-------------------NOTES----------------- This Surveillance shall not be performed in MODE 1, 2, 3, or 4. However, credit may be taken for unplanned events that satisfy this SR. --- Verify each DG rejects a load greater than or equal to its associated single largest post-accident load, and: a. Following load rejection, the frequency is ≤ 64.5 Hz; b. Within 3 seconds following load rejection, the voltage is ≥ 3740 V and ≤ 4580 V; and c. Within 3 seconds following load rejection, the frequency is ≥ 58.8 Hz and ≤ 61.2 Hz.	18 months
SR 3.8.1.10	------------------NOTE------------------ This Surveillance shall not be performed in MODE 1 or 2. However, credit may be taken for unplanned events that satisfy this SR. --- Verify each DG does not trip, and voltage is maintained ≤ 6200 V during and following a load rejection of ≥ 4950 kW and ≤ 5500 kW.	18 months

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.8.1.11	-------------------NOTE------------------- 1. All DG starts may be preceded by an engine prelube period. 2. This Surveillance shall not be performed in MODE 1, 2, 3, or 4. However, credit may be taken for unplanned events that satisfy this SR. -- Verify on an actual or simulated loss of offsite power signal: a. De-energization of emergency buses; b. Load shedding from emergency buses; c. DG auto-starts from standby condition and: 1. energizes permanently connected loads in ≤ 10 seconds, 2. energizes auto-connected shutdown loads through automatic load sequencer, 3. maintains steady state voltage ≥ 3740 V and ≤ 4580 V, 4. maintains steady state frequency ≥ 59.7 Hz and ≤ 61.2 Hz, and 5. supplies permanently connected and auto-connected shutdown loads for ≥ 5 minutes.	18 months

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.8.1.12	-------------------NOTES------------------ 1. All DG starts may be preceded by an engine prelube period. 2. This Surveillance shall not be performed in MODE 1, 2, 3, or 4. However, credit may be taken for unplanned events that satisfy this SR. --	
	Verify on an actual or simulated Engineered Safety Feature (ESF) actuation signal (without a loss of offsite power) each DG auto-starts from standby condition and: a. Achieves voltage ≥ 3740 V and ≤ 4580 V; b. Achieves frequency ≥ 59.7 Hz and ≤ 61.2 Hz; c. Operates for ≥ 5 minutes on standby (running unloaded); d. Permanently connected loads remain energized from the offsite power system; and e. Emergency loads are energized from the offsite power system.	18 months

(continued)

SURVEILLANCE REQUIREMENTS (continued)

	SURVEILLANCE	FREQUENCY
SR 3.8.1.13	-------------------NOTE------------------- This Surveillance shall not be performed in MODE 1 or 2. However, credit may be taken for unplanned events that satisfy this SR. -- Verify each DG automatic trip is bypassed on actual or simulated loss of voltage signal on the emergency bus concurrent with an actual or simulated ESF actuation signal except: a. Engine overspeed; b. Generator differential current; c. Engine low lube oil pressure; and d. Manual emergency stop trip.	18 months

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.8.1.14	------------------NOTES------------------ 1. Momentary transients outside the load range do not invalidate this test. 2. This Surveillance shall not be performed in MODE 1 or 2. However, credit may be taken for unplanned events that satisfy this SR. --- Verify each DG operates for ≥ 24 hours: a. For ≥ 22 hours loaded ≥ 4950 kW and ≤ 5500 kW; and b. For the remaining hours (≥ 2) of the test loaded ≥ 5775 kW and ≤ 6050 kW.	18 months
SR 3.8.1.15	------------------NOTES------------------ 1. This Surveillance shall be performed within 5 minutes of shutting down the DG after the DG, loaded ≥ 4950 kW and ≤ 5500 kW, has operated ≥ 2 hours or until temperatures have stabilized. Momentary transients outside of load range do not invalidate this test. 2. All DG starts may be preceded by an engine prelube period. --- Verify each DG starts and achieves, in ≤ 10 seconds, voltage ≥ 3740 V and ≤ 4580 V, and frequency ≥ 59.7 Hz and ≤ 61.2 Hz.	18 months

(continued)

SURVEILLANCE REQUIREMENTS (continued)

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

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.8.1.18	-------------------NOTE------------------- This Surveillance shall not be performed in MODE 1, 2, 3, or 4. However, credit may be taken for unplanned events that satisfy this SR. --	
	Verify interval between each sequenced load block is within ± 1 second of design interval for each automatic load sequencer.	18 months

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.8.1.19	-------------------NOTES------------------- 1. All DG starts may be preceded by an engine prelube period. 2. This Surveillance shall not be performed in MODE 1, 2, 3, or 4. However, credit may be taken for unplanned events that satisfy this SR. --	
	Verify on an actual or simulated loss of offsite power signal in conjunction with an actual or simulated ESF actuation signal: a. De-energization of emergency buses; b. Load shedding from emergency buses; c. DG auto-starts from standby condition and: 1. energizes permanently connected loads in ≤ 10 seconds, 2. energizes auto-connected emergency loads through load sequencer, 3. achieves steady state voltage ≥ 3740 V and ≤ 4580 V, 4. achieves steady state frequency ≥ 59.7 Hz and ≤ 61.2 Hz, and 5. supplies permanently connected and auto-connected emergency loads for ≥ 5 minutes.	18 months

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.8.1.20	-------------------NOTE------------------- 1. All DG starts may be preceded by an engine prelube period. 2. This Surveillance shall not be performed in MODE 1 or 2. However, credit may be taken for unplanned events or for testing after any modifications which could affect DG independence that satisfy this SR. -- Verify, when started simultaneously from standby condition, each DG achieves, in ≤ 10 seconds, voltage ≥ 3740 V and ≤ 4580 V, and frequency ≥ 59.7 Hz and ≤ 61.2 Hz.	10 years

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 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 with the core offloaded.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One required offsite circuit inoperable.	------------NOTE------------ Enter applicable Conditions and Required Actions of LCO 3.8.10, with 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
	OR	
	A.2.1 Suspend CORE ALTERATIONS.	Immediately
	AND	
		(continued)

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. (continued)	A.2.2	Suspend movement of irradiated fuel assemblies.	Immediately
	<u>AND</u>		
	A.2.3	Initiate action to suspend operations involving positive reactivity additions.	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	Initiate action to suspend operations involving positive reactivity additions.	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	------------------NOTE------------------ The following SRs are not required to be performed: SR 3.8.1.3, SR 3.8.1.9 through SR 3.8.1.11, SR 3.8.1.13 through SR 3.8.1.16, SR 3.8.1.18, and SR 3.8.1.19. --- For AC sources required to be OPERABLE, the SRs of Specification 3.8.1, "AC Sources - Operating," except SR 3.8.1.8, SR 3.8.1.12, SR 3.8.1.17 and SR 3.8.1.20, are applicable.	In accordance with applicable SRs

3.8 ELECTRICAL POWER SYSTEMS

3.8.3 Diesel Fuel Oil, Lube Oil, and Starting Air

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

APPLICABILITY: When associated DG is required to be OPERABLE.

ACTIONS

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

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more DGs with fuel level < 80% indicated fuel level and ≥ 71% indicated fuel level in storage tank.	A.1 Restore fuel oil level to within limits.	48 hours
B. One or more DGs with lube oil inventory < 168 gal and > 144 gal.	B.1 Restore lube oil inventory to within limits.	48 hours
C. One or more DGs with stored fuel oil total particulates not within limits.	C.1 Restore fuel oil total particulates to within limits.	7 days

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
D. One or more DGs with new fuel oil properties not within limits.	D.1 Restore stored fuel oil properties to within limits.	30 days
E. One or more DGs with a required starting air receiver pressure < 235 psig and ≥ 185 psig.	E.1 Restore starting air receiver pressure to ≥ 235 psig.	48 hours
F. Required Action and associated Completion Time not met. OR One or more DGs with diesel fuel oil, lube oil, or starting air subsystem inoperable for reasons other than Condition A, B, C, D, or E.	F.1 Declare associated DG inoperable.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.8.3.1	Verify each fuel oil storage tank contains ≥ 80% indicated fuel level.	31 days

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.8.3.2	Verify lubricating oil inventory is ≥ 168 gal.	31 days
SR 3.8.3.3	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 3.8.3.4	Verify each DG starting air receiver pressure is ≥ 235 psig.	31 days
SR 3.8.3.5	Check for and remove accumulated water from each fuel oil storage tank.	92 days

3.8 ELECTRICAL POWER SYSTEMS

3.8.4 DC Sources – Operating

LCO 3.8.4 The Train A and Train B DC electrical power subsystems shall be OPERABLE.

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

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or both batteries in a DC electrical power subsystem, or associated control equipment or cabling inoperable	A.1 Restore DC electrical power subsystem to OPERABLE status.	2 hours
B. Required Action and associated Completion Time of Condition A not met.	B.1 Be in MODE 3. AND B.2 Be in MODE 5.	6 hours 36 hours
C. Required battery charger, or associated control equipment or cabling inoperable.	C.1 Perform SR 3.8.6.1	1 hour AND Once per 8 hours thereafter
D. Required Action and associated Completion Time of Condition C not met.	D.1 Declare associated battery inoperable.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.8.4.1	Verify battery terminal voltage is ≥ 131 V on float charge.	7 days
SR 3.8.4.2	Verify no visible corrosion at battery terminals and connectors. OR Verify battery connection resistance is ≤ 150E-6 ohms for inter-cell connections. ≤ 150E-6 ohms for inter-rack connections. ≤ 150E-6 ohms for inter-tier connections. and ≤ 150E-6 ohms for terminal connections.	92 days
SR 3.8.4.3	Verify battery cells, cell plates, and racks show no visual indication of physical damage or abnormal deterioration.	18 months
SR 3.8.4.4	Remove visible terminal corrosion and verify battery cell to cell and terminal connections are clean and tight, and are coated with anti-corrosion material.	18 months
SR 3.8.4.5	Verify battery connection resistance is ≤ 150E-6 ohms for inter-cell connections. ≤ 150E-6 ohms for inter-rack connections. ≤ 150E-6 ohms for inter-tier connections. and ≤ 150E-6 ohms for terminal connections.	18 months

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.8.4.6	------------------NOTE------------------ Credit may betaken for unplanned events that satisfy this SR. -- Verify each battery charger supplies ≥ 400 amps for Batteries A and B and ≥ 300 amps for Batteries C and D at ≥ 125 V for ≥ 8 hours.	18 months
SR 3.8.4.7	------------------NOTES------------------ 1. The modified performance discharge test in SR 3.8.4.8 may be performed in lieu of the service test in SR 3.8.4.7 once per 60 months. 2. This Surveillance shall not be performed in MODE 1, 2, 3, or 4. However, credit may be taken for unplanned events that satisfy this SR. -- Verify battery capacity is adequate to supply, and maintain in OPERABLE status, the required emergency loads for the design duty cycle when subjected to a battery service test.	18 months

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.8.4.8	------------------NOTE------------------ This Surveillance shall not be performed in MODE 1, 2, 3, or 4. However, credit may be taken for unplanned events that satisfy this SR. -- Verify battery capacity is ≥ 90% 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 DC electrical power subsystem shall be OPERABLE to support the DC electrical power distribution subsystem(s) required by LCO 3.8.10, "Distribution Systems – Shutdown."

APPLICABILITY: MODES 5 and 6,
During movement of irradiated fuel assemblies with the core offloaded.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more required batteries, associated control equipment or cabling inoperable.	A.1 Declare affected required feature(s) inoperable.	Immediately
	<u>OR</u>	
	A.2.1 Suspend CORE ALTERATIONS.	Immediately
	<u>AND</u>	
	A.2.2 Suspend movement of irradiated fuel assemblies.	Immediately
	<u>AND</u>	
	A.2.3 Initiate action to suspend operations involving positive reactivity additions.	Immediately
	<u>AND</u>	(continued)

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. (continued)	A.2.4	Initiate action to restore required DC electrical power subsystems to OPERABLE status.	Immediately
B. Required battery charger, or associated control equipment or cabling inoperable.	B.1	Perform SR 3.8.6.1	1 hour AND Once per 8 hours thereafter
C. Required Action and associated Completion Time of Condition B not met.	C.1	Declare associated battery inoperable.	Immediately

SURVEILLANCE REQUIREMENTS

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

3.8 ELECTRICAL POWER SYSTEMS

3.8.6 Battery Cell Parameters

LCO 3.8.6 Battery cell parameters for the Train A and Train B batteries shall be within the limits of Table 3.8.6-1.

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 Category A or B limits.	A.1	Verify pilot cells electrolyte level and float voltage meet Table 3.8.6-1 Category C limits.	1 hour
	<u>AND</u>		
	A.2	Verify battery cell parameters meet Table 3.8.6-1 Category C limits.	24 hours <u>AND</u> Once per 7 days thereafter
	<u>AND</u>		
	A.3	Restore battery cell parameters to Category A and B limits of Table 3.8.6-1.	31 days

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. Required Action and associated Completion Time of Condition A not met. OR One or more batteries with average electrolyte temperature of the representative cells < 60°F. OR One or more batteries with one or more battery cell parameters not within Category C limits.	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

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.8.6.2	Verify battery cell parameters meet Table 3.8.6-1 Category B limits.	92 days AND Once within 7 days after battery discharge < 105 V AND Once within 7 days after battery overcharge > 150 V
SR 3.8.6.3	Verify average electrolyte temperature of representative cells is ≥ 60°F.	92 days

Table 3.8.6-1 (page 1 of 1)
Battery 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 ≤ ¼ inch above maximum level indication mark[(a)]	> Minimum level indication mark, and ≤ ¼ inch above maximum level indication mark[(a)]	Above top of plates, and not overflowing
Float Voltage	≥ 2.18 V	≥ 2.18 V	> 2.14 V
Specific Gravity[(b)(c)]	≥ 1.290	≥ 1.280	Not more than 0.020 below average connected cells <u>AND</u> Average of all connected cells ≥ 1.28

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

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

(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 Train A and Train B inverters shall be OPERABLE.

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

a. The associated AC vital instrument bus is energized from its Class 1E constant voltage source regulator; and

b. All other AC vital instrument 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.	A.1	---------NOTE--------- Enter applicable Conditions and Required Actions of LCO 3.8.9, "Distribution Systems - Operating" with any vital instrument bus de-energized. --------------------- Restore inverter to OPERABLE status.	24 hours

(continued)

ACTIONS (continued)

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

SURVEILLANCE REQUIREMENTS

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

3.8 ELECTRICAL POWER SYSTEMS

3.8.8 Inverters – Shutdown

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

APPLICABILITY: MODES 5 and 6,
During movement of irradiated fuel assemblies with the core offloaded.

ACTIONS

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

ACTIONS

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

SURVEILLANCE REQUIREMENTS

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

3.8 ELECTRICAL POWER SYSTEMS

3.8.9 Distribution Systems – Operating

LCO 3.8.9 Train A and Train B AC, DC, and AC vital instrument 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 subsystems inoperable.	A.1 Restore AC electrical power distribution subsystem to OPERABLE status.	8 hours AND 16 hours from discovery of failure to meet LCO
B. One or more AC vital instrument bus electrical power distribution subsystems inoperable.	B.1 Restore AC vital instrument bus electrical power distribution subsystem to OPERABLE status.	2 hours AND 16 hours from discovery of failure to meet LCO

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
C. One or more DC electrical power distribution subsystems inoperable.	C.1	Restore DC electrical power distribution subsystem to OPERABLE status.	2 hours AND 16 hours from discovery of failure to meet LCO
D. Required Action and associated Completion Time not met.	D.1	Be in MODE 3.	6 hours
	AND		
	D.2	Be in MODE 5.	36 hours
E. Two or more inoperable distribution subsystems that result in a loss of safety function.	E.1	Enter LCO 3.0.3.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.8.9.1	Verify correct breaker alignments and voltage to required AC, DC, and AC vital instrument 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 AC vital instrument bus electrical power distribution subsystems shall be OPERABLE to support equipment required to be OPERABLE.

APPLICABILITY: MODES 5 and 6,
During movement of irradiated fuel assemblies with the core offloaded.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more required AC, DC, or AC vital instrument 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>	
	A.2.2 Suspend movement of irradiated fuel assemblies.	Immediately
	<u>AND</u>	
	A.2.3 Initiate action to suspend operations involving positive reactivity additions.	Immediately
	<u>AND</u>	

(continued)

ACTIONS

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

SURVEILLANCE REQUIREMENTS

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

SMOOTH COPY
ITS SECTION 3.8 - BASES

B 3.8 ELECTRICAL POWER SYSTEMS

B 3.8.1 AC Sources – Operating

BASES

BACKGROUND

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

The onsite Class 1E AC Distribution System is divided into redundant load groups (trains) so that the loss of any one group does not prevent the minimum safety functions from being performed. Each train has connections to two preferred offsite power sources (normal and alternate) 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 circuits provide AC power, through ESF service transformers, to the 4.16 kV ESF buses. A detailed description of the offsite power network and the circuits to the Class 1E ESF buses is found in the updated FSAR, Chapter 8 (Ref. 2).

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

Certain required unit loads are returned to service in a predetermined sequence in order to prevent overloading the transformer (NBN-X03 and NBN-X04) supplying offsite power to the onsite Class 1E Distribution System. Within 30 seconds after the initiating signal is received, all automatic and permanently connected loads needed to recover the unit or maintain it in a safe condition are returned to service via the automatic load sequencer.

(continued)

BASES

BACKGROUND (continued)

The onsite standby power source for each 4.16 kV ESF bus is a dedicated DG. DG-A and DG-B are dedicated to ESF buses PBA-S03 and PBB-S04, respectively. A DG starts automatically (in emergency mode) on a safety injection actuation signal (SIAS) (i.e., low pressurizer pressure or high containment pressure signals), auxiliary feedwater actuation signals (AFAS-1 and AFAS-2) (e.g., low steam generator level), or on a loss of power (an ESF bus degraded voltage or undervoltage signal). After the DG has started, it will automatically tie to its respective bus after offsite power is tripped as a consequence of ESF bus undervoltage or degraded voltage, independent of or coincident with a SIAS or AFAS signal. Following the loss of offsite power, the sequencer sheds nonpermanent loads from the ESF bus. When the DG is tied to the ESF bus, loads are then sequentially connected to its respective ESF bus by the automatic load sequencer. The sequencing logic controls the permissive and starting signals to motor breakers to prevent overloading the DG by automatic load application. The DGs will also start and operate in the standby mode (running unloaded) without tying to the ESF bus on a SIAS or AFAS.

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

Certain required unit loads are returned to service in a predetermined sequence in order to prevent overloading the DG in the process. Within 40 seconds after the initiating signal is received, all loads needed to recover the unit or maintain it in a safe condition are returned to service.

Ratings for Train A and Train B DGs satisfy the requirements of Regulatory Guide 1.9 (Ref. 3). The continuous service rating of each DG is 5500 kW with 10% overload permissible for up to 2 hours in any 24 hour period. The ESF loads that are powered from the 4.16 kV ESF buses are listed in the updated FSAR, Chapter 8 (Ref. 2).

(continued)

BASES

APPLICABLE SAFETY ANALYSES

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

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

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

b. A worst case single failure.

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

LCO

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

In addition, one automatic load sequencer per train must be OPERABLE.

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

Each secondary winding of a startup transformer normally provides power to one of two interconnected 13.8 kV

(continued)

BASES

LCO (continued)

intermediate buses (NAN-S05 & NAN-S06), in such a way that the two 13.8 kV intermediate buses of the same unit receive power from two different start-up transformers. The 13.8 kV intermediate buses, in turn, distribute power to the 4.16 kV Class 1E buses (PBA-S03 & PBB-S04) via a 13.8 kV bus (NAN-S03 or NAN-S04) and an ESF transformer (NBN-X03 or NBN-X04).

Each DG must be capable of starting, accelerating to rated speed (i.e., frequency) and voltage, and connecting to its respective ESF bus on detection of bus undervoltage. This will be accomplished within (≤) 10 seconds. Each DG must also be capable of accepting required loads within the assumed loading sequence intervals, and continue to operate until offsite power can be restored to the ESF buses. These capabilities are required to be met from a variety of initial conditions such as DG in standby condition with the engine hot and DG in standby condition with the engine at normal keep-warm conditions. Additional DG capabilities must be demonstrated to meet required Surveillances (e.g., capability of the DG to revert to standby status on an ECCS signal while operating in parallel test mode).

Proper sequencing of loads, including tripping of nonessential loads, is a required function.

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.

APPLICABILITY

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

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

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

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

(continued)

BASES

ACTIONS

A.1

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

A.2

Required Action A.2, which only applies if the train (i.e., ESF bus) 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 require Class 1E power from PBA-S03 or PBB-S04 ESF buses to be OPERABLE, and include: charging pumps; radiation monitors Train A RU-29 and Train B RU-30 (TS 3.3.9), Train A RU-31 (3.3.10) and Train B RU-145 (relocated); pressurizer heaters (TS 3.4.9); ECCS (TS 3.5.3 and TS 3.5.6); containment spray (TS 3.6.6); containment isolation valves NCA-UV-402, NCB-UV-403, WCA-UV-62, and WCB-UV-61 (TS 3.6.3); containment hydrogen monitors (TS 3.3.10); hydrogen recombiners (TS 3.6.7); auxiliary feedwater system (TS 3.7.5); essential cooling water system (TS 3.7.7); essential spray pond system (TS 3.7.8); essential chilled water system (TS 3.7.10); control room essential filtration system (TS 3.7.11); ESF pump room air exhaust cleanup system (TS 3.7.13); shutdown cooling subsystems (TS 3.4.6, 3.4.15, and 3.5.3); and fuel building ventilation (relocated). Mode applicability is as specified in each appropriate TS section.

(continued)

BASES

ACTIONS

A.2 (continued)

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

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

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

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

Discovering no offsite power to one train of the onsite Class 1E Electrical Power Distribution System coincident with one or more inoperable required support or supported features, or both, that are associated with the other train that has offsite power, results in starting the Completion Times for the Required Action. Twenty-four hours 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.

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

A.3

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

(continued)

BASES

ACTIONS

A.3 (continued)

72 hours. With one offsite circuit inoperable, the reliability of the offsite system is degraded, and the potential for a loss of offsite power is increased, with attendant potential for a challenge to the unit safety systems. In this Condition, however, the remaining OPERABLE offsite circuit and 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 Time 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.

(continued)

BASES

ACTIONS (continued)

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 an offsite circuit fails to pass SR 3.8.1.1, it is inoperable. Upon offsite circuit inoperability, additional Conditions and Required Actions must then be entered.

B.2

Required Action B.2 is intended to provide assurance that a loss of offsite power, during the period that a DG is inoperable, does not result in a complete loss of safety function of redundant required features. These features require Class 1E power from PBA-S03 or PBB-S04 ESF buses to be OPERABLE, and are identical to those specified in ACTION A.2. Mode applicability is as specified in each appropriate TS section. 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.

(continued)

BASES

ACTIONS

B.2 (continued)

Four hours from the discovery of these events existing concurrently, is acceptable because it minimizes risk while allowing time for restoration before subjecting the unit to transients associated with shutdown.

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

B.3.1 and B.3.2

Required Action B.3.1 provides an allowance to avoid unnecessary testing of OPERABLE DGs. 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 plant corrective action program will continue to evaluate the common cause possibility. This continued evaluation, however, is no longer under the 24 hour constraint imposed while in Condition B.

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

(continued)

BASES

ACTIONS (continued)

B.4

According to NPSD-996 (Ref. 13), 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 days 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 returned 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 Conditions A and 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.

(continued)

BASES

ACTIONS (continued)

C.1 and C.2

Required Action C.1, which applies when two offsite circuits are inoperable, is intended to provide assurance that an event with a coincident single failure will not result in a complete loss of redundant required safety functions. The Completion Time for this failure of redundant required features is reduced to 12 hours from that allowed for one train without offsite power (Required Action A.2). The rationale for the reduction to 12 hours is that Regulatory Guide 1.93 (Ref. 6) allows a Completion Time of 24 hours for two required offsite circuits inoperable, based upon the assumption that two complete safety trains are OPERABLE. When a concurrent redundant required feature failure exists, this assumption is not the case, and a shorter Completion Time of 12 hours is appropriate. These features are powered from redundant AC safety trains. These features require Class 1E power from PBA-S03 or PBB-S04 ESF buses to be OPERABLE, and are identical to those specified in ACTION A.2. Mode applicability is as specified in each appropriate TS section.

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) and a required feature becomes inoperable, this Completion Time begins to be tracked.

According to Regulatory Guide 1.93 (Ref. 6), operation may continue in Condition C for a period that should not exceed 24 hours. This level of degradation means that the offsite electrical power system does not have the capability to effect a safe shutdown and to mitigate the effects of an

(continued)

BASES

ACTIONS

C.1 and C.2 (continued)

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.

According to Regulatory Guide 1.93 (Ref. 6), with the available offsite AC sources, two less than required by the LCO, operation may continue for 24 hours. If two offsite sources are restored within 24 hours, unrestricted operation may continue. If only one offsite source is restored within 24 hours, power operation continues in accordance with Condition A.

(continued)

BASES

ACTIONS (continued)

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 a train, the Conditions and Required Actions for LCO 3.8.9, "Distribution Systems – Operating," must be immediately entered. This allows Condition D to provide requirements for the loss of one offsite circuit and one DG without regard to whether a train is de-energized. LCO 3.8.9 provides the appropriate restrictions for a de-energized train.

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

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

(continued)

BASES

ACTIONS (continued)

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 ESF functions. Since the offsite electrical power system is the only source of AC power for this level of degradation, the risk associated with continued operation for a 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, the time allowed for continued operation is severely restricted. The intent here is to avoid the risk associated with an immediate controlled shutdown and to minimize the risk associated with this level of degradation.

According to Regulatory Guide 1.93 (Ref. 6), with both DGs inoperable, operation may continue for a period that should not exceed 2 hours.

(continued)

BASES

ACTIONS (continued)

F.1

The sequencer(s) is an essential support system to both the offsite circuit and the DG associated with a given ESF bus. Furthermore, the sequencer is on the primary success path for most major AC electrically powered safety systems powered from the associated ESF bus. Therefore, loss of an ESF bus sequencer affects every major ESF system in the load group. The 72 hour Completion Time provides a period of time to correct the problem commensurate with the importance of maintaining sequencer OPERABILITY. This time period also ensures that the probability of an accident (requiring sequencer OPERABILITY) occurring during periods when the sequencer is inoperable is minimal.

G.1.1

To ensure adequate voltage is delivered to downstream electrical equipment, the Electrical Distribution System (EDS) requires an adequate input voltage. Failure to assure adequate input voltage, may result in double sequencing should an accident requiring sequencer operation and a Fast Bus Transfer (FBT) occur during the period of low input voltage to the EDS.

Adequate EDS voltage is assured by maintenance of switchyard voltage at or above 524kV for Unit 1, and 518kV for Units 2 and 3, when all three startup transformers are in service. When only two startup transformers are in service, adequate voltage is assured to all three Units by maintaining switchyard voltage at or above 525kV. Blocking FBT ensures adequate EDS voltage by preventing the non-Class 1E House Loads from depressing the Class 1E 4.16kV switchgear voltage.

Action G.1.1 applies only if switchgear breakers NANS03B and NANS04B are open (i.e. FBT has not yet occurred). If breakers NANS03B and NANS04B are closed (i.e., FBT has occurred) and the degraded voltage relays (DVRs) have not activated, then the LCO is met, regardless of switchyard voltage, and no action is required as the DVRs are capable

(continued)

BASES

ACTIONS

G.1.1 (continued)

of determining adequate voltage at the Class 1E 4.16kV buses. Also, if the switchyard voltage perturbation is less than 28.62 seconds, then the LCO is met and no action is required as the perturbation is less than the current, minimum time delay of the DVRs.

G.1.2

To ensure adequate voltage is delivered to downstream electrical equipment, the Electrical Distribution System (EDS) requires an adequate input voltage. Failure to assure adequate input voltage, may result in double sequencing should an accident requiring sequencer operation and a Fast Bus Transfer (FBT) occur during the period of low input voltage to the EDS.

Adequate EDS voltage is assured by maintenance of switchyard voltage at or above 524kV for Unit 1, and 518kV for Units 2 and 3, when all three startup transformers are in service. When only two startup transformers are in service, adequate voltage is assured to all three Units by maintaining switchyard voltage at or above 525kV. Blocking FBT ensures adequate EDS voltage by preventing the non-Class 1E House Loads from depressing the Class 1E 4.16kV switchgear voltage. Starting, loading and separating the opposite train's EDG from offsite power prevents FBT from depressing the Class 1E 4.16kV bus voltage. In addition, this configuration provides offsite power to half of the House Loads to provide forced circulation in the event of a plant trip.

Action G.1.2 applies only if switchgear breakers NANS03B and NANS04B are open (i.e, FBT has not yet occurred). If breakers NANS03B and NANS04B are closed (i.e., FBT has occurred) and the degraded voltage relays (DVRs) have not activated, then the LCO is met, regardless of switchyard voltage, and no action is required as the DVRs are capable of determining adequate voltage at the Class 1E 4.16kV buses. Also, if the switchyard voltage perturbation is less than 28.62 seconds, then the LCO is met and no action is required as the perturbation is less than the current, minimum time delay of the DVRs.

(continued)

BASES

ACTIONS (continued)

G.2

The 72 hour completion time establishes a limit on the maximum time allowed to restore adequate Electrical Distribution System (EDS) input voltage. Regulatory Guide 1.93 (Ref. 6) recognizes that under certain conditions it may be safer to continue operation at full or reduced power for a limited time than to effect an immediate shutdown based on the loss of some of the required electric power sources. Action G balances the risk of a forced shutdown against the risk of remaining at power with EDS input voltage restored by blocking Fast Bus Transfer or starting, loading, and separating EDGs from offsite power. Action G.1.1 maintains the availability of all four electric power sources, however, House Loads would not be available for forced circulation capability during plant trips. Action G.1.2 reduces the number of available electric power sources and maintains partial forced circulation capability.

H.1 and H.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 6 hours and to MODE 5 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging unit systems.

I.1

Condition I 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.

(continued)

BASES

SURVEILLANCE REQUIREMENTS

The AC sources are designed to permit inspection and testing of all important areas and features, especially those that have a standby function, in accordance with 10 CFR 50, Appendix A, GDC 18 (Ref. 8). Periodic component tests are supplemented by extensive functional tests during refueling outages (under simulated accident conditions).

The SR for demonstrating OPERABILITY of the DGs are based on the recommendations of Regulatory Guide 1.9 (Ref. 3), unless otherwise noted in the Updated FSAR Section 1.8.

All planned DG starts may be preceded by an engine prelube period as recommended by the manufacturer in order to minimize wear and tear on the DGs during testing. The DG capabilities (starting and loading) are required to be met from a variety of initial conditions such as DG in standby condition with the engine hot (SR 3.8.1.15) and DG in standby condition with the engine at normal keep-warm conditions (SR 3.8.1.7 and SR 3.8.1.20). Although it is expected that most DG starts will be performed from normal keep-warm conditions, DG starts may be performed with the jacket water cooling and lube oil temperatures within the lower to upper limits of DG OPERABILITY, except as noted above. Rapid cooling of the DG down to normal keep-warm conditions should be minimized.

The timed start (≤ 10 seconds) is satisfied when the DG achieves at least 3740 volts and 58.8 Hz. At these values, the DG output breaker permissives are satisfied; and on detection of bus undervoltage or loss of power and subsequent load shed of the bus, the DG breakers would close reenergizing its respective ESF bus. Following the timed start, it is expected that the rated speed (i.e., frequency) and voltage will stabilize and maintain steady state voltage at 4160 ± 420 volts and frequency at 60 +1.2/-0.3 Hz.

The required steady state frequency range for the DG is 60 +1.2/-0.3 Hz to be consistent with the safety analysis to provide adequate safety injection flow. In accordance with the guidance provided in Regulatory Guide 1.9 (Ref. 3), where steady state conditions do not exist (i.e., transients), the frequency range should be restored to within ± 2% of the 60 Hz nominal frequency (58.8 Hz to 61.2 Hz).

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

Surveillance load testing uses the referenced equipment or equivalent loading.

Specific MODE restraints have been footnoted where applicable to each 18 month SR. The reason for "This Surveillance shall not be performed in MODE 1 or 2" is that during operation with the reactor critical, performance of this SR could cause perturbations to the EDS that could challenge continued steady state operation and, as a result, unit safety systems; or that performing the SR would remove a required DG from service. The reason for "This Surveillance shall not be performed in MODE 1, 2, 3, or 4" is that performing this SR would remove a required offsite circuit from service, perturb the EDS, and challenge safety systems.

SR 3.8.1.1

This SR assures proper circuit continuity for the offsite AC electrical power supply to the onsite distribution network and indicated 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 and SR 3.8.1.7

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

To minimize the wear on moving parts that do not get lubricated when the engine is not running, these SRs are modified by a Note (Note 2 for SR 3.8.1.2) to indicate that all DG starts for these Surveillances may be preceded by an engine prelube period and followed by a warmup period prior to loading.

In order to reduce stress and wear on diesel engines, the DG manufacturer recommends a modified start in which the

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.1.2 and SR 3.8.1.7 (continued)

starting speed of DGs is limited, warmup is limited to this lower speed, and the DGs are gradually accelerated to synchronous speed prior to loading. This is the intent of Note 3, which is only applicable when such modified start procedures are recommended by the manufacturer.

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

The 10 second start requirement is not applicable to SR 3.8.1.2 (see Note 3) when a modified start procedure as described above is used. If a modified start is not used, 10 second start requirement of SR 3.8.1.7 applies.

Since SR 3.8.1.7 requires a 10 second start, it is more restrictive than SR 3.8.1.2, and it may be performed in lieu of SR 3.8.1.2. This is the intent of Note 1 of SR 3.8.1.2.

The normal 31 day Frequency for SR 3.8.1.2 is consistent with Regulatory Guide 1.9 (Ref. 3). The 184 day Frequency for SR 3.8.1.7 is a reduction in cold testing consistent with Generic Letter 84-15 (Ref. 7). These Frequencies provide adequate assurance of DG OPERABILITY, while minimizing degradation resulting from testing.

SR 3.8.1.3

This Surveillance verifies that the DGs are capable of synchronizing with the offsite electrical system and accepting loads of 90 to 100 percent (4950 - 5500 kW) of the continuous rating of the DG. Consistent with the guidance provided in the Regulatory Guide 1.9 (Ref. 3) load-run test description., the 4950 - 5500 kW band will demonstrate 90 to 100 percent of the continuous rating of the DG. The load band (4950 - 5500 kW) is meant as guidance to avoid routine overloading of the engine. Loads in excess of this band for special testing may be performed within the guidance of the generator capability curve.

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.1.3 (continued)

A minimum run time of 60 minutes is required to stabilize engine temperatures, while minimizing the time that the DG is connected to the offsite source. However, additional runtime in excess of 60 minutes may be performed as recommended by the manufacturer.

The normal 31 day Frequency for this Surveillance is consistent with Regulatory Guide 1.9 (Ref. 3).

This SR is modified by four Notes. Note 1 indicates that diesel engine runs for this Surveillance may include gradual loading, as recommended by the manufacturer, so that mechanical stress and wear on the diesel engine are minimized. Note 2 states that momentary transients because of changing bus loads do not invalidate this test. 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 day tank is at or above the level at which fuel oil is automatically added. The level is expressed as an equivalent volume in gallons, and is selected to ensure adequate fuel oil for a minimum of 1 hour of DG operation at full load plus 10%.

The 31 day Frequency is adequate to assure that a sufficient supply of fuel oil is available, since low level alarms are provided and 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

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.1.5 (continued)

fuel oil day tanks once every 92 days eliminates the necessary environment for bacterial survival. This is the most effective means of controlling microbiological fouling. In addition, it eliminates the potential for water entrainment in the fuel oil during 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, the fuel delivery piping is not obstructed, and the controls and control systems for automatic fuel transfer systems are OPERABLE.

Since the design of the fuel transfer system is such that pumps will operate automatically in order to maintain an adequate volume of fuel oil in the day tank during or following DG testing, a 31 day Frequency is appropriate.

SR 3.8.1.7

See SR 3.8.1.2.

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BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.8.1.8

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

This SR is modified by a Note. The reason for the Note is that during operation with the reactor critical, performance of this SR could cause perturbations to the electrical distribution systems that could challenge continued steady state operation and, as a result, unit safety systems. Credit may be taken for unplanned events that satisfy this SR.

SR 3.8.1.9

Each DG is provided with an engine overspeed trip to prevent damage to the engine. Recovery from the transient caused by the loss of a large load could cause diesel engine overspeed, which, if excessive, might result in a trip of the engine. This Surveillance demonstrates the DG load response characteristics and capability to reject the largest single load, or equivalent load, without exceeding predetermined voltage and frequency and while maintaining a specified margin to the overspeed trip. Train A Normal Water Chiller (at 842 kW) and Train B AFW pump (at 904 kW) are the bounding loads for the DG A and DG B to reject, respectively. These values are listed in Table 8.3-3, Load Bases for Class 1E Buses, in the Updated FSAR (Ref. 2). This Surveillance may be accomplished by:

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

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BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.1.9 (continued)

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

As required by IEEE-308 (Ref. 13), the load rejection test is acceptable if the increase in diesel speed does not exceed 75% of the difference between synchronous speed and the overspeed trip setpoint, or 15% above synchronous speed, whichever is lower.

The time, voltage, and frequency tolerances specified in this SR are derived from Regulatory Guide 1.9 (Ref. 3) recommendations for response during load sequence intervals. The 3 seconds specified is equal to 60% of a typical 5 second load sequence interval associated with sequencing of the largest load. The voltage and frequency specified are consistent with the design range of the equipment powered by the DG. SR 3.8.1.9.a corresponds to the maximum frequency excursion, while SR 3.8.1.9.b and SR 3.8.1.9.c are steady state voltage and frequency values to which the system must recover following load rejection. The 18 month Frequency is consistent with the recommendation of Regulatory Guide 1.9 (Ref. 3).

This SR is modified by a Note. The reason for the Note is that performing this SR would remove a required offsite circuit from service, perturb the EDS, and challenge safety systems. Credit may be taken for unplanned events that satisfy this SR. This SR is performed in emergency mode (not paralleled to the grid) ensuring that the DG is tested under load conditions that are as close to design basis conditions as possible.

SR 3.8.1.10

This Surveillance demonstrates the DG capability to reject a full load without overspeed tripping or exceeding the predetermined voltage limits. The DG full load rejection may occur because of a system fault or inadvertent breaker tripping. This Surveillance ensures proper engine generator load response under the simulated test conditions. This test simulates the loss of the total connected load that the

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.1.10 (continued)

DG experiences following a full load rejection and verifies that the DG will not trip upon loss of the load. These acceptance criteria provide DG damage protection. While the DG is not expected to experience this transient during an event and continues to be available, this response ensures that the DG is not degraded for future application, including reconnection to the bus if the trip initiator can be corrected or isolated.

In order to ensure that the DG is tested under load conditions that are as close to design basis conditions as possible, testing is performed using design basis kW loading and maximum kVAR loading permitted during testing. These loads represent the inductive loading that the DG would experience to the extent practicable and is consistent with the intent of Regulatory Guide 1.9 (Ref. 3). Consistent with the guidance provided in the Regulatory Guide 1.9 full-load rejection test description, the 4950 - 5500 kW band will demonstrate the DG's capability to reject a load equal to 90 to 100 percent of its continuous rating. Administrative limits have been placed upon the Class 1E 4160 V buses due to high voltage concerns. As a result, power factors deviating much from unity are currently not possible when the DG runs parallel to the grid. To the extent practicable, VARs will be provided by the DG during this SR.

The 18 month Frequency is consistent with the recommendation of Regulatory Guide 1.8 (Ref. 3) and is intended to be consistent with expected fuel cycle lengths.

This SR is modified by a Note. The reason for the Note is that during operation with the reactor critical, performance of this SR could cause perturbation to the electrical distribution systems that could challenge continued steady state operation and, as a result, unit safety systems. Credit may be taken for unplanned events that satisfy this SR.

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BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.8.1.11

As required by Regulatory Guide 1.9 (Ref. 3), paragraph 2.2.4, this Surveillance demonstrates the as designed operation of the standby power sources during loss of the offsite source. This test verifies all actions encountered from the loss of offsite power, including shedding of the nonessential loads and energization of the emergency buses and respective loads from the DG. It further demonstrates the capability of the DG to automatically achieve the required voltage and frequency within the specified time.

The DG auto-start time of 10 seconds is derived from requirements of the accident analysis. 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 is intended to satisfactorily show the relationship of these loads to the DG loading logic. In certain circumstances, many of these loads cannot actually be connected or loaded without undue hardship or potential for undesired operation. For instance, Emergency Core Cooling Systems (ECCS) injection valves are not desired to be stroked open, high pressure injection systems are not capable of being operated at full flow, or shutdown cooling (SDC) systems performing a decay heat removal function are not desired to be realigned to the ECCS mode of operation. In lieu of actual demonstration of connection and loading of loads, testing that adequately shows the capability of the DG system to perform these functions is acceptable. This testing may include any series of sequential, overlapping, or total steps so that the entire connection and loading sequence is verified.

The Frequency of 18 months is consistent with the recommendations of Regulatory Guide 1.9 (Ref. 3), takes into consideration unit conditions required to perform the Surveillance, and is intended to be consistent with expected fuel cycle lengths.

This SR is modified by two Notes. The reason for Note 1 is to minimize wear and tear on the DGs during testing. The

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.1.11 (continued)

reason for Note 2 is that performing the Surveillance would remove a required offsite circuit from service, perturb the electrical distribution system, and challenge safety systems. Credit may be taken for unplanned events that satisfy this SR.

SR 3.8.1.12

This Surveillance demonstrates that the DG automatically starts and achieves the required voltage and frequency and operates for ≥ 5 minutes. The 5 minute period provides sufficient time to demonstrate stability. SR 3.8.1.12.d and SR 3.8.1.12.e ensure that permanently connected loads and emergency loads are energized from the offsite electrical power system on an ESF signal without loss of offsite power.

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

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

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.1.12 (continued)

This SR is modified by two Notes. The reason for Note 1 is to minimize wear and tear on the DGs during testing. The reason for Note 2 is that performing this SR would remove a required offsite circuit from service, perturb the EDS, and challenge safety systems. Credit may be taken for unplanned events that satisfy this SR.

SR 3.8.1.13

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

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

The SR is modified by a Note. The reason for the Note is that performing the Surveillance would remove a required DG from service. Credit may be taken for unplanned events that satisfy this SR.

SR 3.8.1.14

Regulatory Guide 1.9 (Ref. 3), paragraph 2.2.9, requires demonstration once per 18 months that the DGs can start and

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.1.14 (continued)

run continuously at full load capability for an interval of not less than 24 hours, ≥ 2 hours of which is at a load equivalent to 105 to 110% of the continuous rating of the DG (5775 - 6050 kW) and ≥ 22 hours at a load equivalent to 90 to 100% of the continuous duty rating of the DG (4950 - 5500 kW). The DG starts for this Surveillance can be performed either from normal keep-warm or hot conditions. The provisions for prelubricating and warmup, discussed in SR 3.8.1.2, and for gradual loading, discussed in SR 3.8.1.3, are applicable to this SR.

In order to ensure that the DG is tested under load conditions that are as close to design conditions as possible, testing is performed using design basis kW loading and maximum kVAR loading permitted during testing. These loads represent the inductive loading that the DG would experience to the extent practicable and is consistent with the intent of Regulatory Guide 1.9 (Ref. 3). Administrative limits have been placed upon the Class 1E 4160 V buses due to high voltage concerns. As a result, power factors deviating much from unity are currently not possible when the DG runs parallel to the grid. To the extent practicable, VARs will be provided by the DG during this SR. The load band is provided to avoid routine overloading of the DG. Routine overloading may result in more frequent teardown inspections in accordance with vendor recommendations in order to maintain DG OPERABILITY.

The 18 month Frequency is consistent with the recommendations of Regulatory Guide 1.9 (Ref. 3), paragraph 2.2.9, takes into consideration unit conditions required to perform the Surveillance, and is intended to be consistent with expected fuel cycle lengths.

This Surveillance is modified by two Notes. The reason for Note 1 (Momentary transients outside the load range do not invalidate this test) is that this band is meant as guidance to avoid routine overloading of the engine. Loads in excess of this band for special testing under direct monitoring of the manufacturer or momentary variations due to changing bus loads shall not invalidate the test. The reason for Note 2 is that during operation with the reactor critical, performance of this Surveillance could cause perturbations to the electrical distribution systems that could challenge

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.1.14 (continued)

continued steady state operation and, as a result, unit safety systems. Credit may be taken for unplanned events that satisfy this SR.

SR 3.8.1.15

This Surveillance demonstrates that the diesel engine can restart from a hot condition, such as subsequent to shutdown from normal Surveillances, and achieve the required voltage and frequency within 10 seconds. The 10 second time is derived from the requirements of the accident analysis to respond to a design basis large break LOCA. The 18 month Frequency is consistent with the recommendations of Regulatory Guide 1.9 (Ref. 3), paragraph 2.2.10.

This SR is modified by two Notes. Note 1 ensures that the test is performed with the diesel sufficiently hot. The load band is provided to avoid routine overloading of the DG. Routine overloads may result in more frequent teardown inspections in accordance with vendor recommendations in order to maintain DG OPERABILITY. Per the guidance in Regulatory Guide 1.9, this SR would demonstrate the hot restart functional capability at full-load temperature conditions, after the DG has operated for 2 hours (or until operating temperatures have stabilized) at full load. Loads in excess of this band for special testing under direct monitoring of the manufacturer or momentary transients due to changing bus loads shall not invalidate the test. Note 2 allows all DG starts to be preceded by an engine prelube period to minimize wear and tear on the diesel during testing.

SR 3.8.1.16

As required by Regulatory Guide 1.9 (Ref. 3), paragraph 2.2.11, this Surveillance ensures that the manual synchronization and load transfer from the DG to the offsite source can be made and that the DG can be returned to ready-to-load status when offsite power is restored. It also ensures that the auto-start logic is reset to allow the DG to reload if a subsequent loss of offsite power occurs. The DG is considered to be in ready- to-load status when the DG is at rated speed and voltage, in standby operation (running unloaded), the output breaker is open and can receive an

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.1.16 (continued)

autoclose signal on bus undervoltage, and the load sequence timers are reset.

The Frequency of 18 months is consistent with the recommendations of Regulatory Guide 1.9 (Ref. 3), and takes into consideration unit conditions required to perform the Surveillance.

This SR is modified by a Note. The reason for the Note is that performing the Surveillance would remove a required offsite circuit from service, perturb the electrical distribution system, and challenge safety systems. Credit may be taken for unplanned events that satisfy this SR.

SR 3.8.1.17

Demonstration of the test mode override ensures that the DG availability under accident conditions will not be compromised as the result of testing and the DG will automatically reset to ready-to-load operation if a LOCA actuation signal (e.g., simulated SIAS) is received during operation in the test mode. Ready-to-load operation is defined as the DG running at rated speed and voltage, in standby operation (running unloaded) with the DG output breaker open. These provisions for automatic switchover are required by IEEE-308 (Ref. 13), paragraph 6.2.6(2) and Regulatory Guide 1.9 (Ref. 3), paragraph 2.2.13.

The requirement to automatically energize the emergency loads with offsite power is essentially identical to that of SR 3.8.1.12. The intent in the requirement associated with SR 3.8.1.17.b is to show that the emergency loading was not affected by the DG operation in test mode. In lieu of actual demonstration of connection and loading of loads, testing that adequately shows the capability of the emergency loads to perform these functions is acceptable. This testing may include any series of sequential, overlapping, or total steps so that the entire connection and loading sequence is verified.

The 18 month Frequency is consistent with the recommendations of Regulatory Guide 1.9 (Ref. 3); takes into consideration unit conditions required to perform the

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BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.1.17 (continued)

Surveillance; and is intended to be consistent with expected fuel cycle lengths.

This SR is modified by a Note. The reason for the Note is that performing the Surveillance would remove a required offsite circuit from service, perturb the electrical distribution system, and challenge safety systems. Credit may be taken for unplanned events that satisfy this SR.

SR 3.8.1.18

Under accident and loss of offsite power conditions loads are sequentially connected to the bus by the automatic load sequencer. The sequencing logic controls the permissive and starting signals to motor breakers to prevent overloading of the DGs due to high motor starting currents. The 1 second load sequence time tolerance ensures that sufficient time exists for the DG to restore frequency and voltage prior to applying the next load and that safety analysis assumptions regarding ESF equipment time delays are not violated. FSAR, Chapter 8 (Ref. 2) provides a summary of the automatic loading of ESF buses.

The Frequency of 18 months is consistent with the recommendations of Regulatory Guide 1.9 (Ref. 3), paragraph 2.2.4; takes into consideration unit conditions required to perform the Surveillance; and is intended to be consistent with expected fuel cycle lengths.

This SR is modified by a Note. The reason for the Note is that performing the Surveillance would remove a required offsite circuit from service, perturb the electrical distribution system, and challenge safety systems. Credit may be taken for unplanned events that satisfy this SR.

SR 3.8.1.19

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

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.1.19 (continued)

This Surveillance demonstrates the DG operation, as discussed in the Bases for SR 3.8.1.11, during a loss of offsite power actuation test signal in conjunction with an ESF actuation signal. In lieu of actual demonstration of connection and loading of loads, testing that adequately shows the capability of the DG system to perform these functions is acceptable. This testing may include any series of sequential, overlapping, or total steps so that the entire connection and loading sequence is verified.

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

This SR is modified by two Notes. The reason for Note 1 is to minimize wear and tear on the DGs during testing. The reason for Note 2 is that performing the Surveillance would remove a required offsite circuit from service, perturb the electrical distribution system, and challenge safety systems. Credit may be taken for unplanned events that satisfy this SR.

SR 3.8.1.20

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

The 10 year Frequency is consistent with the recommendations of Regulatory Guide 1.9 (Ref. 3), paragraph 2.3.2.4 and Regulatory Guide 1.137 (Ref. 10).

This SR is modified by two Notes. The reason for Note 1 is to minimize wear on the DG during testing. For the purpose of this testing, the DGs must be started from standby conditions with the engine at normal keep-warm conditions. The reason for Note 2 is that during operation with the reactor critical, performance of this SR could cause perturbations to the EDS that could challenge continued steady state operation and, as a result, unit safety

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.1.20 (continued)

systems. In addition, Note 2 credits unplanned events or testing after any modifications which could affect DG independence that satisfy this SR.

REFERENCES:

1. 10 CFR 50, Appendix A, GDC 17
2. Updated FSAR, Chapter 8
3. Regulatory Guide 1.9, Revision 3, "Selection, Design, Qualification and Testing of Emergency Diesel Generator Units Used as Class 1E Onsite Electric Power Systems at Nuclear Power Plants," July 1993.
4. Updated FSAR, Chapter 6
5. Updated FSAR, Chapter 15
6. Regulatory Guide 1.93, "Availability of Electric Power Sources," Revision 0, December 1974.
7. GL 84-15, "Proposed Staff Actions to Improve and Maintain Diesel Generator Reliability," July 2, 1984.
8. 10 CFR 50, Appendix A, GDC 18
9. Regulatory Guide 1.108, Rev. 1, August, 1977
10. Regulatory Guide 1.137, "Fuel Oil Systems for Standby Diesel Generators," Revision 1, October 1979.
11. ANSI C84.1-1982
12. IEEE Standard 308-1974, "IEEE Standard Criteria for Class 1E Power Systems for Nuclear Power Generating Stations."
13. NPSD-996, "CEOG Joint Applications Report for Emergency Diesel Generator AOT Extension, " May 1995.

B 3.8 ELECTRICAL POWER SYSTEMS

B 3.8.2 AC Sources – Shutdown

BASES

BACKGROUND

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

APPLICABLE SAFETY ANALYSES

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

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

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

c. Adequate AC electrical power is provided to mitigate events postulated during shutdown, such as a fuel handling accident.

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

During MODES 1, 2, 3, and 4, various deviations from the analysis assumptions and design requirements are allowed

(continued)

BASES

APPLICABLE SAFETY ANALYSES (continued)

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

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

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

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

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

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

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

LCO

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

(continued)

BASES

LCO (continued)

offsite circuit. Together, OPERABILITY of the required offsite circuit and DG ensures the availability of sufficient AC sources to operate the unit in a safe manner and to mitigate the consequences of postulated events during shutdown (e.g., fuel handling accidents).

The offsite circuit must be capable of maintaining rated frequency and voltage, and accepting required loads during an accident, while connected to the Engineered Safety Feature (ESF) bus(es).

The DG must be capable of starting, accelerating to rated speed and voltage, connecting to its respective ESF bus on detection of bus undervoltage, and accepting required loads. This sequence must be accomplished within 10 seconds. The DG must be capable of accepting required loads within the assumed loading sequence intervals, and must continue to operate until offsite power can be restored to the ESF buses. These capabilities are required to be met from a variety of initial conditions such as DG in standby with the engine hot and DG in standby at keep-warm conditions.

Proper sequencing of loads, including tripping of nonessential loads, is a required function.

In addition, proper sequencer operation is an integral part of offsite circuit OPERABILITY since its inoperability impacts on the ability to start and maintain energized loads required OPERABLE by LCO 3.8.10.

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

APPLICABILITY

The AC sources required to be OPERABLE in MODES 5 and 6, and during movement of irradiated fuel assemblies with the core offloaded provide assurance that:

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

(continued)

BASES

APPLICABILITY (continued)

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 a cold shutdown condition or refueling condition.

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

ACTIONS

A.1

An offsite circuit would be considered inoperable if it were not available to one required ESF train. Although two trains are required by LCO 3.8.10, the remaining train with offsite power available may be capable of supporting sufficient required features to allow continuation of CORE ALTERATIONS and fuel movement. By the allowance of the option to declare required features inoperable, with no offsite power available, appropriate restrictions will be implemented in accordance with the affected required features LCO's ACTIONS.

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

With the offsite circuit not available to all required trains, the option would still exist to declare all required features inoperable. Since this option may involve undesired administrative efforts, the allowance for sufficiently conservative actions is made. With the required DG inoperable, the minimum required diversity of AC power sources is not available. It is, therefore, required to suspend CORE ALTERATIONS, movement of irradiated fuel assemblies, and operations involving positive reactivity additions. The Required Action to suspend positive reactivity additions does not preclude actions to maintain or increase reactor vessel inventory provided the required SDM is maintained.

(continued)

BASES

ACTIONS

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

Suspension of these activities does not preclude completion of actions to establish a safe conservative condition. These actions minimize the probability of the occurrence of postulated events. It is further required to immediately initiate action to restore the required AC 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 ESF bus, the ACTIONS for LCO 3.8.10 must be immediately entered. This Note allows Condition A to provide requirements for the loss of the offsite circuit, whether or not a train is de-energized. LCO 3.8.10 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. The SRs that are required to be performed are SR 3.8.1.1, SR 3.8.1.2, SR 3.8.1.4, SR 3.8.1.5, SR 3.8.1.6, and SR 3.8.1.7. The SRs listed in the Note are not required to be performed as a condition of OPERABILITY because their performance would unnecessarily challenge the only remaining OPERABLE DG or offsite circuit.

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.2.1 (continued)

The following SRs have a specific MODE restraint such that the SR shall not be performed in MODES 1, 2, 3, or 4: SR 3.8.1.9, SR 3.8.1.11, SR 3.8.1.12, SR 3.8.1.16, SR 3.8.1.17, SR 3.8.1.18, and SR 3.8.1.19.

The reasons for the exception to SR 3.8.2.1 applicability are as follows: SR 3.8.1.8 is not applicable since only one offsite circuit is required to be OPERABLE and an alternate offsite circuit may not be available; SR 3.8.1.12 and SR 3.8.1.17 are not applicable because the ESF functions (i.e., AFAS and SIAS) are not required to be OPERABLE during shutdown; SR 3.8.1.17 is not applicable because the required OPERABLE DG(s) is not required to undergo periods of being load tested (parallel to the offsite circuit). SR 3.8.1.20 is excepted because starting independence is not required with DG(s) that are not required to be OPERABLE.

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

REFERENCES

None.

B 3.8 ELECTRICAL POWER SYSTEMS

B 3.8.3 Diesel Fuel Oil, Lube Oil, and Starting Air

BASES

BACKGROUND

Each diesel generator (DG) is provided with a storage tank having a fuel oil capacity sufficient to operate that diesel for a period of 7 days, while the DG is supplying maximum post loss of coolant accident load demand as discussed in the FSAR, Section 9.5.4.2.1 (Ref. 1). The maximum load demand is calculated using the assumption that at least two DGs are available. This onsite fuel oil capacity is sufficient to operate the DGs for longer than the time to replenish the onsite supply from outside sources.

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

For proper operation of the standby DGs, it is necessary to ensure the proper quality of the fuel oil. Regulatory Guide 1.137 (Ref. 2) addresses the recommended fuel oil practices as supplemented by ANSI N195-1976 (Ref. 3). The fuel oil properties governed by these SRs are the water and sediment content, the kinematic viscosity, specific gravity (or API gravity), and impurity level.

The DG lubrication system is designed to provide sufficient lubrication to permit proper operation of its associated DG under all loading conditions. The system is required to circulate the lube oil to the diesel engine working surfaces and to remove excess heat generated by friction during operation. Each engine oil sump contains an inventory capable of supporting a minimum of 7 days of operation. This supply is sufficient supply to allow the operator to replenish lube oil from outside sources.

Each DG has independent and redundant starting air subsystems. Each DG starting subsystem provides a stored compressed air supply sufficient for accomplishing a DG start in ≤ 10 seconds. Each air receiver has been sized to accomplish 5 consecutive DG starts from the receiver design working pressure without being refilled.

(continued)

BASES

APPLICABLE SAFETY ANALYSES

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

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

LCO

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

The starting air system is required to have a minimum capacity for five consecutive 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 AOO or a postulated DBA. Since stored diesel fuel oil, lube oil, and starting air subsystems support LCO 3.8.1 and LCO 3.8.2, stored diesel fuel oil, lube oil and starting

(continued)

BASES

APPLICABILITY (continued)

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 are governed by separate Condition entry and application of associated Required Actions.

<u>A.1</u>

In this Condition (i.e., < 80% indicated fuel level), the 7 day fuel oil supply (69,700 gallon of fuel) for a DG is not available. However, the Condition is restricted to fuel oil level reductions, that maintain at least a 6 day supply (60500 gallons of fuel). These circumstances may be caused by events such as full load operation required after an inadvertent start while at minimum required level; or feed and bleed operations, which may be necessitated by increasing particulate levels or any number of other oil quality degradations. This restriction allows sufficient time for obtaining the requisite replacement volume and performing the analyses required prior to addition of fuel oil to the tank. A period of 48 hours is considered sufficient to complete restoration of the required level prior to declaring the DG inoperable. This period is acceptable based on the remaining capacity (> 6 days or ≥ 71% indicated fuel level), the fact that procedures will be initiated to obtain replenishment, and the low probability of an event during this brief period.

<u>B.1</u>

With lube oil inventory < 168 gal, sufficient lubricating oil to support 7 days of continuous DG operation at full load conditions may not be available. However, the Condition is restricted to lube oil volume reductins that maintain at least a 6 day supply. This restriction allows

(continued)

BASES

ACTIONS

B.1 (continued)

sufficient time to obtain the requisite replacement volume. A period of 48 hours is considered sufficient to complete restoration of the required volume prior to declaring the DG inoperable. This period is acceptable based on the remaining capacity (> 6 days), the low rate of usage, the fact that procedures will be initiated to obtain replenishment, and the low probability of an event during this brief period. The minimum usable level used to measure available gallons is assumed to be the top of the oil suction header in the crankcase. This is a conservative assumption, since the suction openings are in the bottom of the header, about 6 inches lower.

C.1

This Condition is entered as a result of a failure to meet the acceptance criterion of SR 3.8.3.3. Normally, trending of particulate levels allows sufficient time to correct high particulate levels prior to reaching the limit of acceptability. Poor sample procedures (bottom sampling), contaminated sampling equipment, and errors in laboratory analysis can produce failures that do not follow a trend. Since the presence of particulates does not mean failure of the fuel oil to burn properly in the diesel engine, and particulate concentration is unlikely to change significantly between Surveillance Frequency intervals, and proper engine performance has been recently demonstrated (within 31 days), it is prudent to allow a brief period prior to declaring the associated DG inoperable. The 7 day Completion time allows for further evaluation, resampling, and re-analysis of the DG fuel oil.

D.1

With the new fuel oil properties defined in the Bases for SR 3.8.3.3 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 restore the stored fuel oil properties. This restoration may involve feed and bleed procedures, filtering, or

(continued)

BASES

ACTIONS

D.1 (continued)

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.

E.1

There exist two independent and redundant starting air receivers for each DG. Each receiver is sized to accomplish 5 DG starts from its normal operating pressure of 250 psig, and each will start the DG in ≤ 10 seconds with a minimum pressure of 185 psig. Therefore, the DG is considered OPERABLE with one air receiver at its normal operating pressure of ≥ 235 psig indicated. If the one starting air receiver is < 235 psig and ≥ 185 psig, the starting air system is degraded and a period of 48 hours is considered sufficient to complete restoration to the required pressure prior to declaring the DG inoperable. This 48-hour period is acceptable based on the minimum starting air capacity (≥ 185 psig), the fact that the DG start must be accomplished on the first attempt (there are no sequencial starts in emergency mode), and the low probability of an event during this brief period.

Starting air receiver pressure is expected to decrease below 235 psig but remain above 185 psig during any start attempt. Following a start attempt, a recovery period of 30 minutes is considered an acceptable period of time to recharge the air receivers prior to entry into ACTION E.1

F.1

With a Required Action and associated Completion Time not met, or one or more DGs with diesel fuel oil, lube oil, or starting air subsystem inoperable 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.

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.3.1

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

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

SR 3.8.3.2

This Surveillance ensures that sufficient lube oil inventory is available to support at least 7 days of full load operation for each DG. The 168 gal requirement is based on the DG manufacturer consumption values for the run time of the DG. Implicit in this SR is the requirement to verify the capability to transfer the lube oil from its storage location to the DG, when the DG lube oil sump does not hold adequate inventory for 7 days of full load operation without the level reaching the manufacturer recommended minimum level. The minimum usable level used to measure available gallons is assumed to be the top of the oil suction header in the crankcase. This is a conservative assumption, since the suction openings are in the bottom of the header, about 6 inches lower.

The 31 day Frequency is adequate to ensure that a sufficient lube oil supply is onsite, since DG starts and run time are closely monitored by the unit staff.

SR 3.8.3.3

The tests listed below are a means of determining whether new fuel oil is of the appropriate grade and has not been contaminated with substances that would have an immediate, detrimental impact on diesel engine combustion. If results from these tests are within acceptable limits, the fuel oil may be added to the storage tanks without concern for contaminating the entire volume of fuel oil in the storage tanks. These tests are to be conducted prior to adding the

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.3.3 (continued)

new fuel to the storage tank(s), but in no case is the time between receipt of new fuel and conducting the tests to exceed 31 days. The tests, limits, and applicable ASTM Standards are as follows:

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

b. Verify in accordance with the tests specified in ASTM D975 (Ref. 6) that the sample has an absolute specific gravity at 60/60°F of ≥ 0.83 and ≤ 0.89, or an API gravity at 60°F of ≥ 27° and ≤ 39°, a kinematic viscosity at 40°C of ≥ 1.9 centistokes and ≤ 4.1 centistokes, and a flash point ≥ 125°F; and

c. Verify in accordance with the tests specified in ASTM D1796 (Ref. 6) that the sample water and sediment is ≤ 0.05 percent volume.

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

Within 31 days following the initial new fuel oil sample, the fuel oil is analyzed to establish that the other properties specified in Table 1 of ASTM D975 (Ref. 7) are met for new fuel oil when tested in accordance with ASTM D975 (Ref. 6), except that the analysis for cetane number may be performed in accordance with ASTM D976 (Ref. 6) or ASTM D4737 (Ref. 6). The 31 day period is acceptable because the fuel oil properties of interest, even if they were not within stated limits, would not have an immediate effect on DG operation. This surveillance ensures the availability of high quality fuel oil for the DGs.

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

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.3.3 (continued)

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

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

SR 3.8.3.4

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. A start cycle is defined by the DG vendor, but usually is measured in terms of time (seconds or cranking) or engine cranking speed. The pressure specified in this SR is intended to reflect the lowest value at which the DG can be considered OPERABLE.

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

SR 3.8.3.5

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

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.3.5 (continued)

fuel oil storage tanks once every 92 days eliminates the necessary environment for bacterial survival. This is the most effective means of controlling microbiological fouling. In addition, it eliminates the potential for water entrainment in the fuel oil during 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.

REFERENCES

1. FSAR, Section 9.5.4.2.
2. Regulatory Guide 1.137.
3. ANSI N195-1976, Appendix B.
4. FSAR, Chapter 6.
5. FSAR, Chapter 15.
6. ASTM Standards: D4057-81; D975-91; D976-91; D4737-90; D1796-83; D2276-89, Method A.
7. ASTM Standards, D975, Table 1.
8. ASME, Boiler and Pressure Vessel Code, Section XI.

B 3.8 ELECTRICAL POWER SYSTEMS

B 3.8.4 DC Sources – Operating

BASES

BACKGROUND

The station DC electrical power system provides the AC emergency power system with control power. It also provides both motive and control power to selected safety related equipment and preferred AC vital bus power (via inverters). As required by 10 CFR 50, Appendix A, GDC 17 (Ref. 1), the DC electrical power system is designed to have sufficient independence, redundancy, and testability to perform its safety functions, assuming a single failure. The DC electrical power system also conforms to the recommendations of Regulatory Guide 1.6 (Ref. 2) and IEEE-308 (Ref. 3).

The 125 VDC electrical power system consists of two independent and redundant safety related Class 1E DC electrical power subsystems (Train A and Train B). Each subsystem consists of two 125 VDC batteries, the associated battery charger(s) for each battery, and all the associated control equipment and interconnecting cabling. Each subsystem contains two DC power channels. There are four channels designated as A and C for Train A, and B and D for Train B for each unit.

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

During normal operation, the normal battery charger supplies DC power to the DC control center at a float voltage of at least 135 V DC. In addition to carrying the loads on the DC control center, the normal battery charger provides a float (trickle) charge to the battery to keep the battery fully charged. The battery is available as a standby DC source to carry the DC control center load automatically in case of battery charger loss. In case of complete loss of AC power, each DC control center will be fed by its associated battery for at least two hours.

(continued)

BASES

BACKGROUND (continued)

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

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

Each battery has adequate storage capacity to carry the required load continuously for at least 2 hours as discussed in the UFSAR, 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.

In addition, each load group contains a backup battery charger which is manually transferable to either channel of a load group. The transfer mechanism is mechanically interlocked to prevent both DC channels of a load group from being simultaneously connected to the backup battery charger.

The batteries for Train A and Train B DC electrical power subsystems are sized to produce required capacity at 90% of nameplate rating. The voltage limit is 2.18 V per cell, which corresponds to a total minimum voltage output of 131 V per battery discussed in the Design Basis Manual (Ref. 12).

(continued)

BASES

BACKGROUND (continued)

Each Train A and Train B DC electrical power subsystem has ample power output capacity for the steady state operation of connected loads required during normal operation, while at the same time maintaining its battery bank fully charged. Each battery charger also has sufficient capacity to restore the battery from the design minimum charge to its fully charged state within 12 hours while supplying normal steady state loads discussed in the UFSAR, Chapter 8 (Ref. 4).

APPLICABLE SAFETY ANALYSES

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

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

b. A worst case single failure.

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

LCO

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

(continued)

BASES

LCO (continued)

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

APPLICABILITY

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

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

b. Adequate core cooling is provided, and containment integrity 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 in the Bases for LCO 3.8.5, "DC Sources – Shutdown."

ACTIONS

A.1

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

(continued)

BASES

ACTIONS

A.1 (continued)

If one of the required DC electrical power subsystems is inoperable (i.e., 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 subsystem with attendant loss of ESF functions, continued power operation should not exceed 2 hours. The 2 hour Completion Time is based on Regulatory Guide 1.93 (Ref. 8) and reflects a reasonable time to assess unit status as a function of the inoperable DC electrical power subsystem and, if the DC electrical power subsystem is not restored to OPERABLE status, to prepare to effect an orderly and safe unit shutdown.

B.1 and B.2

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

(continued)

BASES

ACTIONS (continued)

C.1

Condition C represents one or both channels in a train with a loss of ability to completely respond to a long term event, and a potential loss of ability to remain energized during normal operation. Since eventual failure of the battery to maintain the required battery cell parameters is highly probable, it is imperative that the operator's attention focus on stabilizing the unit and placing an associated battery charger in service, thereby, minimize the potential for complete loss of DC power to the affected channel. The additional time provided by the Completion Time is consistent with the battery's capability to maintain its short term capability to respond to a design basis event. It is known, however, that if a battery charger is disconnected from its associated battery, the battery will fail Category A, B, and C limits in a very short period of time. Therefore, under these conditions the direction is to declare the affected battery inoperable immediately.

D.1

If the battery cell parameters cannot be maintained within Category A limits as specified in LCO 3.8.6, the short term capability of the battery is also degraded and the battery must be declared inoperable.

SURVEILLANCE REQUIREMENTS

SR 3.8.4.1

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

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued

SR 3.8.4.2

Visual inspection to detect corrosion of the battery cells and connections, or measurement of the resistance of each inter-cell, inter-rack, inter-tier, and terminal connection, provides an indication of physical damage or abnormal deterioration that could potentially degrade battery performance.

The limits established for this SR are based on calculation 1,2,3ECPK207 which states that if every terminal connection were to degrade to 150E-6 ohms, there would be sufficient battery capacity to satisfy the DBA Duty Cycle (Ref. 13).

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

SR 3.8.4.3

Visual inspection of the battery cells, cell plates, and battery racks provides an indication of physical damage or abnormal deterioration that could potentially degrade battery performance.

This SR is consistent with IEEE-450 (Ref. 9), which recommends detailed visual inspection of cell condition and rack integrity. The 18 month Surveillance Frequency is consistent with expected fuel cycle lengths.

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.8.4.4 and SR 3.8.4.5

Visual inspection and resistance measurements of inter-cell, inter-rack, inter-tier, and terminal connections provide an indication of physical damage or abnormal deterioration that could indicate degraded battery condition. The anticorrosion material is used to help ensure good electrical connections and to reduce terminal deterioration. The visual inspection for corrosion is not intended to require removal of and inspection under each terminal connection. The removal of visible corrosion is a preventive maintenance SR. The presence of visible corrosion does not necessarily represent a failure of this SR provided visible corrosion is removed during performance of SR 3.8.4.4.

The connection resistance limits for SR 3.8.4.5 is based on calculation 1,2,3ECPK207 which states that if every terminal connection were to degrade to 150E-6 ohms there would be sufficient battery capacity to satisfy the DBA Duty Cycle (Ref. 13).

The Surveillances are consistent with IEEE-450 (Ref. 9), which recommends cell to cell and terminal connection resistance measurement. The 18 month Surveillance Frequency consistent with expected fuel cycle lengths.

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.8.4.6

This SR requires that each required battery charger be capable of supplying 400 amps for batteries A and B and 300 amps for batteries C and D, and 125 V for ≥ 8 hours. These requirements are based on the design capacity of the chargers (Ref. 4). According to Regulatory Guide 1.32 (Ref. 10), the battery charger supply is required to be based on the largest combined demands of the various steady state loads and the charging capacity to restore the battery from the design minimum charge state to the fully charged state, irrespective of the status of the unit during these demand occurrences. The minimum required amperes and duration ensures that these requirements can be satisfied.

The Surveillance Frequency is acceptable, given the unit conditions required to perform the test and the other administrative controls existing to ensure adequate charger performance during these 18 month intervals. In addition, this Frequency is intended to be consistent with expected fuel cycle lengths.

This SR is modified by a Note. The reason for the Note is that credit may be taken for unplanned events that satisfy this SR.

SR 3.8.4.7

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

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

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.4.7 (continued)

This SR is modified by two Notes. Note 1 allows the performance of a modified performance discharge test in lieu of a service test once per 60 months.

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 (but in no case lower than the performance test rate), 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.

A modified 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.

The reason for Note 2 is that performing the Surveillance would perturb the electrical distribution system and challenge safety systems. Credit may be taken for unplanned events that satisfy this SR.

SR 3.8.4.8

A battery performance discharge test is a test of constant current capacity of a battery, normally done in the "as found" condition, after having been in service, to detect any change in the capacity determined by the acceptance test. The test is intended to determine overall battery degradation due to age and usage.

(continued)

B 3.8 ELECTRICAL POWER SYSTEMS

B 3.8.5 DC Sources – Shutdown

BASES

BACKGROUND	A description of the DC sources is provided in the Bases for LCO 3.8.4, "DC Sources – Operating."
APPLICABLE SAFETY ANALYSES	The initial conditions of Design Basis Accident (DBA) and transient analyses in the UFSAR, Chapter 6 (Ref. 1) and Chapter 15 (Ref. 2), assume that Engineered Safety Feature (ESF) 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 the requirements for the supported systems' OPERABILITY. The OPERABILITY of the minimum DC electrical power sources during MODES 5 and 6, and during movement of irradiated fuel assemblies with the core offloaded ensures that: a. The unit can be maintained in the shutdown or refueling condition for extended periods; b. Sufficient instrumentation and control capability is available for monitoring and maintaining the unit status; and c. Adequate DC electrical power is provided to mitigate events postulated during shutdown, such as a fuel handling accident. The DC sources satisfy Criterion 3 of 10 CFR 50.36 (c)(2)(ii).
LCO	The DC electrical power subsystems, each subsystem consisting of two batteries, one battery charger per battery and the corresponding control equipment and

(continued)

BASES

LCO (continued)

interconnecting cabling within the train, are required to be OPERABLE to support required trains of distribution systems required OPERABLE by LCO 3.8.10, "Distribution Systems – Shutdown." This ensures the availability of sufficient DC electrical power sources to operate the unit in a safe manner and to mitigate the consequences of postulated events during shutdown (e.g., fuel handling accidents).

APPLICABILITY

The DC electrical power sources required to be OPERABLE in MODES 5 and 6, and during movement of irradiated fuel assemblies with the core offloaded provide assurance that:

a. Required features needed to mitigate a fuel handling accident are available;

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

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

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

ACTIONS

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

If two 125 VDC trains are required per LCO 3.8.10, the remaining train with DC power available may be capable of supporting sufficient systems to allow continuation of CORE ALTERATIONS and fuel movement. By allowing the option to declare required features inoperable with the associated DC power source(s) inoperable, appropriate restrictions will be implemented in accordance with the affected required features LCO ACTIONS. In many instances, this option may involve undesired administrative efforts.

(continued)

BASES

ACTIONS

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

Therefore, the allowance for sufficiently conservative actions is made (i.e., to suspend CORE ALTERATIONS, movement of irradiated fuel assemblies, and operations involving positive reactivity additions). The Required Action to suspend positive reactivity additions does not preclude actions to maintain or increase reactor vessel inventory, provided the required SDM is maintained.

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

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

B.1

Condition B represents one channel with a loss of ability to completely respond to a long term event, and a potential loss of ability to remain energized during normal operation. Since eventual failure of the battery to maintain the required battery cell parameters is highly probable, it is imperative that the operator's attention focus on stabilizing the unit and placing an associated battery charger (normal or backup) in service, thereby, minimizing the potential for complete loss of DC power to the affected channel. The additional time provided by the Completion Time is consistent with the battery's capability to maintain its short term capability to respond to a design basis event.

(continued)

BASES

ACTIONS (continued)

C.1

If the battery cell parameters cannot be maintained within Category A limits as specified in LCO 3.8.6, the short term capability of the battery is also degraded and the battery must be declared inoperable.

SURVEILLANCE REQUIREMENTS

SR 3.8.5.1

SR 3.8.5.1 states that Surveillances required by SR 3.8.4.1 through SR 3.8.4.8 are applicable in these MODES. See the corresponding Bases for LCO 3.8.4 for a discussion of each SR.

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

REFERENCES

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

B 3.8 ELECTRICAL POWER SYSTEMS

B 3.8.6 Battery Cell Parameters

BASES

BACKGROUND

This LCO delineates the limits on electrolyte temperature, level, float voltage, and specific gravity for the 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 UFSAR, Chapter 6 (Ref. 1) and Chapter 15 (Ref. 2), assume Engineered Safety Feature (ESF) 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, in the event of:

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

b. A worst case single failure.

Battery cell parameters satisfy Criterion 3 of 10 CFR 50.36 (c)(2)(ii).

LCO

Battery cell parameters must remain within acceptable limits to ensure availability of the required DC power to shut down the reactor and maintain it in a safe condition after an anticipated operational occurrence (AOO) or a postulated DBA. Electrolyte and cell voltage limits are conservatively established, allowing continued DC electrical system function even with Category A and B limits not met. Train A batteries are composed of Channel A and Channel C batteries. Train B batteries are composed of Channel B and Channel D batteries.

(continued)

BASES (continued)

APPLICABILITY

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

ACTIONS

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

With one or more cells in one or more batteries not within limits (i.e., Category A limits not met 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, the battery is degraded but there is still sufficient capacity to perform the intended function. Therefore, the affected battery is not required to be considered inoperable solely as a result of Category A or B limits not met, and 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). This check will provide a quick indication of the status of the remainder of the battery cells. One hour provides time to inspect the electrolyte level and to confirm the float voltage of the pilot cells. One hour is considered a reasonable amount of time to perform the required verification.

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

(continued)

BASES

ACTIONS

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

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

B.1

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

SURVEILLANCE REQUIREMENTS

SR 3.8.6.1

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

SR 3.8.6.2

The quarterly inspection of specific gravity and voltage is consistent with IEEE-450 (Ref. 3). In addition, within 7 days of a battery discharge < 105 V or a battery overcharge > 150 V, the battery must be demonstrated to meet Category B limits. Transients, such as motor starting transients, which may momentarily cause battery voltage to drop to ≤ 105 V, do not constitute a battery discharge

(continued)

SURVEILLANCE REQUIREMENTS

SR 3.8.6.2 (continued)

provided the battery terminal voltage and float current return to pre-transient values. This inspection is also consistent with IEEE-450 (Ref. 3), which recommends special inspections following a severe discharge or overcharge, to ensure that no significant degradation of the battery occurs as a consequence of such discharge or overcharge.

SR 3.8.6.3

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

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

Table 3.8.6-1

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

Category A defines the normal parameter limit for each designated pilot cell in each battery. The cells selected as pilot cells are those whose 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 ¼ inch allowance above the high water level indication for operating margin to account for temperatures and charge effects. In addition to this allowance, footnote (a) to Table 3.8.6-1 permits the electrolyte level to be above the specified maximum level during equalizing charge, provided it is not overflowing. These limits ensure that the plates

(continued)

BASES

SURVEILLANCE REQUIREMENTS

Table 3.8.6.1 (continued)

suffer no physical damage, and that adequate electron transfer capability is maintained in the event of transient conditions. IEEE-450 (Ref. 3) recommends that electrolyte level readings should be made only after the battery has been at float charge for at least 72 hours.

The Category A limit specified for float voltage is ≥ 2.18 V per cell. This value is based on the battery vendor recommendation which states that prolonged operation of cells < 2.18 V can reduce the life expectancy of cells.

The Category A limit specified for specific gravity for each pilot cell is ≥ 1.29 (0.010 below the manufacturer fully charged nominal specific gravity or a battery charging current that had stabilized at a low value). This value is characteristic of a charged cell with adequate capacity. According to IEEE-450 (Ref. 3), the specific gravity readings are based on a temperature of 77°F (25°C).

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

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

The Category B limits specified for electrolyte level and float voltage are the same as those specified for Category A and have been discussed above. The Category B limit specified for specific gravity for each connected cell is ≥ 1.28 (0.020 below the manufacturer fully charged, nominal specific gravity) with the average of all connected cells > 1.29 (0.010 below the manufacturer fully charged, nominal specific gravity). These values are based on manufacturer's recommendations. The minimum specific gravity value required for each cell ensures that the effects of a highly charged or newly installed cell will not mask overall degradation of the battery.

(continued)

BASES

SURVEILLANCE REQUIREMENTS

Table 3.8.6.1 (continued)

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

The Category C limit specified for electrolyte level (above the top of the plates and not overflowing) ensures that the plates suffer no physical damage and maintain adequate electron transfer capability. The Category C Allowable Value for float voltage is based on vendor recommendations which states that a cell voltage of 2.14 V or below, under float conditions and not caused by elevated temperature of the cell, indicates internal cell problems and may require cell replacement.

The Category C limit of average specific gravity ≥ 1.28 is based on manufacturer recommendations (0.020 below the manufacturer recommended fully charged, nominal specific gravity). In addition to that limit, it is required that the specific gravity for each connected cell must be no less than 0.020 below the average of all connected cells. This limit ensures that the effect of a highly charged or new cell does not mask overall degradation of the battery.

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

Because of specific gravity gradients that are produced during the recharging process, delays of several days may occur while waiting for the specific gravity to stabilize. A stabilized charger current is an acceptable alternative to specific gravity measurement for determining the state of charge. This phenomenon is discussed in IEEE-450 (Ref. 3). Footnote (c) to Table 3.8.6-1 allows the float charge current to be used as an alternate to specific gravity for

(continued)

BASES

SURVEILLANCE REQUIREMENTS

Table 3.8.6-1 (continued)

up to 7 days following a battery equalizing 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. UFSAR, Chapter 6.
2. UFSAR, Chapter 15.
3. IEEE-450-1980.

B 3.8 ELECTRICAL POWER SYSTEMS

B 3.8.7 Inverters – Operating

BASES

BACKGROUND

The inverters are the preferred source of power for the AC vital instrument buses because of the stability and reliability they achieve by being powered from the 125 VDC battery source. The function of the inverter is to provide AC electrical power to the AC vital instrument buses, thus providing an uninterruptible power source for the instrumentation and controls for the Reactor Protective System (RPS) and the Engineered Safety Feature Actuation System (ESFAS). There are two inverters per Train (A and B) which totals to four inverters per unit. Specific details on inverters and their operating characteristics are found in the UFSAR, Chapter 8 (Ref. 1).

APPLICABLE SAFETY ANALYSES

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

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

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

b. A worst case single failure.

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

(continued)

BASES (continued)

LCO

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

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

OPERABLE inverters require the associated AC vital instrument bus to be powered by the inverter with output voltage within tolerances.

This LCO is modified by a Note that allows one inverter to be disconnected from its associated battery for ≤ 24 hours, if the AC vital instrument bus is powered from a Class 1E constant voltage regulator during the period and all other inverters are operable. This allows an equalizing charge to be placed on one battery. If the inverter was not disconnected, the resulting voltage condition might damage the inverter. These provisions minimize the loss of equipment that would occur in the event of a loss of offsite power. The 24 hour time period for the allowance minimizes the time during which a loss of offsite power could result in the loss of equipment energized from the affected AC vital instrument bus while taking into consideration the time required to perform an equalizing charge on the battery bank.

The intent of this Note is to limit the number of inverters that may be disconnected. Only the inverter associated with the single battery undergoing an equalizing charge may be disconnected. All other inverters must be connected to their associated batteries and aligned to their associated AC vital instrument buses.

(continued)

BASES (continued)

APPLICABILITY

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

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

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

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

ACTIONS

A.1

With a required inverter inoperable, its associated AC vital instrument bus becomes inoperable until it is re-energized from its Class 1E constant voltage source regulator.

Required Action A.1 is modified by a Note, which states to enter the applicable conditions and Required Actions of LCO 3.8.9, "Distribution Systems – Operating," when Condition A is entered with one AC vital instrument bus de-energized. This ensures the AC vital instrument bus is re-energized within 2 hours.

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

(continued)

BASES (continued)

ACTIONS (continued)

B.1 and B.2

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

SURVEILLANCE REQUIREMENTS

SR 3.8.7.1

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

REFERENCES

1. UFSAR, Chapter 8.
2. UFSAR, Chapter 6.
3. UFSAR, Chapter 15.

B 3.8 ELECTRICAL POWER SYSTEMS

B 3.8.8 Inverters – Shutdown

BASES

BACKGROUND

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

APPLICABLE SAFETY ANALYSES

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

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

The OPERABILITY of the minimum inverters to each AC vital instrument bus during MODES 5 and 6, and during movement of irradiated fuel assemblies with the core offloaded ensures that:

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

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

c. Adequate power is available to mitigate events postulated during shutdown, such as a fuel handling accident.

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

(continued)

BASES (continued)

LCO

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

APPLICABILITY

The inverters required to be OPERABLE in MODES 5 and 6, and during movement of irradiated fuel assemblies with the core offloaded provide assurance that:

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

b. Systems needed to mitigate a fuel handling accident are available;

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

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

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

ACTIONS

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

If two trains of AC vital instrument buses are required by LCO 3.8.10, "Distribution Systems – Shutdown," the remaining OPERABLE inverters may be capable of supporting sufficient required features to allow continuation of CORE ALTERATIONS, fuel movement, operations with a potential for draining the reactor vessel, and operations with a potential for positive

(continued)

BASES

ACTIONS

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

reactivity additions. The Required Action to suspend positive reactivity additions does not preclude actions to maintain or increase reactor vessel inventory, provided the required SDM is maintained. By the allowance of the option to declare required features inoperable with the associated inverter(s) inoperable, appropriate restrictions will be implemented in accordance with the affected required features LCOs' Required Actions. In many instances, this option may involve undesired administrative efforts. Therefore, the allowance for sufficiently conservative actions is made (i.e., to suspend CORE ALTERATIONS, movement of irradiated fuel assemblies, and operations involving positive reactivity additions).

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

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

SURVEILLANCE REQUIREMENTS

SR 3.8.8.1

This Surveillance verifies that the inverters are functioning properly with all required circuit breakers closed and AC vital instrument buses energized from the inverter. The verification of proper voltage output ensures that the required power is readily available for the

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.8.1 (continued)

instrumentation connected to the AC vital instrument buses. The 7 day Frequency takes into account the redundant capability of the inverters and other indications available in the control room that alert the operator to inverter malfunctions.

REFERENCES

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

B 3.8 ELECTRICAL POWER SYSTEMS

B 3.8.9 Distribution Systems - Operating

BASES

BACKGROUND

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

The AC primary electrical power distribution system consists of two 4.16 kV Engineered Safety Feature (ESF) buses. Each 4.16 kV ESF bus is normally connected to a offsite source. If the offsite source is de-energized or disconnected, the onsite emergency DG supplies power to the 4.16 kV ESF bus. Control power for the 4.16 kV breakers is supplied from the Class 1E batteries. Additional description of this system may be found in the Bases for LCO 3.8.1, "AC Sources - Operating," and the Bases for LCO 3.8.4, "DC Sources - Operating."

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.

The 120 VAC vital instrument buses are arranged in two channels per subsystem and are normally powered from the inverters. There are four channels designated as A, B, C and D for each unit. The alternate power supply for the vital instrument buses are Class 1E constant voltage source regulators powered from train-related Class 1E motor control centers and its use is governed by LCO 3.8.7, "Inverters - Operating."

There are two independent 125 VDC electrical power distribution subsystems (Train A and Train B). Each subsystem contains two DC power channels. There are four channels designated as A, B, C, and D for each unit.

The list of all required distribution buses is presented in Table B 3.8.9-1. The six electrical power distribution subsystems consist of those components identified by Table B 3.8.9-1. Load breakers not identified by this table do not impact this LCO but may impact supported system LCOs. Load breakers that are required to maintain energized those buses identified by Table B 3.8.9.-1 (e.g. PG to PH) do impact this LCO.

(continued)

BASES (continued)

APPLICABLE SAFETY ANALYSES

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

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

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

b. A worst case single failure.

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

LCO

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

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

(continued)

BASES

LCO (continued)

OPERABLE AC electrical power distribution subsystems require the associated buses, 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 AC vital instrument bus electrical power distribution subsystems require the associated buses to be energized to their proper voltage from the associated inverter via inverted DC voltage, or Class 1E constant voltage regulator.

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

APPLICABILITY

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

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

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

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

(continued)

BASES (continued)

ACTIONS

A.1

With one or more required AC buses, load centers, or motor control centers (see Table B 3.8.9.-1), except AC vital instrument buses, in one subsystem inoperable, the remaining AC electrical power distribution subsystem in the other train is capable of supporting the minimum safety functions necessary to shut down the reactor and maintain it in a safe shutdown condition, assuming no single failure. The overall reliability is reduced, however, because a single failure in the remaining power distribution subsystems could result in the minimum required ESF functions not being supported. Therefore, the required AC buses, load centers and motor control centers must be restored to OPERABLE status within 8 hours.

Condition A worst scenario is one train (PBA or PBB) 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

(continued)

BASES

ACTIONS

A.1 (continued)

failing to meet the LCO. If Condition A is entered while, for instance, a DC bus is inoperable and subsequently restored OPERABLE, the LCO may already have been not met for up to 2 hours. This could lead to a total of 10 hours, since initial failure of the LCO, to restore the AC distribution system. At this time, a DC circuit could again become inoperable, and AC distribution restored OPERABLE. This could continue indefinitely.

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 AC vital instrument bus(es) (Channels A, B, C or D) in one train inoperable, the remaining OPERABLE AC vital electrical power distribution subsystem is capable of supporting the minimum safety functions necessary to shut down the unit and maintain it in the safe shutdown condition. Overall reliability is reduced, however, since an additional single failure could result in the minimum required ESF functions not being supported. Therefore, the required AC vital instrument buses must be restored to OPERABLE status within 2 hours.

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

(continued)

BASES

ACTIONS

B.1 (continued)

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

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

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

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

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

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

(continued)

BASES

ACTIONS

B.1 (continued)

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 DC bus(es) in one train inoperable, the remaining DC electrical power distribution subsystem is capable of supporting the minimum safety functions necessary to shut down the reactor and maintain it in a safe shutdown condition, assuming no single failure. The overall reliability is reduced, however, because a single failure in the remaining DC electrical power distribution subsystem could result in the minimum required ESF functions not being supported. Therefore, the required DC buses must be restored to OPERABLE status within 2 hours.

Condition C represents one train 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 DC buses and restoring OPERABILITY to the affected DC electrical power distribution subsystem.

(continued)

BASES

ACTIONS

C.1 (continued)

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

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

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

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

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

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

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

(continued)

BASES

ACTIONS (continued)

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

E.1

Condition E corresponds to a level of degradation in the electrical distribution system that causes a required safety function to be lost. When more than one Condition (this can be both trains of a single Condition) is entered, and this results in the loss of a required function, the plant is in a condition outside the accident analysis. Therefore, no additional time is justified for continued operation.

LCO 3.0.3 must be entered immediately to commence a controlled shutdown.

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.9.1

This Surveillance verifies that the AC, DC, and AC vital instrument bus electrical power distribution systems are functioning properly, with the required circuit breakers closed and the buses energized. The correct breaker alignment ensures the appropriate separation and independence of the electrical divisions is maintained, and the appropriate voltage is available to each required bus. The verification of proper voltage availability on the buses ensures that the required voltage is readily available for motive as well as control functions for critical system loads connected to these buses. The 7 day Frequency takes into account the redundant capability of the AC, DC, and AC vital instrument bus electrical power distribution subsystems, and other indications available in the control room that alert the operator to subsystem malfunctions.

REFERENCES

1. UFSAR, Chapter 6.
2. UFSAR, Chapter 15.
3. Regulatory Guide 1.93, Revision 0, December 1974.

Table B 3.8.9-1
(Units 1, 2, and 3)

TYPE	VOLTAGE	TRAIN A		TRAIN B	
AC safety buses	4160 V	ESF Bus PBA-S03		ESF Bus PBB-S04	
	480 V	Load Centers PGA-L31, PGA-L33, PGA-L35		Load Centers PGB-L32, PGB-L34, PGB-L36	
	480 V	Motor Control Centers PHA-M31, PHA-M33, PHA-M35, PHA-M37		Motor Control Center PHB-M32, PHB-M34, PHB-M36, PHB-M38	
		CHANNEL A	CHANNEL C	CHANNEL B	CHANNEL D
DC buses	125 V	Bus PKA-M41 Distribution Panel PKA-D21	Bus PKC-M43 Distribution Panel PKC-D23	Bus PKB-M42 Distribution Panel PKB-D22	Bus PKD-M44 Distribution Panel PKD-D24
		CHANNEL A	CHANNEL C	CHANNEL B	CHANNEL D
AC vital instrument buses	120 V	Bus PNA-D25	Bus PNC-D27	Bus PNB-D26	Bus PND-D28

NOTE: Each train of the electrical power distribution system is comprised of the independent AC, DC, and AC vital instrument bus subsystems.

B 3.8 ELECTRICAL POWER SYSTEMS

B 3.8.10 Distribution Systems – Shutdown

BASES

BACKGROUND

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

APPLICABLE SAFETY ANALYSES

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

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

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

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

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

c. Adequate power is provided to mitigate events postulated during shutdown, such as a fuel handling accident.

The AC and DC electrical power distribution systems satisfy Criterion 3 of 10 CFR 50.36 (c)(2)(ii).

(continued)

BASES (continued)

LCO

Various combinations of subsystems, equipment, and components are required OPERABLE by other LCOs, depending on the specific unit condition. Implicit in those requirements is the required OPERABILITY of necessary support required features. This LCO explicitly requires energization of the portions of the electrical distribution system necessary to support OPERABILITY of required systems, equipment and components - all specifically addressed in each LCO and implicitly required via the definition of OPERABILITY.

Maintaining these portions of the distribution system energized ensures the availability of sufficient power to operate the unit in a safe manner to mitigate the consequences of postulated events during shutdown (e.g., fuel handling accidents).

APPLICABILITY

The AC, DC, and AC vital instrument bus electrical power distribution subsystems required to be OPERABLE in MODES 5 and 6, and during movement of irradiated fuel assemblies with the core offloaded, provide assurance that:

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

b. Systems needed to mitigate a fuel handling accident are available;

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

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

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

(continued)

BASES (continued)

ACTIONS

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

Although redundant required features may require redundant trains of electrical power distribution subsystems to be OPERABLE, one OPERABLE distribution subsystem train may be capable of supporting sufficient required features to allow continuation of CORE ALTERATIONS and fuel movement. By allowing the option to declare required features associated with an inoperable distribution subsystem inoperable, appropriate restrictions are implemented in accordance with the affected required features LCO's Required Actions. In many instances, this option may involve undesired administrative efforts. Therefore, the allowance for sufficiently conservative actions is made (i.e., to suspend CORE ALTERATIONS, movement of irradiated fuel assemblies, and operations involving positive reactivity additions).

Suspension of these activities shall not preclude completion of actions to establish a safe conservative condition. These actions minimize the probability of the occurrence of postulated events. It is further required to immediately initiate action to restore the required AC, DC, and AC vital instrument bus 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 shutdown cooling (SDC) subsystem may be inoperable. In this case, Required Actions A.2.1 through A.2.4 do not adequately address the concerns relating to coolant circulation and heat removal. Pursuant to LCO 3.0.6, the SDC ACTIONS would not be entered. Therefore, Required Action A.2.5 is provided to direct declaring SDC inoperable, which results in taking the appropriate SDC actions.

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

(continued)

BASES (continued)

SURVEILLANCE REQUIREMENTS

SR 3.8.10.1

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

REFERENCES

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

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SPECIFICATION 3.8.1

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<3/4.8> 3.8 ELECTRICAL POWER SYSTEMS

<3/4.8.1> 3.8.1 AC Sources—Operating

<3.8.1.1> LCO 3.8.1 The following AC electrical sources shall be OPERABLE:

<3.8.1.1.a>
<DOC A.5>

a. Two qualified circuits between the offsite transmission network and the onsite Class 1E AC Electrical Power Distribution System; and (17)

<3.8.1.1.b>

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

<DOC M.1>

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

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

ACTIONS

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

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ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. (continued) <Action a.3.a>	A.3	Restore ~~[~~required~~]~~ offsite circuit to OPERABLE status.	72 hours AND ~~6~~ 10 days from discovery of failure to meet LCO
B. One ~~[required]~~ DG inoperable. <Action b.1>	B.1	Perform SR 3.8.1.1 for the OPERABLE ~~[~~required~~]~~ offsite circuit(s).	1 hour AND Once per 8 hours thereafter
<Action b.2>	AND 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)
<Action b.3>	AND B.3.1	Determine OPERABLE DG~~(s)~~ is not inoperable due to common cause failure.	~~[~~24~~]~~ hours
<Action b.3>	OR B.3.2	Perform SR 3.8.1.2 for OPERABLE DG~~(s)~~.	~~[~~24~~]~~ hours
	AND		
			(continued)

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2

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ACTIONS

	CONDITION	REQUIRED ACTION	COMPLETION TIME
<Action b.4.a>	B. (continued)	B.4 Restore [required] DG to OPERABLE status.	~~72 hours~~ 7 days AND ~~6~~ 10 days from discovery of failure to meet LCO
<Action d.1>	C. Two ~~[required]~~ offsite circuits inoperable.	C.1 Declare required feature(s) inoperable when its redundant required feature(s) is inoperable.	12 hours from discovery of Condition C concurrent with inoperability of redundant required feature(s)
		AND	
<Action d.2>		C.2 Restore one ~~[required]~~ offsite circuit to OPERABLE status.	24 hours

(continued)

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ACTIONS (continued)

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

(continued)

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ACTIONS (continued)

	CONDITION	REQUIRED ACTION	COMPLETION TIME	
<DOC m.1>	F. ~~-----NOTE----- This Condition may be deleted if the unit design is such that any sequencer failure mode will only affect the ability of the associated DG to power its respective safety loads following a loss of offsite power independent of, or coincident with, a Design Basis Event.~~ One ~~[required]~~ automatic load sequencer inoperable.	F.1 Restore ~~[required]~~ automatic load sequencer to OPERABLE status.	~~[12]~~ 72 hours	3
<Action a.3.b, b.4.b, c, d.2, and e>	~~G~~ H. Required Action and Associated Completion Time of Condition A, B, C, D, ~~[or]~~ E, F, or ~~[F]~~ G not met.	~~G~~ H.1 Be in MODE 3. AND ~~G~~ H.2 Be in MODE 5.	6 hours 36 hours	
<DOC M.2>	~~H~~ I. Three or more ~~[required]~~ AC sources inoperable.	~~H~~ I.1 Enter LCO 3.0.3.	Immediately	

Insert 1
Action G

18

INSERT 1:

G. Electrical Distribution System input voltage less than limits.

G.1.1 Block both trains of Fast Bus Transfer, within 1 hour.

OR

G.1.2 Block one train of Fast Bus Transfer and start, load, and separate the opposite train DG from offsite power, within 1 hour.

AND

G.2 Restore Electrical Distribution System input voltage to within limits, within 72 hours.

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SURVEILLANCE REQUIREMENTS

	SURVEILLANCE	FREQUENCY
<4.8.1.1.1.a> SR 3.8.1.1	Verify correct breaker alignment and indicated power availability for each ~~required~~ offsite circuit.	7 days
<4.8.1.1.2.a.2> <Note 2> SR 3.8.1.2	----------NOTES---------- 1. Performance of SR 3.8.1.7 satisfies this SR. 2. All DG starts may be preceded by an engine prelube period and followed by a warmup period prior to loading. ~~3. A modified DG start involving idling and gradual acceleration to synchronous speed may be used for this SR as recommended by the manufacturer. When modified start procedures are not used, the time, voltage, and frequency tolerances of SR 3.8.1.7 must be met.~~ ------------------------------ Verify each DG starts from standby conditions and achieves steady state voltage ≥ 3740 V and ≤ 4580 V, and frequency ≥ 58.8 Hz and ≤ 61.2 Hz.	31 days ~~As specified in Table 3.8.1-1~~

4

(continued)

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SURVEILLANCE REQUIREMENTS (continued)

	SURVEILLANCE		FREQUENCY	
<4.8.1.1.2.a.3> <note 3>	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 immediately follow without shutdown a successful performance of SR 3.8.1.2 or SR 3.8.1.7. --- Verify each DG is synchronized and loaded, and operates for ≥ 60 minutes at a load ≥ ~~[4500]~~ 4956 kW and ≤ ~~[5000]~~ 5500 kW.	31 days ~~[As specified in Table 3.8.1-1]~~	4
<4.8.1.1.2.a.1>	SR 3.8.1.4	Verify each day tank ~~[and engine mounted tank]~~ contains ≥ ~~[220]~~ 550 gal of fuel oil (minimum level of 2.75 feet).	~~31 days~~	5
<DOC M.5>	SR 3.8.1.5	Check for and remove accumulated water from each day tank ~~[and engine mounted tank]~~.	~~[31]~~ 92 days	
<4.8.1.1.2.b>	SR 3.8.1.6	Verify the fuel oil transfer system operates to ~~[automatically]~~ transfer fuel oil from the storage tank~~[s]~~ to the day tank ~~[and engine mounted tank]~~ the.	~~[92]~~ 31 days	6

(continued)

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SURVEILLANCE REQUIREMENTS (continued)

	SURVEILLANCE		FREQUENCY
<4.8.1.1.2.c>	SR 3.8.1.7	------NOTE------ All DG starts may be preceded by an engine prelube period. ------ Verify each DG starts from standby condition and achieves, in ≤ [10] seconds, voltage ≥ [3740] V and ≤ [4580] V, and frequency ≥ ~~[58.8]~~ 59.7 Hz and ≤ [61.2] Hz.	184 days (7)
<4.8.1.1.1.b> <NOTE 1>	[SR 3.8.1.8	------NOTE------ This Surveillance shall not be performed in MODE 1 or 2. However, credit may be taken for unplanned events that satisfy this SR. ------ Verify ~~[automatic and]~~ manual transfer of AC power sources from the normal offsite circuit to each alternate ~~[required]~~ offsite circuit.	[18 months]]

(continued)

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SURVEILLANCE REQUIREMENTS (continued)

	SURVEILLANCE	FREQUENCY
<4.8.1.1.2.d.1> SR 3.8.1.9	-------------------NOTES------------------- 1. This Surveillance shall not be performed in MODE ~~1 or 2~~. However, credit may be taken for unplanned events that satisfy this SR. ~~2. If performed with the DG synchronized with offsite power, it shall be performed at a power factor ≤ [0.9].~~ --- Verify each DG rejects a load greater than or equal to its associated single largest post-accident load, and: a. Following load rejection, the frequency is ≤ ~~[63]~~ 64.5 Hz; b. Within [3] seconds following load rejection, the voltage is ≥ [3740] V and ≤ [4580] V; and c. Within [3] seconds following load rejection, the frequency is ≥ [58.8] Hz and ≤ [61.2] Hz.	1,2,3,or 4 (8) [18 months]
<4.8.1.1.2.f.2> <Note 2> SR 3.8.1.10	-------------------NOTE------------------- This Surveillance shall not be performed in MODE 1 or 2. However, credit may be taken for unplanned events that satisfy this SR. --- Verify each DG ~~operating at a power factor ≤ [0.9]~~ does not trip, and voltage is maintained ≤ ~~[5000]~~ 6200 V during and following a load rejection of ≥ ~~[4500]~~ 4950 kW and ≤ ~~[5000]~~ 5500 kW.	[18 months] (9)

(continued)

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SURVEILLANCE REQUIREMENTS (continued)

	SURVEILLANCE	FREQUENCY
<4.8.1.1.2.d.3> SR 3.8.1.11 <note 3>	-------------------NOTE------------------- 1. All DG starts may be preceded by an engine prelube period. 2. This Surveillance shall not be performed in MODE 1, 2, 3, or 4. However, credit may be taken for unplanned events that satisfy this SR. -- Verify on an actual or simulated loss of offsite power signal: <4.8.1.1.2.d.3.a> a. De-energization of emergency buses; <4.8.1.1.2.d.3.b> b. Load shedding from emergency buses; <4.8.1.1.2.d.3.c> c. DG auto-starts from standby condition and: <4.8.1.1.2.d.3.c.1> 1. energizes permanently connected loads in ≤ 10 seconds, <4.8.1.1.2.d.3.c.2> 2. energizes auto-connected shutdown loads through automatic load sequencer, <4.8.1.1.2.d.3.c.3> 3. maintains steady state voltage ≥ 3740 V and ≤ 4580 V, <4.8.1.1.2.d.3.c.3> 4. maintains steady state frequency ≥ $\boxed{58.8}$ 59.7 Hz and ≤ 61.2 Hz, and <4.8.1.1.2.d.3.c.4> 5. supplies permanently connected and auto-connected shutdown loads for ≥ 5 minutes.	18 months 7

(continued)

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SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
<4.8.1.1.2.d.4> SR 3.8.1.12	---NOTES--- 1. All DG starts may be preceded by an engine prelube period. 2. This Surveillance shall not be performed in MODE ~~[1 or 2]~~ 1, 2, 3, or 4. However, credit may be taken for unplanned events that satisfy this SR. --- Verify on an actual or simulated Engineered Safety Feature (ESF) actuation signal (without a loss of offsite power) each DG auto-starts from standby condition and: a. ~~In ≤ [10] seconds after auto-start and during tests,~~ achieves voltage ≥ [3740] V and ≤ [4580] V; b. ~~In ≤ [10] seconds after auto-start and during tests,~~ achieves frequency ≥ ~~[58.8]~~ 59.7 Hz and ≤ [61.2] Hz; c. Operates for ≥ 5 minutes on standby (running unloaded); d. Permanently connected loads remain energized from the offsite power system; and e. Emergency loads are energized ~~[or auto-connected through the automatic load sequencer]~~ from the offsite power system. <DOC M.4>	[18 months] 8 10

(continued)

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SURVEILLANCE REQUIREMENTS (continued)

	SURVEILLANCE	FREQUENCY
<4.8.1.1.2 d 6> <Note 2> <DOC L.1> SR 3.8.1.13	------------------NOTE------------------ This Surveillance shall not be performed in MODE 1 or 2. However, credit may be taken for unplanned events that satisfy this SR. --- Verify each DG automatic trip is bypassed on actual or simulated loss of voltage signal on the emergency bus concurrent with an actual or simulated ESF actuation signal except: a. Engine overspeed; [~~and~~] b. Generator differential current; c. Engine Low lube oil pressure; and d. Manual emergency stop trip ~~[High crankcase pressure; and~~ ~~e. Start failure relay]~~.	18 months

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(continued)

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SURVEILLANCE REQUIREMENTS (continued)

	SURVEILLANCE	FREQUENCY
<4.8.1.1.2.d.7> SR 3.8.1.14 <NOTE 1> <NOTE 2>	-------------------NOTES------------------- 1. Momentary transients outside the load and power factor ranges do not invalidate this test. 2. This Surveillance shall not be performed in MODE 1 or 2. However, credit may be taken for unplanned events that satisfy this SR. --- Verify each DG, operating at a power factor ≤ [0.9], operates for ≥ 24 hours: a. For ≥ [2] 22 hours loaded ≥ [5250] 4950 kW and ≤ [5500] kW; and (≥2) b. For the remaining hours of the test loaded ≥ [4500] 5775 kW and ≤ [5000] 6050 kW.	[18 months] 9
<4.8.1.1.2.d.8> SR 3.8.1.15 <NOTE 1> <DOC L.7>	-------------------NOTES------------------- 1. This Surveillance shall be performed within 5 minutes of shutting down the DG after the DG has operated ≥ [2] hours loaded ≥ [4500] 4950 kW and ≤ [5000] 5500 kW. Momentary transients outside of load range do not invalidate this test. 2. All DG starts may be preceded by an engine prelube period. --- Verify each DG starts and achieves, in ≤ [10] seconds, voltage ≥ [3740] V and ≤ [4580] V, and frequency ≥ [58.8] 59.7 Hz and ≤ [61.2] Hz.	OR until temperatures have stabilized 12 [18 months] 7

(continued)

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SURVEILLANCE REQUIREMENTS (continued)

	SURVEILLANCE	FREQUENCY
<4.8.1.1.2.d.9> SR 3.8.1.16 <Note 3>	-----NOTE----- This Surveillance shall not be performed in MODE 1, 2, 3, or 4. However, credit may be taken for unplanned events that satisfy this SR. ----- Verify each DG: a. Synchronizes with offsite power source while loaded with emergency loads upon a simulated restoration of offsite power; b. Transfers loads to offsite power source; and c. Returns to ready-to-load operation.	[18 months]
<4.8.1.1.2.d.10> [SR 3.8.1.17 <Note 3>	-----NOTE----- This Surveillance shall not be performed in MODE 1, 2, 3, or 4. However, credit may be taken for unplanned events that satisfy this SR. ----- Verify, with a DG operating in test mode and connected to its bus, an actual or simulated ESF actuation signal overrides the test mode by: a. Returning DG to ready-to-load operation; and b. Automatically energizing the emergency load from offsite power.	[18 months]]

(continued)

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SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
<4.8.1.1.2.d.11> SR 3.8.1.18	---NOTE--- This Surveillance shall not be performed in MODE 1, 2, 3, or 4. However, credit may be taken for unplanned events that satisfy this SR. ------ Verify interval between each sequenced load block is within ± [10%] 1 second of design interval for each [emergency [and shutdown]] automatic load sequencer.	[18 months] 13

(continued)

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SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
<4.8.1.1.2.d.5> SR 3.8.1.19 <Note 3>	-------------------NOTES------------------- 1. All DG starts may be preceded by an engine prelube period. 2. This Surveillance shall not be performed in MODE 1, 2, 3, or 4. However, credit may be taken for unplanned events that satisfy this SR. -- Verify on an actual or simulated loss of offsite power signal in conjunction with an actual or simulated ESF actuation signal: a. De-energization of emergency buses; b. Load shedding from emergency buses; c. DG auto-starts from standby condition and: 1. energizes permanently connected loads in ≤ 10 seconds, 2. energizes auto-connected emergency loads through load sequencer, 3. achieves steady state voltage ≥ 3740 V and ≤ 4580 V, 4. achieves steady state frequency ≥ ~~58.8~~ 59.7 Hz and ≤ 61.2 Hz, and 5. supplies permanently connected and auto-connected emergency loads for ≥ 5 minutes.	18 months 7

(continued)

SURVEILLANCE REQUIREMENTS (continued)

	SURVEILLANCE	FREQUENCY
<4.8.1.1.2.e> <Doc L.2> SR 3.8.1.20	---NOTE--- 1. All DG starts may be preceded by an engine prelube period. 2. This surveillance shall not be performed in Mode 1 or 2. However Credit may be taken for unplanned events or for testing after any modifications which could affect DG independance that satisfy this SR. ------ Verify, when started simultaneously from standby condition, each DG achieves, in ≤ [10] seconds, voltage ≥ [3740] V and ≤ [4580] V, and frequency ≥ ~~[58.8]~~ 59.7 Hz and ≤ [61.2] Hz.	14 10 years 7

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

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

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

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

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

4

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NUREG-1432 REV. 1
SPECIFICATION 3.8.1
BASES MARK UP

15

B 3.8 ELECTRICAL POWER SYSTEMS

B 3.8.1 AC Sources—Operating

BASES

BACKGROUND

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

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~~. (normal and alternate)

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

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

Certain required unit loads are returned to service in a predetermined sequence in order to prevent overloading the transformer (NBN-X03 and NBN-X04) supplying offsite power to the onsite Class 1E Distribution System. Within ~~1 minute~~ 30 seconds after the initiating signal is received, all automatic and permanently connected loads needed to recover the unit or maintain it in a safe condition are returned to service via the ~~load sequencer~~ automatic.

The onsite standby ~~power~~ source ~~for~~ each 4.16 kV ESF bus is a dedicated DG. DGs ~~[11]~~ -A and ~~[12]~~ DG-B are dedicated to ESF buses ~~[11]~~ PBA-S03 and ~~[12]~~ PBB-S04 respectively. A DG starts

(continued)

BASES

(in emergency mode) actuation (SIAS) , auxiliary feedwater actuation signals (AFAS-1 and AFAS-2) (e.g., low steam generator level), or on a loss of power (an

BACKGROUND (continued)

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

SIAS or AFAS · loss · Sheds · (Running unloaded) · the

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

Certain required unit loads are returned to service in a predetermined sequence in order to prevent overloading the DG in the process. Within ~~[1] minute~~ 40 seconds after the initiating signal is received, all loads needed to recover the unit or maintain it in a safe condition are returned to service.

Ratings for Train A and Train B DGs satisfy the requirements of Regulatory Guide 1.9 (Ref. 3). The continuous service rating of each DG is ~~[7000]~~ 5500 kW with [10]% overload permissible for up to 2 hours in any 24 hour period. The ESF loads that are powered from the 4.16 kV ESF buses are listed in ~~Reference 2.~~ the updated FSAR, Chapter 8 (Ref. 2).

APPLICABLE SAFETY ANALYSES

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

(continued)

BASES

APPLICABLE SAFETY ANALYSES (continued)

Bases for Section 3.2, Power Distribution Limits; Section 3.4, Reactor Coolant System (RCS); and Section 3.6, Containment Systems.

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

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

b. A worst case single failure.

10 CFR 50.36(c)(2)(ii)

The AC sources satisfy Criterion 3 of ~~NRC Policy Statement~~.

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 train ensure availability of the required power to shut down the reactor and maintain it in a safe shutdown condition after an anticipated operational occurrence (AOO) or a postulated DBA.

~~Qualified offsite circuits are those that are described in the FSAR and are part of the licensing basis for the unit.~~ 15

~~[~~In addition, one ~~required~~ automatic load sequencer per train~~]~~ must be OPERABLE.

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

~~Offsite circuit #1 consists of Safeguards Transformer B, which is supplied from Switchyard Bus B, and is fed through breaker 52-3 powering the ESF transformer XNB01, which, in turn, powers the #1 ESF bus through its normal feeder breaker. Offsite circuit #2 consists of the Startup Transformer, which is normally fed from the Switchyard Bus A, and is fed through breaker PA 0201 powering the ESF~~ NEW TEXT

(continued)

Each secondary winding of a startup transformer normally provides power to one of two interconnected 13.8 kV intermediate buses (NAN-S05 & NAN-S06), in such a way that the two 13.8 kV intermediate buses of the same unit receive power from two different start-up transformers. The 13.8 kV intermediate buses, in turn, distribute power to the 4.16 kV Class 1E buses (PBA-S03 & PBB-S04) via a 13.8 kV bus (NAN-S03 or NAN-S04) and an ESF transformer (NBN-X03 or NBN-X04).

BASES

LCO (continued)

~~transformer, which, in turn, powers the #2 ESF bus through its normal feeder breaker.~~ (15)

Each DG must be capable of starting, accelerating to rated speed (i.e., frequency) and voltage, and connecting to its respective ESF bus on detection of bus undervoltage. This will be accomplished within (≤) [10] seconds. Each DG must also be capable of accepting required loads within the assumed loading sequence intervals, and continue to operate until offsite power can be restored to the ESF buses. These capabilities are required to be met from a variety of initial conditions such as DG in standby condition with the engine hot and DG in standby condition with the engine at ~~ambient~~ normal keep-warm conditions. Additional DG capabilities must be demonstrated to meet required Surveillances, (e.g., capability of the DG to revert to standby status on an ECCS signal while operating in parallel test mode).

Proper sequencing of loads, (including tripping of nonessential loads,) is a required function ~~for DG OPERABILITY~~.

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

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

APPLICABILITY

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

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

(continued)

BASES

APPLICABILITY (continued)

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

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

ACTIONS

A.1

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

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

(15)

A.2

(i.e., ESF bus)

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

NEW TEXT

(continued)

CEOG STS BASES ACTION A.2
Pages B 3.8-5

These features require Class 1E power from PBA-S03 or PBB-S04 ESF buses to be OPERABLE, and include: charging pumps; radiation monitors Train A RU-29 and Train B RU-30 (TS 3.3.9), Train A RU-31 (3.3.10) and Train B RU-145; pressurizer heaters (TS 3.4.4); ECCS (TS 3.5.3 and TS 3.5.6); containment spray (TS 3.6.6); containment isolation valves NCA-UV-402, NCB-UV-403, WCA-UV-62, and WCB-UV-61 (TS 3.6.3); containment hydrogen monitors (TS 3.3.11); containment electric hydrogen recombiners (TS 3.6.8); auxiliary feedwater pumps (TS 3.7.5); essential cooling water loops (TS 3.7.7); essential spray pond loops (TS 3.7.8); essential chilled water loops (TS 3.7.10); control room essential filtration (TS 3.7.11); ESF pump room air exhaust cleanup (TS 3.7.13); shutdown cooling subsystems (TS 3.4.6, 3.4.14, and 3.5.2); and fuel building ventilation (TS 3.7.14). Mode applicability is as specified in each appropriate TS section.

BASES

ACTIONS

A.2 (continued)

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

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

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

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

15

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 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.

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

A.3

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

(continued)

BASES

ACTIONS

A.3 (continued)

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.

1

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 ~~12 hours~~. This could lead to a total of 10 days ~~44 hours~~ since initial failure to meet the LCO, to restore the offsite circuit. At this time, a DG could again become inoperable, the circuit restored OPERABLE, and an additional 7 days ~~12 hours~~ 17 ~~(for a total of 9 days)~~ allowed prior to complete restoration of the LCO. The 10 ~~6 day Completion Time provides~~ a limit on the time allowed in a specified condition after discovery of failure to meet the LCO. This limit is considered reasonable for situations in which Conditions A and B are entered concurrently. The "AND" connector between 10 ~~the 72 hour and 6~~ day Completion Time 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.

(continued)

BASES

15

ACTIONS (continued)

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.

an offsite

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

B.2

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

Redundant required features.

These features require Class 1E power from PBA-S03 or PBB-S04 ESF buses to be operable, and are identical to those specified in ACTION A.2. Mode applicability is as specified in each appropriate TS Section.

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

(continued)

BASES

ACTIONS

B.2 (continued)

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.

B.3.1 and B.3.2

Required Action B.3.1 provides an allowance to avoid unnecessary testing of OPERABLE DGs. 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(s), the other DG(s) 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(s), performance of 2

(continued)

BASES

ACTIONS

B.3.1 and B.3.2 (continued)

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

In the event the inoperable DG is restored to OPERABLE status prior to completing either B.3.1 or B.3.2, the ~~[~~plant corrective action program~~]~~ will continue to evaluate the common cause possibility. This continued evaluation, however, is no longer under the 24 hour constraint imposed while in Condition B.

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

B.4

According to NPSD-996 (Ref. 13) ~~Regulatory Guide 1.93 (Ref. 6)~~, operation may continue in Condition B for a period that should not exceed 7 days ~~72 hours~~.

1

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 ~~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 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 returned OPERABLE, the LCO may already have been not met for up to 72 hours. This could lead to a total of 10 days ~~144 hours~~, since initial failure to meet the LCO, to restore the DG. At this time, an offsite circuit could again become inoperable, the DG restored OPERABLE, and an additional 72 hours (for a total of 13 ~~9~~ days) allowed prior to complete restoration of the LCO. The 10 ~~6~~ day Completion Time provides a limit on time allowed in a specified condition after discovery of failure to meet the LCO. This limit is considered reasonable for situations in which Conditions A

(continued)

BASES

ACTIONS

B.4 (continued)

and B are entered concurrently. The "AND" connector between the ~~12 hour and 6 day~~ Completion Times means that both Completion Times apply simultaneously, and the more restrictive Completion Time must be met.

7day and 10day

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 Regulatory Guide 1.93 (Ref. 6) allows a Completion Time of 24 hours for two required offsite circuits inoperable, based upon the assumption that two complete safety trains are OPERABLE. When a concurrent redundant required feature failure exists, this assumption is not the case, and a shorter Completion Time of 12 hours is appropriate. These features are powered from redundant AC safety trains. ~~This includes motor driven auxiliary feedwater pumps. Single train features, such as turbine driven auxiliary pumps, are not included in the list.~~

these features require class 1E power from PBA-S03 OR PBB-S04 ESF BUSES to be operable, and are identical to those specified in ACTION A.2. Mode applicability is as specified in each appropriate TS section.

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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.

(continued)

BASES

ACTIONS

C.1 and C.2 (continued)

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

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

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

Regulatory Guide 1.93 (Ref. 6)

According to ~~Reference 6~~ with the available offsite AC sources, two less than required by the LCO, operation may 15

(continued)

BASES

ACTIONS

C.1 and C.2 (continued)

continue for 24 hours. If two offsite sources are restored within 24 hours, unrestricted operation may continue. If only one offsite source is restored within 24 hours, power operation continues in accordance with Condition A.

D.1 and D.2

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

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

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

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

(continued)

BASES

ACTIONS

E.1 (continued)

are available to power the minimum required ESF functions. Since the offsite electrical power system is the only source of AC power for this level of degradation, the risk associated with continued operation for a 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.

Regulatory Guide 1.93 (Ref. 6),

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

(15)

~~F.1~~

~~The sequencer(s) is an essential support system to [both the offsite circuit and the DG associated with a given ESF bus]. [Furthermore, the sequencer is on the primary success path for most major AC electrically powered safety systems powered from the associated ESF bus.] Therefore, loss of an [ESF bus sequencer] affects every major ESF system in the [division]. The [12] hour Completion Time provides a period of time to correct the problem commensurate with the importance of maintaining sequencer OPERABILITY. This time period also ensures that the probability of an accident (requiring sequencer OPERABILITY) occurring during periods when the sequencer is inoperable is minimal.~~

load group

72

(3)

~~This Condition is preceded by a Note that allows the Condition to be deleted if the unit design is such that any sequencer failure mode will only affect the ability of the associated DG to power its respective safety loads under any conditions. Implicit in this Note is the concept that the Condition must be retained if any sequencer failure mode results in the inability to start all or part of the safety loads when required, regardless of power availability, or results in overloading the offsite power circuit to a safety bus during an event, thereby causing its failure. Also~~

(continued)

BASES

ACTIONS

~~F.1 (continued)~~

~~implicit in the Note, is that the Condition is not applicable to any train that does not have a sequencer.~~

INSERT NEW TEXT for G

H ~~G~~.1 and ~~G~~.2 H

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

I ~~H~~.1

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

SURVEILLANCE REQUIREMENTS

The AC sources are designed to permit inspection and testing of all important areas and features, especially those that have a standby function, in accordance with 10 CFR 50, Appendix A, GDC 18 (Ref. 8). Periodic component tests are supplemented by extensive functional tests during refueling outages (under simulated accident conditions). The SRs for demonstrating the OPERABILITY of the DGs ~~are in accordance with the recommendations of Regulatory Guide 1.9 (Ref. 3), Regulatory Guide 1.108 (Ref. 9), and Regulatory Guide 1.137 (Ref. 10), as addressed in the FSAR.~~

~~Where the SRs discussed herein specify voltage and frequency tolerances, the following is applicable. The minimum steady state output voltage of [3740] V is 90% of the nominal 4160 V output voltage. This value, which is specified in~~

15

NEW TEXT

(continued)

CEOG STS BASES ACTION G:
Page 3.8-15:

G.1.1

To ensure adequate voltage is delivered to downstream electrical equipment, the Electrical Distribution System (EDS) requires an adequate input voltage. Failure to assure adequate input voltage, may result in double sequencing should an accident requiring sequencer operation and a Fast Bus Transfer (FBT) occur during the period of low input voltage to the EDS.

Adequate EDS voltage is assured by maintenance of switchyard voltage at or above 524kV for Unit 1, and 518kV for Units 2 and 3, when all three startup transformers are in service. When only two startup transformers are in service, adequate voltage is assured to all three Units by maintaining switchyard voltage at or above 525kV. Blocking FBT ensures adequate EDS voltage by preventing the non-Class 1E House Loads from depressing the Class 1E 4.16kV switchgear voltage.

Action G.1.1 applies only if switchgear breakers NANS03B and NANS04B are open (i.e. FBT has not yet occurred). If breakers NANS03B and NANS04B are closed (i.e., FBT has occurred) and the degraded voltage relays (DVRs) have not activated, then the LCO is met, regardless of switchyard voltage, and no action is required as the DVRs are capable of determining adequate voltage at the Class 1E 4.16kV buses. Also, if the switchyard voltage perturbation is less than 28.62 seconds, then the LCO is met and no action is required as the perturbation is less than the current, minimum time delay of the DVRs.

G.1.2

To ensure adequate voltage is delivered to downstream electrical equipment, the Electrical Distribution System (EDS) requires an adequate input voltage. Failure to assure adequate input voltage, may result in double sequencing should an accident requiring sequencer operation and a Fast Bus Transfer (FBT) occur during the period of low input voltage to the EDS.

Adequate EDS voltage is assured by maintenance of switchyard voltage at or above 524kV for Unit 1, and 518kV for Units 2 and 3, when all three startup transformers are in service. When only two startup transformers are in service, adequate voltage is assured to all three Units by maintaining switchyard voltage at or above 525kV. Blocking FBT ensures adequate EDS voltage by preventing the non-Class 1E House Loads from depressing the Class 1E 4.16kV switchgear voltage. Starting, loading and separating the opposite train's EDG from offsite power prevents FBT from depressing the Class 1E 4.16kV bus voltage. In addition, this configuration provides offsite power to half of the House Loads to provide forced circulation in the event of a plant trip.

CEOG STS ACTION G:
(continued)
Page 3.8-15:

Action G.1.2 applies only if switchgear breakers NANS03B and NANS04B are open (i.e. FBT has not yet occurred). If breakers NANS03B and NANS04B are closed (i.e., FBT has occurred) and the degraded voltage relays (DVRs) have not activated, then the LCO is met, regardless of switchyard voltage, and no action is required as the DVRs are capable of determining adequate voltage at the Class 1E 4.16kV buses. Also, if the switchyard voltage perturbation is less than 28.62 seconds, then the LCO is met and no action is required as the perturbation is less than the current, minimum time delay of the DVRs.

G.2

The 72 hour completion time establishes a limit on the maximum time allowed to restore adequate Electrical Distribution System (EDS) input voltage. Regulatory Guide 1.93 (Ref. 6) recognizes that under certain conditions it may be safer to continue operation at full or reduced power for a limited time than to effect an immediate shutdown based on the loss of some of the required electric power sources. Action G balances the risk of a forced shutdown against the risk of remaining at power with EDS input voltage restored by blocking Fast Bus Transfer or starting, loading, and separating EDGs from offsite power. Action G.1.1 maintains the availability of all four electric power sources, however, House Loads would not be available for forced circulation capability during plant trips. Action G.1.2 reduces the number of available electric power sources and maintains partial forced circulation capability.

CEOG STS BASES SURVEILLANCE REQUIREMENTS:
Page 3.8-15 and 16:

are based on the recommendations of Regulatory Guide (RG) 1.9 (Ref. 3), unless otherwise noted in the Updated FSAR Section 1.8.

All planned DG starts may be preceded by an engine prelube period as recommended by the manufacturer in order to minimize wear and tear on the DGs during testing. The DG capabilities (starting and loading) are required to be met from a variety of initial conditions such as DG in standby condition with the engine hot (SR 3.8.1.15) and DG in standby condition with the engine at normal keep-warm conditions (SR 3.8.1.7 and SR 3.8.1.20). Although it is expected that most DG starts will be performed from normal keep-warm conditions, DG starts may be performed with the jacket water cooling and lube oil temperatures within the lower to upper limits of DG OPERABILITY, except as noted above. Rapid cooling of the DG down to normal keep-warm conditions should be minimized.

The timed start (≤ 10 seconds) is satisfied when the DG achieves at least 3740 volts and 58.8 Hz. At these values, the DG output breaker permissives are satisfied; and on detection of bus undervoltage or loss of power, the DG breakers would close reenergizing its respective ESF bus. Following the timed start, it is expected that the rated speed (i.e., frequency) and voltage will stabilize and maintain steady state voltage at 4160 ± 420 volts and frequency at 60 +1.2/-0.3 Hz.

The required steady state frequency range for the DG is 60 +1.2/-0.3 Hz to be consistent with the safety analysis to provide adequate safety injection flow. In accordance with the guidance provided in Regulatory Guide 1.9 (Ref. 3), where steady state conditions do not exist (i.e., transients), the frequency range should be restored to within ± 2% of the 60 Hz nominal frequency (58.8 Hz to 61.2 Hz).

Surveillance load testing uses the referenced equipment or equivalent loading.

Specific MODE restraints have been footnoted where applicable to each 18 month SR. The reason for "This Surveillance shall not be performed in MODE 1 or 2" is that during operation with the reactor critical, performance of this SR could cause perturbations to the EDS that could challenge continued steady state operation and, as a result, unit safety systems; or that performing the SR would remove a required DG from service. The reason for "This Surveillance shall not be performed in MODE 1, 2, 3, or 4" is that performing this SR would remove a required offsite circuit from service, perturb the EDS, and challenge safety systems.

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BASES

SURVEILLANCE REQUIREMENTS (continued)

~~ANSI C84.1-1982 (Ref. 11), 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 80% of name plate rating. The specified maximum steady state output voltage of [4756] V is equal to the maximum operating voltage specified for 4000 V motors. It ensures that for a lightly loaded distribution system, the voltage at the terminals of 4000 V motors is no more than the maximum rated operating voltages. The specified minimum and maximum frequencies of the DG are 58.8 Hz and 61.2 Hz, respectively. These values are equal to ± 2% of the 60 Hz nominal frequency and are derived from the recommendations given in Regulatory Guide 1.9 (Ref. 3).~~

NEW TEXT (continued)

SR 3.8.1.1

indicated

This SR assures 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 and SR 3.8.1.7

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

TYPO —

To minimize the wear on moving parts that do not get lubricated when the engine is not running, these SRs are modified by a Note (Note 2 for SR 3.8.1.2) to indicate that all DG starts for these Surveillances may be preceded by an engine prelube period and followed by a warmup period prior to loading ~~by an engine prelube period~~.

Starting Procedure previously addressed

~~For the purposes of SR 3.8.1.2 and SR 3.8.1.7 testing, the DGs are started from standby conditions. Standby conditions~~

(continued)

(15)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.1.2 and SR 3.8.1.7 (continued)

~~for a DG mean the diesel engine coolant and oil are being continuously circulated and temperature is being maintained consistent with manufacturer recommendations.~~

In order to reduce stress and wear on diesel engines, some manufacturers recommends a modified start in which the starting speed of DGs is limited, warmup is limited to this lower speed, and the DGs are gradually accelerated to synchronous speed prior to loading. This is the intent of Note 3, which is only applicable when such modified start procedures are recommended by the manufacturer.

the DG

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

with the engine at normal keep-warm conditions

The 10 second start requirement is not applicable to SR 3.8.1.2 (see Note 3) when a modified start procedure as described above is used. If a modified start is not used, 10 second start requirement of SR 3.8.1.7 applies.

Since SR 3.8.1.7 requires a 10 second start, it is more restrictive than SR 3.8.1.2, and it may be performed in lieu of SR 3.8.1.2. This is the intent of Note 1 of SR 3.8.1.2.

The normal 31 day Frequency for SR 3.8.1.2 (see Table 3.8.1-1, "Diesel Generator Test Schedule," in the accompanying LCO) is consistent with Regulatory Guide 1.9 (Ref. 3). The 184 day Frequency for SR 3.8.1.7 is a reduction in cold testing consistent with Generic Letter 84-15 (Ref. 7). These Frequencies provide adequate assurance of DG OPERABILITY, while minimizing degradation resulting from testing.

SR 3.8.1.3

(16)

This Surveillance verifies that the DGs are capable of synchronizing with the offsite electrical system and accepting loads greater than or equal to the equivalent of the maximum expected accident loads. A minimum run time of 60 minutes is required to stabilize engine temperatures,

NEW TEXT

(continued)

90 to 100 percent (4950 - 5500 kW) of the continuous rating of the DG. Consistent with the guidance provided in the Regulatory Guide 1.9 (Ref. 3) load-run test description, the 4950 - 5500 kW band will demonstrate 90 to 100 percent of the continuous rating of the DG. The load band (4950 - 5500 kW) is meant as guidance to avoid routine overloading of the engine. Loads in excess of this band for special testing may be performed within the guidance of the generator capability curve.

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BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.1.3 (continued)

while minimizing the time that the DG is connected to the offsite source.

However, additional runtime in excess of 60 minutes may be performed as recommended by the manufacturer

~~Although no power factor requirements are established by this SR, the DG is normally operated at a power factor between [0.8 lagging] and [1.0]. The 0.8 value is the design rating of the machine, while [1.0] is an operational limitation [to ensure circulating currents are minimized].~~ The normal 31 day Frequency for this Surveillance ~~(Table 3.8.1-1)~~ is consistent with Regulatory Guide 1.9 (Ref. 3).

This SR is modified by four Notes. Note 1 indicates that diesel engine runs for this Surveillance may include gradual loading, as recommended by the manufacturer, so that mechanical stress and wear on the diesel engine are minimized. Note 2 states that momentary transients because of changing bus loads do not invalidate this test. ~~Similarly, momentary power factor transients above the limit will not invalidate the 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.

9

SR 3.8.1.4

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

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

(continued)

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BASES

SURVEILLANCE REQUIREMENTS (continued)

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]~~ 92 days eliminates the necessary environment for bacterial survival. This is the most effective means of controlling microbiological fouling. In addition, it eliminates the potential for water entrainment in the fuel oil during 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, the fuel delivery piping is not obstructed, and the controls and control systems for automatic fuel transfer systems are OPERABLE.

[~~The Frequency for this SR is variable, depending on individual system design, with up to a [92] day interval. The [92] day Frequency corresponds to the testing requirements for pumps as contained in the ASME Code, Section XI (Ref. 12); however,~~ Since the design of fuel transfer systems is such that pumps will operate automatically ~~or must be started manually~~ in order to maintain an adequate volume of fuel oil in the day ~~[and engine mounted]~~ tanks during or following DG testing. ~~In such a case,~~ a 31 day

(continued)

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BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.1.6 (continued)

[Frequency is appropriate. ~~Since proper operation of fuel transfer systems is an inherent part of DG OPERABILITY, the Frequency of this SR should be modified to reflect individual designs.~~]

SR 3.8.1.7

See SR 3.8.1.2.

[SR 3.8.1.8

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

This SR is modified by a Note. The reason for the Note is that during operation with the reactor critical, performance of this SR could cause perturbations to the electrical distribution systems that could challenge continued steady state operation and, as a result, unit safety systems. Credit may be taken for unplanned events that satisfy this SR.]

SR 3.8.1.9

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

(continued)

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BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.1.9 (continued)

and frequency and while maintaining a specified margin to the overspeed trip. ~~[For this unit, the single load for each DG and its horsepower rating is as follows:]~~ This Surveillance may be accomplished by:

NEW TEXT

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

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

As required by IEEE-308 (Ref. 13), the load rejection test is acceptable if the increase in diesel speed does not exceed 75% of the difference between synchronous speed and the overspeed trip setpoint, or 15% above synchronous speed, whichever is lower.

The time, voltage, and frequency tolerances specified in this SR are derived from Regulatory Guide 1.9 (Ref. 3) recommendations for response during load sequence intervals. The [3] seconds specified is equal to 60% of a typical 5 second load sequence interval associated with sequencing of the largest load. The voltage and frequency specified are consistent with the design range of the equipment powered by the DG. SR 3.8.1.9.a corresponds to the maximum frequency excursion, while SR 3.8.1.9.b and SR 3.8.1.9.c are steady state voltage and frequency values to which the system must recover following load rejection. The [18 month] Frequency is consistent with the recommendation of Regulatory Guide 1.~~108~~ 9 (Ref. ~~9~~ 3).

This SR is modified by a Note. The reason for the Note is that ~~during operation with the reactor critical, performance of this SR could cause perturbations to the electrical distribution systems that could challenge continued steady state operation and, as a result, unit safety systems.~~ Credit may be taken for unplanned events that satisfy this SR. ~~In order to ensure that the DG is tested under load conditions that are as close to design basis conditions as possible, Note 2 requires that, if synchronized to offsite power, testing must be performed using a power factor ≤ [0.9]. This power factor is chosen to be representative~~

Use MODE 1-4 Restraint text

NEW TEXT

(continued)

CEOG STS BASES SR 3.8.1.9
Page 3.8-21

Top of page:

Train A Normal Water Chiller (at 842 kW) and Train B AFW pump (at 904 kW) are the bounding loads for the EDG A and EDG B to reject, respectively. These values are listed in Table 8.3-3, Load Bases for Class 1E Buses, in the Updated FSAR (Ref. 2).

Bottom of page:

This SR is performed in emergency mode (not paralleled to the grid) ensuring that the DG is tested under load conditions that are as close to design basis conditions as possible.

BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.1.9 (continued)

~~of the actual design basis inductive loading that the DG would experience.~~

~~Reviewer's Note: The above MODE restrictions may be deleted if it can be demonstrated to the staff, on a plant specific basis, that performing the SR with the reactor in any of the restricted MODES can satisfy the following criteria, as applicable:~~

~~a. Performance of the SR will not render any safety system or component inoperable;~~

~~b. Performance of the SR will not cause perturbations to any of the electrical distribution systems that could result in a challenge to steady state operation or to plant safety systems; and~~

~~c. Performance of the SR, or failure of the SR, will not cause, or result in, an AOO with attendant challenge to plant safety systems.~~

SR 3.8.1.10

This Surveillance demonstrates the DG capability to reject a full load without overspeed tripping or exceeding the predetermined voltage limits. The DG full load rejection may occur because of a system fault or inadvertent breaker tripping. This Surveillance ensures proper engine generator load response under the simulated test conditions. This test simulates the loss of the total connected load that the DG experiences following a full load rejection and verifies that the DG will not trip upon loss of the load. These acceptance criteria provide DG damage protection. While the DG is not expected to experience this transient during an event and continues to be available, this response ensures that the DG is not degraded for future application, including reconnection to the bus if the trip initiator can be corrected or isolated.

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9 16

In order to ensure that the DG is tested under load conditions that are as close to design basis conditions as possible, testing must be performed using ~~a power factor ≤ [0.9]. This power factor is chosen to be representative~~

NEW TEXT

(continued)

CEOG STS BASES SR 3.8.1.10
Page B 3.8-22 and 23:

design basis kW loading and maximum kVAR loading permitted during testing. These loads represent the inductive loading that the DG would experience to the extent practicable and is consistent with the intent of Regulatory Guide 1.9 (Ref. 3). Consistent with the guidance provided in the Regulatory Guide 1.9 full-load rejection test description, the 4950 - 5500 kW band will demonstrate the DG's capability to reject a load equal to 90 to 100 percent of its continuous rating. Administrative limits have been placed upon the Class 1E 4160 V buses due to high voltage concerns. As a result, power factors deviating much from unity are currently not possible when the DG runs parallel to the grid. To the extent practicable, VARs will be provided by the DG during this SR.

BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.1.10 (continued)

~~of the actual design basis inductive loading that the DG would experience.~~

New Text (continued)

16

The ~~(1)~~18 month~~s~~ Frequency is consistent with the recommendation of Regulatory Guide 1.~~108~~ 9 (Ref. ~~8~~ 3) and is intended to be consistent with expected fuel cycle lengths.

This SR is modified by a Note. The reason for the Note is that during operation with the reactor critical, performance of this SR could cause perturbation to the electrical distribution systems that could challenge continued steady state operation and, as a result, unit safety systems. Credit may be taken for unplanned events that satisfy this SR.

~~Reviewer's Note: The above MODE restrictions may be deleted if it can be demonstrated to the staff, on a plant specific basis, that performing the SR with the reactor in any of the restricted MODES can satisfy the following criteria, as applicable:~~

~~a. Performance of the SR will not render any safety system or component inoperable;~~

~~b. Performance of the SR will not cause perturbations to any of the electrical distribution systems that could result in a challenge to steady state operation or to plant safety systems; and~~

~~c. Performance of the SR, or failure of the SR, will not cause, or result in, an AOO with attendant challenge to plant safety systems.~~

SR 3.8.1.11

16

As required by Regulatory Guide 1.~~108~~ 9 (Ref. ~~8~~ 3), paragraph ~~2.a.(1)~~ 2.2.4, this Surveillance demonstrates the as designed operation of the standby power sources during loss of the offsite source. This test verifies all actions encountered from the loss of offsite power, including shedding of the nonessential loads and energization of the emergency buses and respective loads from the DG. It further demonstrates the capability of the DG to

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.1.11 (continued)

automatically achieve the required voltage and frequency within the specified time.

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

The requirement to verify the connection and power supply of permanent and auto-connected loads is intended to satisfactorily show the relationship of these loads to the DG loading logic. In certain circumstances, many of these loads cannot actually be connected or loaded without undue hardship or potential for undesired operation. For instance, Emergency Core Cooling Systems (ECCS) injection valves are not desired to be stroked open, high pressure injection systems are not capable of being operated at full flow, or shutdown cooling (SDC) systems performing a decay heat removal function are not desired to be realigned to the ECCS mode of operation. In lieu of actual demonstration of connection and loading of loads, testing that adequately shows the capability of the DG system to perform these functions is acceptable. This testing may include any series of sequential, overlapping, or total steps so that the entire connection and loading sequence is verified.

16

The Frequency of 18 months is consistent with the recommendations of Regulatory Guide ~~1.108 (Ref. 9), paragraph 2.a.(1)~~ 1.9 (Ref. 3), takes into consideration unit conditions required to perform the Surveillance, and is intended to be consistent with expected fuel cycle lengths.

Starting Procedure Previously addressed

This SR is modified by two Notes. The reason for Note 1 is to minimize wear and tear on the DGs during testing. ~~For the purpose of this testing, the DGs must be started from standby conditions, that is, with the engine coolant and oil continuously circulated and temperature maintained consistent with manufacturer recommendations.~~ The reason for Note 2 is that performing the Surveillance would remove a required offsite circuit from service, perturb the electrical distribution system, and challenge safety

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.1.11 (continued)

systems. Credit may be taken for unplanned events that satisfy this SR.

SR 3.8.1.12

This Surveillance demonstrates that the DG automatically starts and achieves the required voltage and frequency within the specified time ([10] seconds) from the design basis actuation signal (LOCA signal) and operates for ≥ 5 minutes. The 5 minute period provides sufficient time to demonstrate stability. SR 3.8.1.12.d and SR 3.8.1.12.e ensure that permanently connected loads and emergency loads are energized from the offsite electrical power system on an ESF signal without loss of offsite power.

(10)

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

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

Starting procedures previously addressed

This SR is modified by two Notes. The reason for Note 1 is to minimize wear and tear on the DGs during testing. For the purpose of this testing, the DGs must be started from

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.1.12 (continued)

Replace with text for MODES 1-4 restraint

~~standby conditions, that is, with the engine coolant and oil continuously circulated and temperature maintained consistent with manufacturer recommendations.~~ The reason for Note 2 is that during operation with the reactor critical, performance of this Surveillance could cause perturbations to the electrical distribution systems that could challenge continued steady state operation and, as a result, unit safety systems. Credit may be taken for unplanned events that satisfy this SR.

SR 3.8.1.13

11

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

engine

and manual emergency stop trip

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

The SR is modified by a Note. The reason for the Note is that performing the Surveillance would remove a required DG from service. Credit may be taken for unplanned events that satisfy this SR.

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.1.13 (continued)

~~Reviewer's Note: The above MODE restrictions may be deleted if it can be demonstrated to the staff, on a plant specific basis, that performing the SR with the reactor in any of the restricted MODES can satisfy the following criteria, as applicable:~~

~~a. Performance of the SR will not render any safety system or component inoperable;~~

~~b. Performance of the SR will not cause perturbations to any of the electrical distribution systems that could result in a challenge to steady state operation or to plant safety systems; and~~

~~c. Performance of the SR, or failure of the SR, will not cause, or result in, an AOO with attendant challenge to plant safety systems.~~

16

SR 3.8.1.14

9 3 2.2.9

Regulatory Guide 1.~~108~~ (Ref. ~~8~~), paragraph ~~2.a.(3)~~, requires demonstration once per 18 months that the DGs can start and run continuously at full load capability for an interval of not less than 24 hours, ≥ ~~[2]~~ hours of which is at a load equivalent to 110% of the continuous duty rating of the DG (5775-6050 kW) and the ~~remainder of the time~~ at a load equivalent to the continuous duty rating of the DG. The DG starts for this Surveillance can be performed either from standby or hot conditions. The provisions for prelubricating and warmup, discussed in SR 3.8.1.2, and for gradual loading, discussed in SR 3.8.1.3, are applicable to this SR.

105.60 ≥ 22 hours 90 to 100% of (4950-5500 kW)

15

In order to ensure that the DG is tested under load conditions that are as close to design conditions as possible, testing ~~must be~~ performed using ~~a power factor of ≤ [0.9]. This power factor is chosen to be representative of the actual design basis inductive loading that the DG would experience.~~ The load band is provided to avoid routine overloading of the DG. Routine overloading may result in more frequent teardown inspections in accordance with vendor recommendations in order to maintain DG OPERABILITY.

9 NEW TEXT

(continued)

CEOG STS BASES SR 3.8.1.14
Page B 3.8-27:

design basis kW loading and maximum kVAR loading permitted during testing. These loads represent the inductive loading that the DG would experience to the extent practicable and is consistent with the intent of Regulatory Guide 1.9 (Ref. 3). Administrative limits have been placed upon the Class 1E 4160 V buses due to high voltage concerns. As a result, power factors deviating much from unity are currently not possible when the DG runs parallel to the grid. To the extent practicable, VARs will be provided by the DG during this SR.

BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.1.14 (continued) 16

The [18 months] Frequency is consistent with the recommendations of Regulatory Guide 1.108 9 (Ref. 3, paragraph 2.2.9), takes into consideration unit conditions required to perform the Surveillance, and is intended to be consistent with expected fuel cycle lengths.

This Surveillance is modified by two Notes. ~~Note 1 states that momentary transients due to changing bus loads do not invalidate this test. Similarly, momentary power factor transients above the power factor limit will not invalidate the test.~~ The reason for Note 2 is that during operation with the reactor critical, performance of this Surveillance could cause perturbations to the electrical distribution systems that could challenge continued steady state operation and, as a result, unit safety systems. Credit may be taken for unplanned events that satisfy this SR. NEW TEXT 9

SR 3.8.1.15

This Surveillance demonstrates that the diesel engine can restart from a hot condition, such as subsequent to shutdown from normal Surveillances, and achieve the required voltage and frequency within [10] seconds. The [10] second time is derived from the requirements of the accident analysis to respond to a design basis large break LOCA. The [18 month] Frequency is consistent with the recommendations of Regulatory Guide 1.108 9 (Ref. 3, paragraph 2.2.10). 16

This SR is modified by two Notes. Note 1 ensures that the test is performed with the diesel sufficiently hot. The load band is provided to avoid routine overloading of the DG. Routine overloads may result in more frequent teardown inspections in accordance with vendor recommendations in order to maintain DG OPERABILITY. The requirement that the diesel has operated for at least [2] hours at full load conditions prior to performance of this Surveillance is based on manufacturer recommendations for achieving hot conditions. Momentary transients due to changing bus loads do not invalidate this test. Note 2 allows all DG starts to be preceded by an engine prelube period to minimize wear and tear on the diesel during testing. NEW TEXT 12

(continued)

CEOG STS BASES SR 3.8.1.14
Page B 3.8-28:

The reason for Note 1 (Momentary transients outside the load range do not invalidate this test) is that this band is meant as guidance to avoid routine overloading of the engine. Loads in excess of this band for special testing under direct monitoring of the manufacturer or momentary variations due to changing bus loads shall not invalidate the test.

CEOG STS BASES SR 3.8.1.15
Page B 3.8-28:

Per the guidance in Regulatory Guide 1.9, this SR would demonstrate the hot restart functional capability at full-load temperature conditions, after the DG has operated for 2 hours (or until operating temperatures have stabilized) at full load. Loads in excess of this band for special testing under direct monitoring of the manufacturer or momentary transients due to changing bus loads shall not invalidate the test.

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.8.1.16

16

15

As required by Regulatory Guide 1.108 (Ref. 9), paragraph 2.a.(6), this Surveillance ensures that the manual synchronization and automatic load transfer from the DG to the offsite source can be made and that the DG can be returned to ready-to-load status when offsite power is restored. It also ensures that the auto-start logic is reset to allow the DG to reload if a subsequent loss of offsite power occurs. The DG is considered to be in ready-to-load status when the DG is at rated speed and voltage, the output breaker is open and can receive an autoclose signal on bus undervoltage, and the load sequence timers are reset.

9 3 2.2.11

IN standby operation (RUNNING unloaded)

The Frequency of 18 months is consistent with the recommendations of Regulatory Guide 1.108 (Ref. 9), paragraph 2.a.(6), and takes into consideration unit conditions required to perform the Surveillance.

9 3

16

This SR is modified by a Note. The reason for the Note is that performing the Surveillance would remove a required offsite circuit from service, perturb the electrical distribution system, and challenge safety systems. Credit may be taken for unplanned events that satisfy this SR.

SR 3.8.1.17

Demonstration of the test mode override ensures that the DG availability under accident conditions will not be compromised as the result of testing and the DG will automatically reset to ready-to-load operation if a LOCA actuation signal is received during operation in the test mode. Ready-to-load operation ~~is defined as the DG running at rated speed and voltage~~ with the DG output breaker open. These provisions for automatic switchover ~~are required by IEEE-308 (Ref. 13), paragraph 6.2.6(2).~~ and Regulatory Guide 1.9 (Ref. 3), Paragraph 2.2.13.

(e.g., simulated SIAS)

16

The requirement to automatically energize the emergency loads with offsite power is essentially identical to that of SR 3.8.1.12. The intent in the requirement associated with SR 3.8.1.17.b is to show that the emergency loading was not affected by the DG operation in test mode. In lieu of actual demonstration of connection and loading of loads, testing that adequately shows the capability of the

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.1.17 (continued)

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

The 18 month Frequency is consistent with the recommendations of Regulatory Guide 1.108 (Ref. 9), paragraph 2.a.(8), takes into consideration unit conditions required to perform the Surveillance; and is intended to be consistent with expected fuel cycle lengths. 16

This SR is modified by a Note. The reason for the Note is that performing the Surveillance would remove a required offsite circuit from service, perturb the electrical distribution system, and challenge safety systems. Credit may be taken for unplanned events that satisfy this SR.

SR 3.8.1.18

Under accident and loss of offsite power conditions loads are sequentially connected to the bus by the automatic load sequencer. The sequencing logic controls the permissive and starting signals to motor breakers to prevent overloading of the DGs due to high motor starting currents. The 10% load sequence time interval tolerance ensures that sufficient time exists for the DG to restore frequency and voltage prior to applying the next load and that safety analysis assumptions regarding ESF equipment time delays are not violated. Reference 2 provides a summary of the automatic loading of ESF buses. 15

1 second

FSAR, Chapter 8 (Ref. 2)

The Frequency of 18 months is consistent with the recommendations of Regulatory Guide 1.108 (Ref. 9), paragraph 2.a.(2); takes into consideration unit conditions required to perform the Surveillance; and is intended to be consistent with expected fuel cycle lengths. 16

2.2.4

This SR is modified by a Note. The reason for the Note is that performing the Surveillance would remove a required offsite circuit from service, perturb the electrical distribution system, and challenge safety systems. Credit may be taken for unplanned events that satisfy this SR.

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.1.18 (continued)

~~Reviewer's Note: The above MODE restrictions may be deleted if it can be demonstrated to the staff, on a plant specific basis, that performing the SR with the reactor in any of the restricted MODES can satisfy the following criteria, as applicable:~~

~~a. Performance of the SR will not render any safety system or component inoperable;~~

~~b. Performance of the SR will not cause perturbations to any of the electrical distribution systems that could result in a challenge to steady state operation or to plant safety systems; and~~

~~c. Performance of the SR, or failure of the SR, will not cause, or result in, an AOO with attendant challenge to plant safety systems.~~

SR 3.8.1.19

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

This Surveillance demonstrates the DG operation, as discussed in the Bases for SR 3.8.1.11, during a loss of offsite power actuation test signal in conjunction with an ESF actuation signal. In lieu of actual demonstration of connection and loading of loads, testing that adequately shows the capability of the DG system to perform these functions is acceptable. This testing may include any series of sequential, overlapping, or total steps so that the entire connection and loading sequence is verified.

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

Starting Procedure Previously addressed

This SR is modified by two Notes. The reason for Note 1 is to minimize wear and tear on the DGs during testing. ~~For the purpose of this testing, the DGs must be started from~~

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.1.19 (continued)

~~standby conditions, that is, with the engine coolant and oil continuously circulated and temperature maintained consistent with manufacturer recommendations for DGs.~~ The reason for Note 2 is that performing the Surveillance would remove a required offsite circuit from service, perturb the electrical distribution system, and challenge safety systems. Credit may be taken for unplanned events that satisfy this SR.

SR 3.8.1.20

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

15

The 10 year Frequency is consistent with the recommendations of Regulatory Guide 1.108 (Ref. 8), paragraph 2.3.2.4 and Regulatory Guide 1.137 (Ref. 10).

This SR is modified by a Note. two 9 3 The reason for the Note is 1 to minimize wear on the DG during testing. For the purpose of this testing, the DGs must be started from standby conditions, ~~that is, with the engine coolant and oil continuously circulated, and temperature maintained consistent with manufacturer recommendations.~~ with the engine at keep-warm conditions.

ADDITIONAL TEXT

~~Diesel Generator Test Schedule~~

~~The DG test schedule (Table 3.8.1-1) implements the recommendations of Revision 3 to Regulatory Guide 1.9 (Ref. 3). The purpose of this test schedule is to provide timely test data to establish a confidence level associated with the goal to maintain DG reliability above 0.95 per demand.~~

4

~~According to Regulatory Guide 1.9, Revision 3 (Ref. 3), each DG unit should be tested at least once every 31 days. Whenever a DG has experienced 4 or more valid failures in the last 25 valid tests, the maximum time between tests is reduced to 7 days. Four failures in 25 valid tests is a failure rate of 0.16, or the threshold of acceptable DG~~

(continued)

CEOG STS BASES SR 3.8.1.20
Page B 3.8-32:

The reason for Note 2 is that during operation with the reactor critical, performance of this SR could cause perturbations to the EDS that could challenge continued steady state operation and, as a result, unit safety systems. In addition, Note 2 credits unplanned events or testing after any modifications which could affect DG independence that satisfy this SR.

BASES

SURVEILLANCE REQUIREMENTS

<u>Diesel Generator Test Schedule</u> (continued)

4

performance, and hence may be an early indication of the degradation of DG reliability. When considered in the light of a long history of tests, however, 4 failures in the last 25 valid tests may only be a statistically probable distribution of random events. Increasing the test Frequency will allow for a more timely accumulation of additional test data upon which to base judgment of the reliability of the DG. The increased test Frequency must be maintained until seven consecutive, failure free tests have been performed.

The Frequency for accelerated testing is 7 days, but no less than 24 hours. Tests conducted at intervals of less than 24 hours may be credited for compliance with Required Actions. However, for the purpose of re-establishing the normal 31-day Frequency, a successful test at an interval of less than 24 hours should be considered an invalid test and not count towards the seven consecutive failure free starts, and the consecutive test count is not reset.

A test interval in excess of 7 days (or 31 days, as appropriate) constitutes a failure to meet the SRs and results in the associated DG being declared inoperable. It does not, however, constitute a valid test or failure of the DG, and any consecutive test count is not reset.

REFERENCES

1. 10 CFR 50, Appendix A, GDC ~~17.~~

2. FSAR, Chapter [8].

3. Regulatory Guide 1.9, Rev. [3], [date].

4. FSAR, Chapter [6].

5. FSAR, Chapter [15].

6. Regulatory Guide 1.93, Rev. [ ], [date].

7. Generic Letter 84-15.

8. 10 CFR 50, Appendix A, GDC 18.

9. Regulatory Guide 1.108, Rev. [1], [August 1977].

NEW TEXT

(continued)

CEOG STS BASE REFERENCES
Page b 3.8-33 and 34

REFERENCES:

1. 10 CFR 50, Appendix A, GDC 17
2. Updated FSAR, Chapter 8
3. Regulatory Guide 1.9, Revision 3, "Selection, Design, Qualification and Testing of Emergency Diesel Generator Units Used as Class 1E Onsite Electric Power Systems at Nuclear Power Plants," July 1993.
4. Updated FSAR, Chapter 6
5. Updated FSAR, Chapter 15
6. Regulatory Guide 1.93, "Availability of Electric Power Sources," Revision 0, December 1974.
7. GL 84-15, "Proposed Staff Actions to Improve and Maintain Diesel Generator Reliability," July 2, 1984.
8. 10 CFR 50, Appendix A, GDC 18
9. Regulatory Guide 1.108, Rev. 1, August, 1977
10. Regulatory Guide 1.137, "Fuel Oil Systems for Standby Diesel Generators," Revision 1, October 1979.
11. ANSI C84.1-1982
12. IEEE Standard 308-1974, "IEEE Standard Criteria for Class 1E Power Systems for Nuclear Power Generating Stations."
13. NPSD-996, "CEOG Joint Applications Report for Emergency Diesel Generator AOT Extension, " May 1995.

BASES

REFERENCES (continued)

10. Regulatory Guide 1.137, Rev. [ ], [date].
11. ANSI C84.1-1982.
12. ASME, Boiler and Pressure Vessel Code, Section XI.
13. IEEE Standard 308-[1978].

NEW TEXT (continued)

NUREG-1432 EXCEPTIONS
SPECIFICATION 3.8.1

1. The completion time for ITS Action 3.8.1.A.3 has been modified to state "10 days from discovery of failure to meet LCO" and the completion time for ITS Action 3.8.1.B.4 has been modified to state, "7 days AND within 10 days from discovery of failure to meet LCO." According to CE NPSD-996, "CEOG Joint Applications Report for Emergency Diesel Generator AOT Extension," May 1995, operation may continue with one DG inoperable for a period that should not exceed 7 days. Additionally, CE NPSD-996 states that operation may continue with one DG inoperable for a maximum continuous period of 10 days on a once per refueling cycle frequency. CE NPSD-996 provides a series of deterministic and probabilistic justifications for the completion times corresponding to the periods in which continued power operations are allowed with one DG inoperable. With one DG inoperable, the remaining OPERABLE DG and offsite circuits are adequate to supply electrical power to the onsite Class 1E power distribution system. The 7 day completion time takes into account the capacity and capability of the remaining AC sources, a reasonable time for corrective or preventive maintenance, and the low probability of a DBA occurring during this period.

   By combining the 72 hours (or 3 days) allowed outage time for one offsite circuit to inoperable with the 7 days allowed outage time for one DG to be inoperable, the 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 has been extended from 6 days to 10 days from discovery of failure to meet 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.

   This change is consistent with the following submittals: 102-03392 (06/13/95) and 102-03449 (08/16/95). The NRC is currently reviewing this TS change. Although this is a deviation from NUREG-1432, it is consistent with PVNGS licensing basis.

2. NUREG Actions 3.8.1.B.3.1 and 3.8.1.B.3.2 refers to "OPERABLE DG(s)." ITS Actions 3.8.1.B.3.1 and 3.8.1.B.3.2 refers to "OPERABLE DG." Per plant specific design each PVNGS unit has only two (2) DGs. Therefore, per Action B with one DG inoperable, only the remaining single DG OPERABILITY would be questioned. This exception is attributed to a plant specific design feature.

3. The sequencer(s) is an essential support system to both the offsite circuit and the DG associated with a given ESF bus. Furthermore, the sequencer is on the primary success path for most major AC electrically powered safety systems powered from the associated ESF bus. Therefore, loss of an ESF bus sequencer affects every major ESF system in the load group. The 72 hour Completion Time takes into account the capacity and capability of the remaining AC sources, a reasonable time for corrective or preventive maintenance, and the low probability of a DBA occurring during this period. In addition, the sequencer functions can be accomplished by the operator relatively quickly and simply using well-rehearsed emergency procedures. An evaluation (Risk-Informed Basis for Load Sequencer Allowed Outage Time - 13-NS-C24) determined that the risk associated with operating without one of the sequencers available was less than the risk of a forced shutdown, and that it was reasonable to allow a sequencer to be inoperable for 72 hours. This exception is attributed to a plant specific operating practice.

4. ITS SR 3.8.1.2 and 3.8.1.3 state that the surveillance is to be performed on a frequency of 31 days. NUREG-1432 states, "As specified in Table 3.8.1-1." This change is consistent with the guidance provided in Generic Letter 94-01, "REMOVAL OF ACCELERATED TESTING AND SPECIAL REPORTING REQUIREMENTS FOR EMERGENCY DIESEL GENERATORS," which allows licensees to request removal from TS the provisions for accelerated testing and special reporting requirements for DGs. PVNGS TS change submittal, dated March 24, 1995, adopted this recommendation. This change is consistent with the following submittals: 102-03293 (03/24/95), 102-03472 (09/10/95), and 102-03632 (03/22/96). The NRC is currently reviewing this TS change. Therefore, although this is a deviation from NUREG-1432, it is consistent with PVNGS licensing basis.

5. ITS SR 3.8.1.4 states, "Verify each day tank contains ≥ 550 gal of fuel (minimum level of 2.75 feet)." NUREG-1432 states, "Verify each day tank [and engine mounted tank] contains ≥ [220] gal of fuel oil." PVNGS's DGs does not have an engine mounted fuel tank. The plant specific operating practice to determine if adequate fuel oil exists in gallons from the control room is feet, specifically 2.75 feet. Therefore, consistent with CTS, both the gallons and footage were included in the ITS SR. This exception is attributed to a plant specific operating practice.

6. ITS SR 3.8.1.6 states that the SR will be performed every 31 days as opposed to the NUREG 1432 bracketed value of 92 days. Per the NUREG SR 3.8.1.6 Bases, if the design of the fuel transfer systems is such that pumps will operate automatically or must be started manually in order to maintain an adequate volume of fuel oil in the day tanks during or following DG testing, a 31 day Frequency is appropriate. Therefore, the frequency of this SR was modified to reflect specific PVNGS plant design.

7. NUREG 1432 specifies a frequency of ≥ 58.8 Hz and ≤ 61.2 Hz (60 ± 1.2 Hz). For specific SR in ITS, the required steady state frequency range for the DG is 60 +1.2/-0.3 Hz (≥ 59.7 Hz and ≤ 61.2 Hz) to be consistent with the safety analysis to provide adequate safety injection flow. In accordance with the guidance provided in Regulatory Guide 1.9 (Ref. 3), where steady state conditions do not exist (i.e., transients), the frequency range should be restored to within ± 2% of the 60 Hz nominal frequency (58.8 Hz to 61.2 Hz). This exception is attributed to a plant specific design feature and bracketed parameter carried over from CTS.

8. NUREG 1432 specifies in the Note that "This Surveillance shall not be performed in MODE 1 or 2." ITS states that "This Surveillance shall not be performed in MODE 1, 2, 3, or 4." Per PVNGS plant design, performing this surveillance in Modes 1 through 4 would remove a required offsite circuit from service, perturb the EDS, and challenge safety systems. This exception is attributed to a plant specific design feature.

9. ITS SRs do not reference the DG power factor as part of the SRs. NUREG-1432 references a power factor and that it should be ≤ 0.9. NUREG-1432 references power factor for three different SRs: 1) single largest load rejection, 2) full load rejection, and 3) 24-hour DG run. Power factor will not be specified as a surveillance condition for the single largest load rejection testing because this test will be performed in the emergency mode with equivalent safety related loads. Power factor is not adjustable while in the emergency mode of operation.

Power factor testing will not be specified for full load rejection testing and the 24-hour DG run SRs because of PVNGS administrative limits imposed on Class 1E 4.16 kV bus voltage are restrictive and ≤ 0.9 power factor can not be achieved. The full load reject and 24-hour run SRs are performed while paralleled to the grid. Some power factor can be obtained by overexciting the generator field (raising voltage reference signal) which increases reactive loads (VARS) and also raises bus voltage. The maximum administrative bus voltage limit is reached before 0.9 power factor is achieved. Depending on the EDS conditions the DG could have to be overexcited to maintain a power factor ≤ 0.90. Power factors deviating much from unity are currently not possible when the DG runs parallel to the grid. To the extent practicable, VARS will be on the DG during the test. Performance of the full load rejection testing from rated power also results in unnecessary generator wear from higher than normal voltages resulting from rejecting full load with an overexcited generator. As a result the DG is maintained within its capability curve without exceeding PVNGS administrative requirements and power factor is not a surveillance requirement. Although this is a deviation from NUREG-1432, it is consistent with PVNGS licensing basis. This exception is attributed to a plant specific design feature.

10. ITS SR 3.8.1.12 states that the DG achieves steady state voltage and frequency and operates for greater than 5 minutes. There is no starting time requirement (≤ 10 seconds) associated with this SR. NUREG-1432 SR 3.8.1.12 specifies a starting time of ≤ 10 seconds after an auto-start and testing. The primary purpose of this SR is to test the circuitry of a SIAS with offsite power available and to verify that the DG receives a start signal. Therefore, a timed start is not required to support this SR. Not adopting an unnecessary fast start is consistent with industry and regulatory guidance for reducing the number of fast starts. Other SRs demonstrate that the DGs can start within 10 seconds, therefore, it is not necessary for a time requirement in this SR. Although this is a deviation from NUREG-1432, it is consistent with PVNGS licensing basis.

    ITS SR 3.8.1.12 states in part "actuations signal (without a loss of offsite power) each DG auto-starts" and "Operates for ≥ 5 minutes on standby (running unloaded)." NUREG-1432 states in part "actuations signal each DG auto-starts" and "Operates for ≥ 5 minutes." The additions in ITS are to provide clarification that this SR is for an ESF actuation only and not an ESF with a loss of offsite power. This is also included to be consistent with ITS Bases for SR 3.8.1.16 and 3.8.1.17 ready-to-load status. This exception is attributed to a TS BASES clarification.

11. ITS SR 3.8.1.13 states in part, "Verify each DG automatic trip is bypassed... except: a. Engine overspeed; b. Generator differential current; c. Engine low lube oil pressure; and d. Manual emergency stop trip." NUREG-1432 states in part, "Verify each DG automatic trip is bypassed... except: a. Engine overspeed; b. Generator differential current; c. Low lube oil pressure; and d. High crankcase pressure; and e. Start failure relay." Per PVNGS design, the critical protective devices that function to shut down the diesel generator during testing and are also retained during emergency operation are engine overspeed, generator differential, engine low lube oil pressure, and manual emergency stop trip. The remaining EDG noncritical protective functions are bypassed during emergency operation, and function to shut down the diesel generator only during testing operation. The critical protective functions trip the DG to avert substantial damage to the DG unit. The noncritical trips are bypassed during DBAs and provide an alarm on an abnormal engine condition. The DG availability to mitigate the DBA is more critical than protecting the engine against minor problems that are not immediately detrimental to emergency operation of the DG. Although this is a deviation from NUREG-1432, it is consistent with PVNGS plant design and licensing basis. This exception is attributed to a plant specific design feature.

12. The Note for ITS SR 3.8.1.15 states in part, "...the DG has operated ≥ 2 hours loaded ≥ 4950 kW and ≤ 5500 kW or until temperatures have stabilized...." Running for 2 hours or until operating temperatures have stabilized ensures that the test is performed with the DG sufficiently hot, this SR demonstrates the hot restart functional capability at full load temperature conditions. Stable operating temperatures ensures this condition has been met. The load band is provided to avoid routine overloading of the DG. Although this is a deviation from NUREG-1432, it is consistent with PVNGS licensing basis. This exception is attributed to a plant specific design feature.

13. ITS SR 3.8.1.18 states "Verify interval between each sequenced load block is within ± 1 second of design interval for each automatic load sequencer." NUREG 1432 SR 3.8.1.18 states "Verify interval between each sequenced load block is within ± 10% of design interval for each emergency [and shutdown] load sequencer." The term "emergency load sequencer" or "shutdown load sequencer" has not been previously referred to in the LCO or Bases sections of NUREG 1432. LCO 3.8.1 specifically refers to the "automatic load sequencers for Train A and Train B." Therefore, a grammar change has been made to enhance clarity. No technical or intent change to the ITS are made by this change. This exception is also attributed to plant specific terminology.

The 1 second load sequence time tolerance ensures that sufficient time exists for the DG to restore frequency and voltage prior to applying the next load and that safety analysis assumptions regarding ESF equipment time delays are not violated. Updated FSAR, Chapter 8 (Ref. 2) provides a summary of the automatic loading of ESF buses. The plant specific value (1 second verses ± 10%) is used. The plant specific value was directly transferred from CTS to the ITS. This exception is attributed to a plant specific design feature.

14. NOTE 2 for ITS 3.8.1.20 states, "This Surveillance shall not be performed in MODE 1 or 2. However, credit may be taken for unplanned events or for testing after any modifications which could affect DG independence that satisfy this SR." NUREG-1432 does not include this note. The reason for "This Surveillance shall not be performed in MODE 1 or 2" is that during operation with the reactor critical, performance of this SR could cause perturbations to the EDS that could challenge continued steady state operation and, as a result, unit safety systems; or that performing the SR would remove a required DG from service. This exception is attributed to a plant specific design feature. In an effort to minimize the unnecessary testing of DGs, a note consistent with other NUREG-1432 notations has been added to take credit for events that would satisfy this SR, including testing. Although this is a deviation from NUREG-1432, it is consistent with PVNGS licensing basis.

15. This section of the Bases has been modified to provide plant specific titles, values, or system design. In some cases, grammar and/or editorial changes have been made to enhance clarity. No technical or intent changes to the ITS are made by this change.

16. This section of the Bases has been modified to provide clarification that is consistent with the guidance provided in Regulatory Guide 1.9.

17. NUREG-1432 LCO 3.8.1 and the corresponding BASES refer to one QUALIFIED offsite circuit. PVNGS does not have unqualified circuits (e.g., SONGS has unqualified offsite circuits). Therefore, the qualification is not necessary. This exception is attributed to a plant specific design feature.

18. ACTION G has been added to address a condition when the electrical distribution system input voltage is less than its limits (as defined in the BASES section). Degraded grid voltage issues are a plant specific concern at PVNGS that have been recently addressed with a TS amendment. This ACTION has been incorporated into ITS.

PVNGS CTS
SPECIFICATION 3.8.1
MARK UP

Specification 3.8.1

A.1

3.8 ~~3/4.8~~ ELECTRICAL POWER SYSTEMS

3.8.1 ~~3/4.8.1~~ A.C. SOURCES

OPERATING

~~LIMITING CONDITION FOR OPERATION~~

LCO 3.8.1 ~~3.8.1.1~~ The following AC electrical power sources shall be OPERABLE: A.5 each capable of supplying one train of the onsite Class 1E AC Electrical Power Distribution System; and

<LCO 3.8.1.a> a. Two ~~physically independent~~ circuits between ~~from~~ the offsite transmission network ~~to the switchyard and two physically independent circuits from the switchyard to~~ and the onsite Class 1E AC Electrical distribution system, ~~and~~

<LCO 3.8.1.b> b. Two ~~separate and independent emergency~~ diesel generators (~~E~~DG)

c. Automatic load sequencers for Train A and Train B M.1

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

ACTION:

<Act B> ~~a.~~ With one required offsite circuit ~~of LCO 3.8.1.1.a~~ inoperable,

<ACT A.1> ~~1.~~ Demonstrate the OPERABILITY of the ~~remaining~~ required OPERABLE offsite circuits by performing SR ~~4.8.1.1.1.a~~ 3.8.1.1 within 1 hour and once per 8 hours thereafter; AND

<ACT A.2> ~~2.~~ Declare the required feature(s) with no offsite power available inoperable when its redundant required feature(s) is inoperable within 24 hours from the discovery of no offsite power to one train concurrent with the inoperability of the redundant required feature(s); AND

<ACT A.3> ~~3.a.~~ Restore the required offsite circuit to OPERABLE status within 72 hours AND within ~~6~~ 10 days from the discovery of failure to meet LCO ~~3.8.1.1; OR~~ A.2

<ACT H> ~~b.~~ Be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

<Act B> ~~b.~~ With one required EDG ~~of LCO 3.8.1.1.b~~ inoperable. LA.1

<ACT B.1> ~~1.~~ Demonstrate the OPERABILITY of the OPERABLE offsite circuits by performing SR ~~4.8.1.1.1.a~~ 3.8.1.1 within 1 hour and once per 8 hours thereafter; AND

<ACT B.2> ~~2.~~ Declare the required feature(s) supported by the inoperable EDG inoperable when its redundant required feature(s) is inoperable within 4 hours from the discovery of an inoperable EDG concurrent with the inoperability of the redundant required feature(s); AND

~~TS LCO 3.8.1.1 ACTION b.3 shall be completed if this condition is entered.~~ LA.1

Specification 3.8.1

A.1

ELECTRICAL POWER SYSTEMS

LIMITING CONDITION FOR OPERATION (Continued)

<ACT B.3.1> ~~3.~~ Determine that the OPERABLE EDG is not inoperable due to common mode failure within 24 hours, OR demonstrate the

<ACT B.3.2> OPERABILITY of the remaining OPERABLE EDG by performing SR ~~4.8.1.1.2.a.2~~ 3.8.1.2 within 24 hours; AND

<ACT B.4> ~~4.a.~~ Restore the EDG to OPERABLE status within ~~72 hours~~ 7 days AND within ~~6~~ 10 days from the discovery of failure to meet LCO ~~3.8.1.1; OR~~ A.2

<ACT H> ~~b.~~ Be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

A.3

<ACT D.2+D.3> ~~c.~~ With one required offsite circuit and one EDG inoperable, (1) restore one of the inoperable AC sources to OPERABLE status within 12 hours; OR

<ACT H> be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

C ~~d.~~ With two of the required offsite circuits inoperable, ~~2~~ A.3

<ACT C.2> ~~1.~~ Declare the required feature(s) inoperable when its redundant required feature(s) is inoperable within 12 hours from the discovery of two offsite circuits inoperable concurrent with the inoperability of the redundant required feature(s); AND

<ACT C.3> ~~2.~~ Restore one required offsite circuit to OPERABLE status within 24 hours; OR be in at least HOT STANDBY within the next 6 hours

<ACT H> and in COLD SHUTDOWN within the following 30 hours.

A.3

<ACT E>
<ACT E.2>
<ACT H>
e. With two of the ~~required~~ EDGs inoperable, ~~3~~ restore one EDG to OPERABLE status within 2 hours; OR be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

Insert 1 — M.1 & A.6

1 ~~Enter applicable conditions and requirements of TS LCO 3.8.1.1 ACTION a and ACTION b.~~ In addition, with no AC power source to one train, enter applicable conditions and ACTIONs of TS LCO ~~3.8.3.1~~ 3.8.9, "Onsite Power Distribution Systems -Operating." — 3.8.1.D NOTE — A.3

2 ~~Enter applicable conditions and requirements of TS LCO 3.8.1.1 ACTION a.~~

3 ~~Enter applicable conditions and requirements of TS LCO 3.8.1.1 ACTION b.~~

INSERT 1:

ACT F With on automatic load sequencer inoperable. restore the load sequencer to OPERABLE status. within 72 hours.

ACT G Electrical Distribution System input voltage less than limits.

G.1.1 Block both trains of Fast Bus Transfer. within 1 hour.

OR

G.1.2 Block one train of Fast Bus Transfer and start. load. and separate the opposite train DG from offsite power. within 1 hour.

AND

G.2 Restore Electrical Distribution System input voltage to within limits. within 72 hours.

ACT H Required action and associated completion time of Actions A. B. C. D. E. F. or G not met

G.1 Be in MODE 3. within 6 hours

AND

G.2 Be in MODE 5. within 36 hours

ACT I· With three or more required AC sources inoperable. enter LCO 3.0.3 immediately.

LA.6 Action G - reworded

~~ELECTRICAL POWER SYSTEMS~~

~~LIMITING CONDITION FOR OPERATION (Continued)~~

ACTION (Continued)

f.* With switchyard voltage less than 524 kV and with three startup transformers in service, restore OPERABILITY of one train of A.C. sources by blocking fast bus transfer within 1 hour; AND[1] either:

1. Restore OPERABILITY of the remaining EDG by starting, loading, and separating from offsite power within the next hour; AND[2] restore the remaining offsite circuit to OPERABLE status within 72 hours AND within 6 days from the discovery of failure to meet the LCO; OR

2. Restore OPERABILITY of the remaining train of A.C. sources by blocking fast bus transfer within the next hour; OR

3. Be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

g.* With switchyard voltage less than 525 kV and with two startup transformers in service, restore OPERABILITY of one train of A.C. sources by blocking fast bus transfer within 1 hour; AND[1] either:

1. Restore OPERABILITY of the remaining EDG by starting, loading, and separating from offsite power within the next hour; AND[2] restore the remaining offsite circuit to OPERABLE status within 72 hours AND within 6 days from the discovery of failure to meet the LCO; OR

2. Restore OPERABILITY of the remaining train of A.C. sources by blocking fast bus transfer within the next hour; OR

3. Be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

*This amendment will expire upon full implementation of the final modification.

[1] Enter applicable conditions and requirements of TS LCO 3.8.1.1 ACTION a and ACTION b for the INOPERABLE train. In addition, with no A.C. power source to one train, enter applicable conditions and ACTIONS of TS LCO 3.8.3.1, "Onsite Power Distribution Systems - Operating."

[2] Enter applicable conditions and requirements of TS LCO 3.8.1.1 ACTION a for the INOPERABLE offsite circuit.

LA.6

ACTION (Continued)

f. With switchyard voltage less than 524 kV, with three startup transformers in service, and with circuit breakers NANS03B and NANS04B open:

1. Restore OPERABILITY of degraded voltage protection by blocking fast bus transfer for one train within 1 hour and start, load, and separate the opposite train's EDG from offsite power within 1 hour;[1] AND restore switchyard voltage above 524 kV within 72 hours; OR
2. Restore OPERABILITY of both trains of degraded voltage protection by blocking fast bus transfer on both trains within 1 hour; AND restore switchyard voltage above 524 kV within 72 hours; OR
3. Be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

g. With switchyard voltage less than 525 kV, with two startup transformers in service, and with circuit breakers NANS03B and NANS04B open:

1. Restore OPERABILITY of degraded voltage protection by blocking fast bus transfer for one train within 1 hour and start, load, and separate the opposite train's EDG from offsite power within 1 hour;[1] AND restore switchyard voltage above 525 kV within 72 hours; OR
2. Restore OPERABILITY of both trains of degraded voltage protection by blocking fast bus transfer on both trains within 1 hour; AND restore switchyard voltage above 525 kV within 72 hours; OR
3. Be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

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[1] Enter applicable conditions and requirements of TS LCO 3.8.1.1 ACTION a for the INOPERABLE offsite circuit

Specification 3.8.1

A.1

ELECTRICAL POWER SYSTEMS

SURVEILLANCE REQUIREMENTS

<SR 3.8.1.1> ~~4.8.1.1.1~~ Each required offsite circuit of LCO 3.8.1.1.a shall be:

~~a.~~ Determined OPERABLE at least once per 7 days by verifying correct breaker alignment and indicated power availability.

<SR 3.8.1.8> ~~b.~~ Demonstrated OPERABLE at least once per 18 months[1] by manually transferring the onsite Class 1E power supply from the normal offsite circuit to the alternate offsite circuit.

4.8.1.1.2 Each emergency diesel generator (EDG) of LCO 3.8.1.1.b shall be demonstrated OPERABLE:

a. At least once per 31 days by:

<SR 3.8.1.4> ~~1.~~ Verifying each ~~the~~ day tank has a minimum level of 2.75 feet (550 gallons of fuel).

A.4

<SR 3.8.1.2> ~~2.~~ Verifying the EDG starts from stand by condition and achieves voltage at 4160 ± 420 volts and frequency at 60 ± 1.2 Hz.[2]

<SR 3.8.1.3> ~~3.~~ Verifying the EDG is synchronized ~~to its appropriate bus~~ and ~~gradually~~ loaded to 4950 - 5500 kW and operates for at least 60 minutes.[3]

<SR 3.8.1.6> ~~b.~~ At least once per 31 days by verifying the fuel oil transfer system operates to automatically transfer fuel oil from the storage tank to the day tank.

<SR 3.8.1.5> Check for and remove accumulated water from each day tank every 92days

M.2

SR 3.8.1.8 NOTE — [1] This surveillance shall not be performed in MODE 1, OR 2, ~~3, or 4~~. Credit may be taken for unplanned events that satisfy this SR.

A.4

SR 3.8.1.2 NOTE — [2] ~~Performance of 4.8.1.1.2.c satisfies this SR.~~ SR 3.8.1.7 modified
A ~~fuel limited~~ EDG start may be used for the SR as recommended by the manufacturer. When the ~~fuel limited~~ start procedure is not used, the time, voltage, and frequency tolerances of ~~4.8.1.1.2.c~~ SR 3.8.1.7 must be met.
All EDG starts may be preceded by an engine prelube period and followed by a warmup period prior to loading as recommended by the manufacturer.

SR 3.8.1.3 NOTE — [3] EDG loading may be conducted in accordance with the manufacturer's recommendations, including gradual loading.
Momentary transients outside the load range do not invalidate this test;
This SR shall be conducted on only one EDG at a time;
This SR shall be preceded by and immediately follow, without shutting down, a successful performance of ~~4.8.1.1.2.a.2~~ SR 3.8.1.2 or ~~4.8.1.1.2.c~~ SR 3.8.1.7.

Specification 3.8.1

(A.1)

ELECTRICAL POWER SYSTEMS

SURVEILLANCE REQUIREMENTS (Continued)

4.8.1.1.2 (Continued)

<SR 3.8.1.7> c. At least once per 184 days by verifying the EDG starts from ~~normal~~ standby condition and achieves in ≤ 10 seconds ~~at least 3740 volts and 58.8 Hz, and subsequently achieves steady state~~ voltage at 4160 ± 420 volts and frequency at 60 +1.2/-0.3 Hz.[1] Following the EDG start, perform SR ~~4.8.1.1.2.a.3~~ 3.8.1.3

SR 3.8.1.3 NOTE 4

d. At least once per 18 months by:

<SR 3.8.1.9> ~~1.~~ Verifying the EDG capability to reject a single largest load ≥ 842 kW for EDG A (Train A Normal Water Chiller) and ≥ 904 kW for EDG B (Train B Auxiliary Feedwater pump) without tripping on overspeed, while maintaining voltage at 4160 ± 420 volts and frequency at 60 ± 1.2 Hz[3]. REWORDED

<SR 3.8.1.10> ~~2.~~ Verifying the EDG capability to reject a load of 4950 - 5500 kW without tripping on overspeed. The EDG voltage shall not exceed 6200 volts during and following the load rejection[2].

<SR 3.8.1.11> ~~3.~~ Verifying on an actual or ~~a~~ simulated loss of offsite power signal:[3] (L.1)

a. Deenergization of the emergency buses;

b. Load shedding from emergency buses;

c. EDG auto-starts and:

1. energizes the emergency buses with permanently connected loads in ≤ 10 seconds,

2. energizes auto-connected shutdown loads through the load sequencer,

3. maintains steady state voltage at 4160 ± 420 volts, and frequency at 60 +1.2/-0.3 Hz,[4] and

4. operates for ≥ 5 minutes while loaded with shutdown loads.

SR 3.8.1.11 NOTE

1 ~~Performance of this SR may also serve to meet the requirements of SR 4.8.1.1.2.a.2.~~ (LA.2)

SR 3.8.1.7 NOTE — All EDG starts may be preceded by an engine prelube period ~~and followed by a warmup period prior to loading as recommended by the manufacturer.~~ (LA.3)

SR 3.8.1.10 NOTE — 2 This Surveillance shall not be performed in MODE 1 or 2.

SR 3.8.1.9 NOTE — 3 This Surveillance shall not be performed in MODE 1, 2, 3, or 4.

SR 3.8.1.11 NOTE

4 ~~Momentary transients do not invalidate this test.~~ (LA.4)

Specification 3.8.1

A.1

ELECTRICAL POWER SYSTEMS

SURVEILLANCE REQUIREMENTS (Continued)

4.8.1.1.2 (Continued) actual or L.1

<SR 3.8.1.12> ~~4.~~ Verifying that on an ESF actuation test signal (without a loss of power) the EDG auto-starts and: from standby condition A.4

M.3 b ~~a.~~ Achieves a steady state voltage at 4160 ± 420 volts ~~and~~ frequency at 60 +1.2/-0.3 Hz; and

Insert 2 c ~~b.~~ operates for ≥ 5 minutes on standby (running unloaded).[3]

<SR 3.8.1.19> ~~5.~~ Verifying on ~~a~~ an actual or simulated loss of offsite power signal in conjunction with an ESF actuation test signal:[3] L.1

a. Deenergization of the emergency buses;
b. Load shedding from emergency buses;
c. EDG auto-starts from normal standby condition and:

1. energizes the emergency buses with permanently connected loads in ≤ 10 seconds,
2. energizes auto-connected emergency accident loads through the load sequencer, A.1
3. achieves maintains steady state voltage at 4160 ± 420 volts, and frequency at 60 +1.2/-0.3 Hz, and
4. operates for ≥ 5 minutes while loaded with permanently connected and auto connected emergency loads.

<SR 3.8.1.13> ~~6.~~ Verifying that all automatic EDG trips are bypassed ~~during emergency operation~~ on actual or simulated loss of voltage signal on the emergency bus concurrent with an actual or simulated ESF actuation signal, except[2]: M.4

a. Engine overspeed,
b. Generator differential,
c. Engine low lube oil pressure, and
d. Manual emergency stop trip.

<SR 3.8.1.14> ~~7.~~ Verifying each EDG operates for ≥ 24 hours[2,4]: LA.5

a. For ≥ 22 hours of the test, the EDG shall be loaded to 4950 -5500 kW[1], and
b. For ≥ 2 continuous hours of the test, the EDG shall be loaded to 5775 - 6050 kW[1].

SR 3.8.1.14 NOTE — [1] Momentary transients outside the load range do not invalidate this test.

SR 3.8.1.13 NOTE — [2] This Surveillance shall not be performed in MODE 1 or 2.

SR 3.8.1.12 NOTE — [3] This Surveillance shall not be performed in MODE 1, 2, 3, or 4. — SR 3.8.1.19 NOTE

SR 3.8.1.12 NOTE — [4] The EDG may be prelubed, ~~warmed up, and loaded in accordance with the manufacturer's recommendations.~~ LA.5

INSERT 2:

d. Permanently connected loads remain energized from the offsite power system; and M.3

e. Emergency loads are energized from the offsite power system.

Specification 3.8.1

A.1

ELECTRICAL POWER SYSTEMS

SURVEILLANCE REQUIREMENTS (Continued)

4.8.1.1.2 (Continued)

<SR 3.8.1.15> ~~8.~~ Within 5 minutes of shutting down the EDG after the EDG has operated at 4950 - 5500 kW for 2 hours or until operating temperatures have stabilized,[1,2] verifying that the EDG starts and achieves in ≤ 10 seconds ~~at least 3740 volts and 58.8 Hz, and maintains steady state~~ voltage at 4160 ± 420 volts and frequency at 60 +1.2/-0.3 Hz.

<SR 3.8.1.16> ~~9.~~ Verifying each EDG[3]:

a. Synchronizes with offsite power source while loaded with emergency loads upon a simulated restoration of offsite power,

b. Transfers loads to offsite power source, and

c. Return to ~~standby~~ Ready-to-load operation ~~(running unloaded)~~.

<SR 3.8.1.17> ~~10.~~ Verifying, with the EDG operating in test mode and connected to its bus, ~~a~~ an actual or simulated ~~SIAS~~ ESFAS overrides the test mode by[3]:

L.1

a. Returning the EDG to ~~standby~~ Ready-to-load operation ~~(running unloaded)~~; and

b. the Class 1E bus remains energized with offsite power.

<SR 3.8.1.18> ~~11.~~ Verifying that the automatic load sequencers are OPERABLE with the interval between each load block within ± 1 second of its design interval[3].

<SR 3.8.1.20> ~~8.~~ At least once per 10 years, verifying, when started from standby condition simultaneously, each EDG achieves in ≤ 10 seconds ~~at least 3740 volts and 58.8 Hz, and maintains steady state~~ voltage at 4160 ± 420 volts and frequency at 60 +1.2/-0.3 Hz.[2,4]

A.4

SR 3.8.1.15 3.8.1.20 NOTE — All DG starts may be preceded by an engine prelube period — A.7

SR 3.8.1.15 NOTE — 1 Momentary transients outside the load range do not invalidate this test.

SR 3.8.1.20 NOTE — 2 This Surveillance shall not be performed in MODE 1 or 2.

SR 3.8.1.16, SR 3.8.1.17, & SR 3.8.1.18 NOTES — 3 This Surveillance shall not be performed in MODE 1, 2, 3, or 4.

4 Credit may be taken for unplanned events or for testing after any modifications which could affect EDG interdependence that satisfy this SR. — SR 3.8.1.20 NOTE

DISCUSSION OF CHANGES
SPECIFICATION 3.8.1

ADMINISTRATIVE CHANGES

A.1 All reformatting and renumbering is in accordance with the Combustion Engineering Plant (CEOG) Standard Technical specifications NUREG-1432, Rev. 1 (NUREG-1432). As a result, the Palo Verde Nuclear Generating Station (PVNGS) Improved Technical Specifications (ITS) should be more readable, and therefore understandable, by plant operators as well as other users. During the reformatting and renumbering of the ITS, no technical changes (either actual or interpretational) to the Current Technical Specification (CTS) were made unless they were identified and justified.

Editorial rewording (either adding or deleting) is made consistent with NUREG-1432. During NUREG-1432 development, certain wording preferences or English language conventions were adopted which resulted in no technical changes (either actual or interpretational) to the CTS.

Additional information has also been added to more fully describe each subsection. This wording is consistent with NUREG-1432. Since the design is already approved by the NRC, adding more detail does not result in a technical change.

A.2 The completion time for ITS Action 3.8.1.A.3 has been modified to state "10 days from discovery of failure to meet LCO" and the completion time for ITS Action 3.8.1.B.4 has been modified to state, "7 days AND within 10 days from discovery of failure to meet LCO." According to CE NPSD-996, "CEOG Joint Applications Report for Emergency Diesel Generator AOT Extension," May 1995, operation may continue with one DG inoperable for a period that should not exceed 7 days. Additionally, CE NPSD-996 states that operation may continue with one DG inoperable for a maximum continuous period of 10 days on a once per refueling cycle frequency. CE NPSD-996 provides a series of deterministic and probabilistic justifications for the completion times corresponding to the periods in which continued power operations are allowed with one DG inoperable. With one DG inoperable, the remaining OPERABLE DG and offsite circuits are adequate to supply electrical power to the onsite Class 1E power distribution system. The 7 day completion time takes into account the capacity and capability of the remaining AC sources, a reasonable time for corrective or preventive maintenance, and the low probability of a DBA occurring during this period.

By combining the 72 hours (or 3 days) allowed outage time for one offsite circuit to inoperable with the 7 days allowed outage time for one DG to be inoperable, the 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 has been extended from 6 days to 10 days from discovery of failure to meet 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.

This change is consistent with the following submittals: 102-03392 (06/13/95) and 102-03449 (08/16/95). The NRC is currently reviewing this TS change. This change is also noted in NUREG-1432 Exception Number 1.

A.3 CTS 3.8.1.1.c through 3.8.1.1.e have footnotes requiring an entry into the applicable conditions and requirements of TS LCO 3.8.1.1 ACTION a and b. ITS 3.8.1.C through 3.8.1.E do not have the footnotes. The format of the Actions is such that loss of one offsite circuit or DG would also have to be addressed. Therefore, the footnote in the CTS is redundant and unnecessary. This change does not impact safety and is consistent with NUREG-1432.

A.4 CTS 4.8.1.1.2.a.2, 4.8.1.1.2.d.4, and 4.8.1.1.2.e did not specify that the DG start "from standby condition" as specified in NUREG-1432. Per the ITS Bases, the DG capabilities (starting and loading) are required to be met from a variety of initial conditions such as DG in standby condition with the engine hot (SR 3.8.1.15) and DG in standby condition with the engine at normal keep-warm conditions (SR 3.8.1.7 and SR 3.8.1.20). Although it is expected that most DG starts will be performed from normal keep-warm conditions, DG starts may be performed with the jacket water cooling and lube oil temperatures within the lower to upper limits of DG OPERABILITY, except as noted above. Rapid cooling of the DG down to normal keep-warm conditions should be minimized. This change does not impact safety and is consistent with NUREG-1432.

The footnote 2 for CTS 4.8.1.1.2.a.2 refers to a "fuel limited" DG start in order to fore go the requirements for a timed (≤ 10 second) start. NUREG-1432 refers to a "modified start" and defines it as "involving idling and gradual acceleration to synchronous speed." The "fuel limited" term has been replaced with the defined "modified" term. This change does not impact safety and is consistent with NUREG-1432.

A.5 CTS LCO 3.8.1.1.a and b states, "a. Two physically independent circuits from the offsite transmission network to the switchyard and two physically independent circuits from the switchyard to the onsite Class 1E distribution system, and b. Two separate and independent emergency diesel generators (EDG)." ITS LCO 3.8.1 states, "a. Two 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;

The words from ITS LCO 3.8.1.a and b are being added for clarity and is administrative only. This change does not impact safety and is consistent with NUREG-1432.

A.6 CTS 3.8.1.1 does not specify a required action for three or more AC sources being inoperable. ITS 3.8.1.I states, "With three or more required AC sources inoperable, enter 3.0.3 immediately." This condition corresponds to a level of degradation in which all redundancy in the AC electrical power supplies has been lost. Therefore, no additional time is justified for continued operation. The addition of this requirement constitutes an administrative change in that entry into TS 3.0.3 was defaulted due the inability to comply with the LCO. This change is consistent with NUREG-1432.

A.7 CTS 4.8.1.1.2.d.8 and 4.8.1.1.2.e do not have a footnote which states, "All DG starts may be preceded by an engine prelube period." ITS SR 3.8.1.15 and SR 3.8.1.20 added this note. The addition of the note is strictly administrative in order to be consistent with the other SRs involving DG starts. The BASES section is very clear that all planned DG starts may be preceded by an engine prelube period as recommended by the manufacturer in order to minimize wear and tear on the DGs during testing. This change is consistent with NUREG-1432.

TECHNICAL CHANGES - MORE RESTRICTIVE

M.1 CTS LCO 3.8.1.1 does not identify automatic load sequencers for Train A and Train B as a requirement for AC electrical power sources required to be operable. ITS LCO 3.8.1 requires automatic load sequencers for Train A and Train B be OPERABLE. The 72 hour Completion Time takes into account the capacity and capability of the remaining AC sources, a reasonable time for corrective or preventive maintenance, and the low probability of a DBA occurring during this period. In addition, the sequencer functions can be accomplished by the operator relatively quickly and simply using well-rehearsed emergency procedures. The addition of this requirement constitutes a more restrictive change to plant operation. This change is consistent with NUREG-1432.

M.2 CTS 3/4.8.1.1 does not include an SR comparable to NUREG SR 3.8.1.5 to "Check for and remove accumulated water from each day tank every 92 days." ITS 3.8.1.5 has been added. Frequent checking for and removal of accumulated water minimizes fouling and provides data regarding the watertight integrity of the fuel oil system. The addition of this SR constitutes a more restrictive change to plant operation. This change is consistent with NUREG-1432.

M.3 CTS 4.8.1.1.2.d.4 states, "Verifying that on an ESF actuation test signal (without a loss of power) the DG auto-starts and: a. Achieves a steady state voltage at 4160 ± 420 volts and frequency at 60 +1.2/-0.3 Hz; and b. operates for ≥ 5 minutes on standby (running unloaded)." ITS SR 3.8.1.11 has the above requirements plus the additional requirement, "d. Permanently connected loads remain energized from the offsite power system; and e. Emergency loads are energized or auto-connected from the offsite power system." This added restriction enforces a level of Technical Specification control that is currently enforced via a surveillance test procedure.

M.4 CTS 4.8.1.1.2.d.6 requires verifying that all automatic DG trips are bypassed "during emergency operation." ITS SR 3.8.1.13 specifies the bypass "on actual or simulated loss of voltage signal on the emergency bus concurrent with an actual or simulated ESF actuation signal. The addition of this requirement constitutes a more restrictive change to plant operation. This change is consistent with NUREG-1432.

TECHNICAL CHANGES - RELOCATIONS

LA.1 CTS 3.8.1.1.b's footnote states, "TS LCO 3.8.1.1 Action b.3 shall be completed if this condition is entered." ITS 3.8.1 Action B does not contain this note. In the event the inoperable DG is restored to OPERABLE status prior to completing either B.3.1 or B.3.2, the plant corrective action program will continue to evaluate the common cause possibility. This continued evaluation, however, is no longer under the 24 hour constraint imposed while in Condition B. This action has been moved to the ITS Bases. This change does not impact safety and is consistent with NUREG-1432.

LA.2 CTS 4.8.1.1.2.c's footnote states, "Performance of this SR may also serve to meet the requirements of SR 4.8.1.1.2.a.2." ITS SR 3.8.1.7 does not contain this note. The CTS footnote is only informational, there are no requirements imposed by it. Therefore, this footnote has been moved to the Bases, section SR 3.8.1.7.

LA.3 CTS 4.8.1.1.2.c's footnote states, "All DG starts may be preceded by an engine prelube period and followed by a warmup period prior to loading as recommended by the manufacturer." ITS SR 3.8.1.7 does not state that the prelube period can be followed by a warmup period prior to loading as recommended by the manufacturer. DG loading done in accordance with manufacturer's recommendations minimizes wear on the engine. The starting, loading, subsequent full load operation required by other Technical Specification Surveillances is adequate to confirm the DG's capability without a loading requirement. Therefore, this footnote has been moved to the Bases, section SR 3.8.1.7.

LA.4 The footnote for "Momentary transients do not invalidate this test" specific to CTS SR 4.8.1.1.2.d.3.c.3 has been relocated to the Bases section for ITS SR 3.8.1.11. The ITS Bases states "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."

LA.5 CTS 4.8.1.1.2.d.7 specifically allowed for the DG to be prelubed, warmed up, and loaded in accordance with the manufacturer's recommendations. ITS SR 3.8.1.14 does not contain this Note or provision. However, the Surveillance Requirements section of the ITS Bases does state "All planned DG starts may be preceded by an engine prelube period as recommended by the manufacturer in order to minimize wear and tear on the DGs during testing." This provision has been relocated to the BASES section. This change is consistent with NUREG-1432.

LA.6 CTS 3.8.1.1 ACTIONs f and g give detailed information about the minimum voltages required for each unit and the number of startup transformers inservice for the electrical distribution system input voltages to be within their limits. ITS 3.8.1 ACTION G does not contain this information. ACTION G states "Electrical Distribution System input voltage less than limits ..." Because of the level of detail and varying conditions of the plant, this information is being relocated from CTS to the Bases Section. In addition, the Voltage Regulation Improvement Project is implementing modifications that will improve the EDS input voltage limit requirements.

Any changes to the Bases will be in accordance with Chapter 5.0 Bases Control Program. Any technical changes to plant procedures will be in accordance with the PVNGS procedure control process. This provides an equivalent level of control and is an administrative change with no impact on the margin of safety. This requirement is not required to be in ITS to provide adequate protection of public health and safety. Therefore, relocation of this requirement to a Licensee Controlled Document is acceptable and consistent with NUREG-1432.

TECHNICAL CHANGES - LESS RESTRICTIVE

L.1 CTS 4.8.1.1.2.d.3, 4.8.1.1.2.d.4, 4.8.1.1.d.5, and 4.8.1.1.d.10, require verifying the DG capability on a simulated signal. ITS SR 3.8.1.11, 3.8.1.12, SR 3.8.1.19, and SR 3.8.1.17, respectively, require verification using an actual or simulated actuation signal instead of just a test signal. These changes allow PVNGS to take credit for SRs if a DG start occurs in the event of an actual actuation signal is received. In this case, if an actual signal is received and the appropriate components properly actuate per the safety analysis, there would be no need to perform the SRs at the original 18 month interval. PVNGS would have the option to either start the SR Frequency from receipt to the actual actuation or to retest the system as originally scheduled. OPERABILITY is adequately demonstrated in either case since the components are not capable of discriminating between an actual or simulated actuation signal. This change is consistent with NUREG-1432.

TECHNICAL CHANGES - CTS CHANGES

None

NO SIGNIFICANT HAZARDS CONSIDERATION
SPECIFICATION 3.8.1

ADMINISTRATIVE CHANGES
(ITS 3.8.1 Discussion of Changes Labeled A.1, A.2, A.3, A.4, A.5, A.6 and A.7)

Arizona Public Service Company, Palo Verde Nuclear Generating Station (PVNGS), Units 1, 2, and 3, is converting to the ITS as outlined in NUREG-1432, "Standard Technical Specifications, Combustion Engineering Plants." The proposed changes involve the reformatting, renumbering, rewording of the Technical Specifications (TS) and Bases with no change in intent, and the incorporation of current operating practices consistent with NUREG-1432. These changes, since they do not involve technical changes to the Current TS (CTS), are administrative. Below are the No Significant Hazards Consideration (NSHC) for the conversion of this Section/Chapter to NUREG-1432.

The Commission has provided standards for determining whether a significant hazards consideration exists as stated in 10 CFR 50.92. A proposed amendment to an operating license for a facility involves a no significant hazards consideration if operation of the facility, in accordance with a proposed amendment, would not 1) involve a significant increase in the probability or consequences of an accident previously evaluated; 2) create the possibility of a new or different kind of accident from any accident previously evaluated; or 3) involve a significant reduction in a margin of safety. A discussion of these standards as they relate to this amendment request follows:

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

> The proposed changes involve reformatting, renumbering, and rewording of the CTS and Bases along with incorporation of PVNGS current operating practices and other changes to the CTS as discussed in the specific Discussion of Changes listed above in order to be consistent with NUREG-1432. The reformatting, renumbering, and rewording along with the other changes listed above, involves no technical changes to the CTS. Specifically, there will be no change in the requirements imposed on PVNGS due to these changes. During development of NUREG-1432, certain wording preferences or English language conventions were adopted. The proposed changes to this Section/Chapter are administrative in nature and do not impact initiators of any analyzed events. They also do not impact the assumed mitigation of accidents or transient events. Therefore, these changes do not involve a significant increase in the probability or consequences of an accident previously evaluated.

ADMINISTRATIVE CHANGES
(ITS 3.8.1 Discussion of Changes Labeled A.1, A.2, A.3, A.4, A.5, A.6 and A.7) (continued)

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

The proposed changes involve reformatting, renumbering, and rewording of the CTS, along with the incorporation of PVNGS current operating practices and other changes, as discussed, in order to be consistent with NUREG-1432. The proposed changes do not involve a physical alteration of the plant (no new or different type of equipment will be installed) or change the methods governing normal plant operation. The proposed changes will not impose any new or different requirements or eliminate any existing requirements. Therefore, these changes do not create the possibility of a new or different kind of accident from any accident previously evaluated.

Standard 3.-- Does the proposed change involve a significant reduction in a margin of safety?

The proposed changes involve reformatting, renumbering, and rewording of the CTS, along with the incorporation of PVNGS current operating practices and other changes, as discussed, in order to be consistent with NUREG-1432. The proposed changes are administrative in nature and will not involve any technical changes. The proposed changes will not reduce a margin of safety because they have no impact on any safety analysis assumptions. Also, because these changes are administrative in nature, no question of safety is involved. Therefore, these changes do not involve a significant reduction in a margin of safety.

TECHNICAL CHANGES - MORE RESTRICTIVE
(ITS 3.8.1 Discussion of Changes Labeled M.1, M.2, M.3 and M.4)

Arizona Public Service Company, Palo Verde Nuclear Generating Station (PVNGS), Units 1, 2, and 3 is converting to the ITS as outlined in NUREG-1432. This particular NSHC is for the changes labeled "Technical Changes - More Restrictive" described in the specific Discussion of Changes listed above. The proposed changes incorporate more restrictive changes into the CTS by either making current requirements more stringent or adding new requirements which currently do not exist.

The Commission has provided standards for determining whether a significant hazards consideration exists as stated in 10 CFR 50.92. A proposed amendment to an operating license for a facility involves a no significant hazards consideration if operation of the facility, in accordance with a proposed amendment, would not 1) involve a significant increase in the probability or consequences of an accident previously evaluated; 2) create the possibility of a new or different kind of accident from any accident previously evaluated; or 3) involve a significant reduction in a margin of safety. A discussion of these standards as they relate to this amendment request follows:

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

The proposed changes provide more stringent requirements than previously existed in the CTS. The more stringent requirements will not result in operation that will increase the probability of initiating an analyzed event. If anything, the new requirements may decrease the probability or consequences of an analyzed event by incorporating the more restrictive changes discussed in the specific Discussion of Changes listed above. These changes will not alter assumptions relative to mitigation of an accident or transient event. The more restrictive requirements will not alter the operation and will continue to ensure process variables, structures, systems, or components are maintained consistent with safety analyses and licensing basis. These changes have been reviewed to ensure that no previously evaluated accident has been adversely affected. Therefore, these changes will not involve a significant increase in the probability or consequences of an accident evaluated.

TECHNICAL CHANGES - MORE RESTRICTIVE
(ITS 3.8.1 Discussion of Changes Labeled M.1, M.2, M.3 and M.4) (continued)

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

Making existing requirements more restrictive and adding more restrictive requirements to the CTS will not alter the plant configuration (no new or different type of equipment will be installed) or change the methods governing normal plant operation. These changes do impose different requirements. However, they are consistent with the assumptions made in the safety analyses, licensing basis, and NUREG-1432. Therefore, these changes will not create the possibility of a new or different kind of accident from any accident previously evaluated.

Standard 3.-- Does the proposed change involve a significant reduction in a margin of safety?

The proposed changes provide more stringent requirements than previously existed in the CTS. An evaluation of these changes concluded that adding these more restrictive requirements either increases or has no impact on the margin of safety. The changes provide additional restrictions which may enhance plant safety. These changes maintain requirements of the safety analysis, licensing basis, and NUREG-1432. As such, no question of safety is involved. Therefore, these changes will not involve a significant reduction in a margin of safety.

TECHNICAL CHANGES - RELOCATIONS
(ITS 3.8.1 Discussion of Changes Labeled LA.1, LA.2, LA.3, LA.4, LA.5, and LA.6)

Arizona Public Service Company, Palo Verde Nuclear Generating Station (PVNGS), Units 1, 2, and 3 is converting to the ITS as outlined in NUREG-1432. The proposed changes, since detail is being removed from the CTS to a Licensee Controlled Document, are less restrictive. The descriptions of these changes are in the Discussion of Changes listed above.

The Commission has provided standards for determining whether a significant hazards consideration exists as stated in 10 CFR 50.92. A proposed amendment to an operating license for a facility involves a no significant hazards consideration if operation of the facility, in accordance with a proposed amendment, would not 1) involve a significant increase in the probability or consequences of an accident previously evaluated; 2) create the possibility of a new or different kind of accident from any accident previously evaluated; or 3) involve a significant reduction in a margin of safety. A discussion of these standards as they relate to this amendment request follows:

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

> The proposed changes relocate requirements from the CTS to a Licensee Controlled Document. These changes do not result in any hardware changes or changes to plant operating practices. The details being relocated are not assumed to be an initiator of any analyzed event. The Licensee Controlled Document containing the relocated requirements will be maintained using the provisions of 10 CFR 50.59 or other specified control processes and is subject to the change control process in the Administrative Controls Section of the ITS. Since any changes to a Licensee Controlled Document will be evaluated, no increase in the probability or consequences of an accident previously evaluated will be allowed. Therefore, these changes will not involve a significant increase in the probability or consequences of an accident previously evaluated.

TECHNICAL CHANGES - RELOCATIONS
(ITS 3.8.1 Discussion of Changes Labeled LA.1, LA.2, LA.3, LA.4, LA.5 and LA.6) (continued)

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

The proposed changes relocate requirements from the CTS to a Licensee Controlled Document. These changes will not alter the plant configuration (no new or different type of equipment will be installed) or change the methods governing normal plant operation. These changes will not impose different requirements and adequate control of information will still be maintained. These changes will not alter assumptions made in the safety analysis or licensing basis. Therefore, these changes will not create the possibility of a new or different kind of accident from any accident previously evaluated.

Standard 3.-- Does the proposed change involve a significant reduction in a margin of safety?

The proposed changes relocate requirements from the CTS to a Licensee Controlled Document. These changes will not reduce a margin of safety since they have no impact on any safety analysis assumptions. In addition, the requirements to be transposed from the CTS to the Licensee Controlled Document are the same as the CTS. Since any future changes to this Licensee Controlled Document will be evaluated per the requirements of 10 CFR 50.59, or other specified control processes, no reduction (significant or insignificant) in a margin of safety will be allowed. Therefore, these changes will not involve a significant reduction in a margin of safety.

The NRC review provides a certain margin of safety, and although this review will no longer be performed prior to submittal, the NRC still inspects the 10 CFR 50.59 process. The proposed changes are consistent with NUREG-1432, which was approved by the NRC Staff. The change controls for proposed relocated details and requirements provide an acceptable level of regulatory authority. Revising the CTS to reflect the approved level of detail per NUREG-1432 reinforces the conclusion that there is not a significant reduction in the margin of safety. Therefore, revising the CTS to reflect the NRC accepted level of detail and requirements ensures no reduction in a margin of safety.

TECHNICAL CHANGES - LESS RESTRICTIVE
(ITS 3.8.1 Discussion of Changes Labeled L.1)

Arizona Public Service Company, Palo Verde Nuclear Generating Station (PVNGS), Units 1, 2, and 3 is converting to the ITS as outlined in NUREG-1432. The proposed change involves making the CTS less restrictive. Below is the description of this less restrictive change and the NSHC for the conversion to NUREG 1432.

L.1 CTS 4.8.1.1.2.d.3, 4.8.1.1.2.d.4, 4.8.1.1.d.5, and 4.8.1.1.d.10, require verifying the DG capability on a simulated signal. ITS SR 3.8.1.11, 3.8.1.12, SR 3.8.1.19, and SR 3.8.1.17, respectively, require verification using an actual or simulated actuation signal instead of just a test signal. These changes allow PVNGS to take credit for SRs if a DG start occurs in the event of an actual actuation signal is received. In this case, if an actual signal is received and the appropriate components properly actuate per the safety analysis, there would be no need to perform the SRs at the original 18 month interval. PVNGS would have the option to either start the SR Frequency from receipt to the actual actuation or to retest the system as originally scheduled. OPERABILITY is adequately demonstrated in either case since the components are not capable of discriminating between an actual or simulated actuation signal. This change is consistent with NUREG-1432.

The Commission has provided standards for determining whether a significant hazards consideration exists as stated in 10 CFR 50.92. A proposed amendment to an operating license for a facility involves a no significant hazards consideration if operation of the facility, in accordance with a proposed amendment, would not 1) involve a significant increase in the probability or consequences of an accident previously evaluated; 2) create the possibility of a new or different kind of accident from any accident previously evaluated; or 3) involve a significant reduction in a margin of safety. A discussion of these standards as they relate to this amendment request follows:

TECHNICAL CHANGES - LESS RESTRICTIVE
(ITS 3.8.1 Discussion of Changes Labeled L.1) (continued)

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

> The proposed changes to CTS 4.8.1.1.2.d.3, 4.8.1.1.2.d.4, 4.8.1.1.d.5, and 4.8.1.1.d.10 allow PVNGS to take credit for SRs if a DG start occurs in the event of an actual actuation signal is received. ITS SR 3.8.1.11, 3.8.1.12, SR 3.8.1.19, and SR 3.8.1.17, respectively, require verification using an actual or simulated actuation signal instead of just a test signal. OPERABILITY is adequately demonstrated in either case since the components are not capable of discriminating between an actual or simulated actuation signal. This change will not affect the probability of an accident. Crediting a DG start in the event of an actual actuation signal is not an initiator of any analyzed event. The consequences of an accident is not significantly affected by this change. The change does not alter assumptions relative to the mitigation of an analyzed event. Therefore, the change will not involve a significant increase in the probability or consequence of an accident previously evaluated.

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

> The proposed change crediting a DG start in the event of an actual actuation signal does not physically alter the plant (no new or different type of equipment will be installed). The change does not require any new or unusual operator actions. Therefore, this change does not create the possibility of a new or different kind of accident from any accident previously evaluated.

Standard 3.-- Does the proposed change involve a significant reduction in a margin of safety?

> The proposed change credits a DG start in the event of an actual actuation signal. The margin of safety is not affected by this change. The reason for the change is that OPERABILITY is adequately demonstrated in either case since the components are not capable of discriminating between an actual or simulated actuation signal. Therefore, the change does not involve a significant reduction in a margin of safety.

CE STS
NUREG-1432 REV. 1
SPECIFICATION 3.8.2
MARK UP

<CTS>
<DOC>

3.8 ELECTRICAL POWER SYSTEMS

3.8.2 AC Sources—Shutdown

<3.8.1.2> LCO 3.8.2 The following AC electrical power sources shall be OPERABLE: (4)

<3.8.1.2.a> 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

<3.8.1.2.b> 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,
<DOC M.1> During movement of irradiated fuel assemblies, with the core offloaded (5)

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
<Action> <Note 1> 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. ----------------------------	
<DOC M.2>	A.1 Declare affected required feature(s) with no offsite power available inoperable.	Immediately
	OR	
<Action 1>	A.2.1 Suspend CORE ALTERATIONS.	Immediately
	AND	
		(continued)

<CTS>
<DOC>

ACTIONS

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

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.8.2.1	-------------------NOTE------------------- The following SRs are not required to be performed: SR 3.8.1.3, SR 3.8.1.9 through SR 3.8.1.11, SR 3.8.1.13 through SR 3.8.1.16, SR 3.8.1.18, and SR 3.8.1.19. --	
	For AC sources required to be OPERABLE, the SRs of Specification 3.8.1, "AC Sources—Operating," except SR 3.8.1.8, SR 3.8.1.17, and SR 3.8.1.20, are applicable. 3.8.1.12,	In accordance with applicable SRs

1

CE STS
NUREG-1432 REV. 1
SPECIFICATION 3.8.2
BASES MARK UP

B 3.8 ELECTRICAL POWER SYSTEMS

B 3.8.2 AC Sources—Shutdown

BASES

BACKGROUND

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

APPLICABLE SAFETY ANALYSES

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

with the core offloaded

5

3

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

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

c. Adequate AC electrical power is provided to mitigate events postulated during shutdown, such as a fuel handling accident.

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

During MODES 1, 2, 3, and 4, various deviations from the analysis assumptions and design requirements are allowed

(continued)

BASES

APPLICABLE SAFETY ANALYSES (continued)

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

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

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

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

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

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

3

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

LCO

One offsite circuit capable of supplying the onsite Class 1E power distribution subsystem(s) of LCO 3.8.10, "Distribution Systems—Shutdown," ensures that all required loads are powered from offsite power. An OPERABLE DG, associated with 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

(continued)

BASES

LCO (continued)

offsite circuit. Together, OPERABILITY of the required offsite circuit and DG ensures the availability of sufficient AC sources to operate the unit in a safe manner and to mitigate the consequences of postulated events during shutdown (e.g., fuel handling accidents).

The qualified offsite circuit must be capable of maintaining rated frequency and voltage, and accepting required loads during an accident, while connected to the Engineered Safety Feature (ESF) bus(es). ~~Qualified offsite circuits are those that are described in the FSAR and are part of the licensing basis for the unit.~~ 4

~~Offsite circuit #1 consists of Safeguards Transformer B, which is supplied from Switchyard Bus B, and is fed through breaker 52-3 powering the ESF transformer XNB01, which, in turn, powers the #1 ESF bus through its normal feeder breaker. The second offsite circuit consists of the Startup Transformer, which is normally fed from the Switchyard Bus A, and is fed through breaker PA 0201 powering the ESF transformer, which, in turn, powers the #2 ESF bus through its normal feeder breaker.~~ 2

The DG must be capable of starting, accelerating to rated speed and voltage, connecting to its respective ESF bus on detection of bus undervoltage, and accepting required loads. This sequence must be accomplished within (10) seconds. The DG must be capable of accepting required loads within the assumed loading sequence intervals, and must continue to operate until offsite power can be restored to the ESF buses. These capabilities are required to be met from a variety of initial conditions such as DG in standby with the engine hot and DG in standby at ~~ambient~~ Keep-warm conditions. 2

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

[In addition, proper sequencer operation is an integral part of offsite circuit OPERABILITY since its inoperability impacts on the ability to start and maintain energized loads required OPERABLE by LCO 3.8.10.]

(continued)

BASES

LCO (continued)

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

APPLICABILITY

The AC sources required to be OPERABLE in MODES 5 and ~~6~~ 5 and during movement of irradiated fuel assemblies with the core offloaded provide assurance that: 3 5

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

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 a cold shutdown condition or refueling condition.

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

ACTIONS

A.1

An offsite circuit would be considered inoperable if it were not available to one required ESF train. Although two trains are required by LCO 3.8.10, the remaining train with offsite power available may be capable of supporting sufficient required features to allow continuation of CORE ALTERATIONS and fuel movement. By the allowance of the option to declare required features inoperable, with no offsite power available, appropriate restrictions will be implemented in accordance with the affected required features LCO's ACTIONS.

(continued)

BASES

ACTIONS (continued)

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

With the offsite circuit not available to all required trains, the option would still exist to declare all required features inoperable. Since this option may involve undesired administrative efforts, the allowance for sufficiently conservative actions is made. With the required DG inoperable, the minimum required diversity of AC power sources is not available. It is, therefore, required to suspend CORE ALTERATIONS, movement of irradiated fuel assemblies, and operations involving positive reactivity additions. The Required Action to suspend positive reactivity additions does not preclude actions to maintain or increase reactor vessel inventory provided the required SDM is maintained.

Suspension of these activities does not preclude completion of actions to establish a safe conservative condition. These actions minimize the probability of the occurrence of postulated events. It is further required to immediately initiate action to restore the required AC sources and to continue this action until restoration is accomplished in order to provide the necessary AC power to the unit safety systems. 3

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 ESF bus, the ACTIONS for LCO 3.8.10 must be immediately entered. This Note allows Condition A to provide requirements for the loss of the offsite circuit, whether or not a train is de-energized. LCO 3.8.10 provides the appropriate restrictions for the situation involving a de-energized train.

(continued)

BASES (continued)

SURVEILLANCE REQUIREMENTS

SR 3.8.2.1

SR 3.8.2.1 requires the SRs from LCO 3.8.1 that are necessary for ensuring the OPERABILITY of the AC sources in other than MODES 1, 2, 3, and 4. SR 3.8.1.8 is not required to be met since only one offsite circuit is required to be OPERABLE. SR 3.8.1.17 is not required to be met because the required OPERABLE DG(s) is not required to undergo periods of being synchronized to the offsite circuit. SR 3.8.1.20 is excepted because starting independence is not required with DG(s) that are not required to be OPERABLE.

NEW TEXT ① ③

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

REFERENCES

None.

CEOG STS BASES SR 3.8.2.1
Page B 3.8-40

The SRs that are required to be performed are SR 3.8.1.1, SR 3.8.1.2, SR 3.8.1.4, SR 3.8.1.5, SR 3.8.1.6, and SR 3.8.1.7. The SRs listed in the Note are not required to be performed as a condition of OPERABILITY because their performance would unnecessarily challenge the only remaining OPERABLE DG or offsite circuit.

The following SRs have a specific MODE restraint such that the SR shall not be performed in MODES 1, 2, 3, or 4: SR 3.8.1.9, SR 3.8.1.11, SR 3.8.1.12, SR 3.8.1.16, SR 3.8.1.17, SR 3.8.1.18, and SR 3.8.1.19.

The reasons for the exception to SR 3.8.2.1 applicability are as follows: SR 3.8.1.8 is not applicable since only one offsite circuit is required to be OPERABLE and an alternate offsite circuit may not be available; SR 3.8.1.12 and SR 3.8.1.17 are not applicable because the ESF functions (i.e., AFAS and SIAS) are not required to be OPERABLE during shutdown; SR 3.8.1.17 is not applicable because the required OPERABLE DG(s) is not required to undergo periods of being load tested (parallel to the offsite circuit). SR 3.8.1.20 is excepted because starting independence is not required with DG(s) that are not required to be OPERABLE.

NUREG-1432 EXCEPTIONS
SPECIFICATION 3.8.2

1. NUREG-1432 SR 3.8.2.1 states that the following SRs are not applicable for the required AC sources to be OPERABLE: SR 3.8.1.8, SR 3.8.1.17, and SR 3.8.1.20. ITS 3.8.2.1 has added, that in addition to the above SRs, SR 3.8.1.12 is not applicable.

   SR 3.8.1.8 is not applicable since only one offsite circuit is required to be OPERABLE and an alternate offsite circuit may not be available. SR 3.8.1.12 and SR 3.8.1.17 are not applicable because the ESF functions (i.e., AFAS and SIAS) are not required to be OPERABLE during shutdown. In addition, SR 3.8.1.17 is not applicable because the required OPERABLE DG(s) is not required to undergo periods of being load tested (parallel to the offsite circuit). SR 3.8.1.20 is excepted because starting independence is not required with DG(s) that are not required to be OPERABLE.

2. This section of the Bases has been modified to provide plant specific titles, values, or system design.

3. Grammar and/or editorial changes have been made to enhance clarity. No technical or intent changes to the Specification are made by this change.

4. NUREG-1432 LCO 3.8.2 and the corresponding BASES refer to one QUALIFIED offsite circuit. PVNGS does not have unqualified circuits (e.g., SONGS has unqualified offsite circuits). Therefore, the qualification is not necessary. This exception is attributed to a plant specific design feature.

5. NUREG-1432 LCO 3.8.2 and the corresponding BASES' APPLICABILITY statement "During movement of irradiated fuel assemblies" has been suffixed with "with the core offloaded." Per the ITS writer's guide, this APPLICABILITY would also apply to AC Sources - Operating. This change has been incorporated into ITS 3.8.2 to keep Operations personnel from entering two TS, one for operating and one for shutdown, at the same time.

PVNGS CTS
SPECIFICATION 3.8.2
MARK UP

Specification 3.8.2

A.1

ELECTRICAL POWER SYSTEMS

A.C. SOURCES

SHUTDOWN

LIMITING CONDITION FOR OPERATION

3.8.2 — ~~3.8.1.2~~ The following AC electrical power sources shall be OPERABLE:

a. One circuit between the offsite transmission network and the onsite Class 1E distribution system, and

b. One emergency diesel generator (EDG). Required by LCO 3.8.10 — A.2

APPLICABILITY: MODES 5 and 6 DURING movement of irradiated fuel assemblies with the core offloaded — M.1

ACTION:

M.2

With less than the above minimum required AC electrical power sources OPERABLE,[1] immediately suspend all operations involving:

A.1 Declare affected required feature(s) with no offsite power available inoperable

Act A.2.1 & B.1 — 1. CORE ALTERATIONS,

Act A.2.2 & B.2 — 2. Movement of irradiated fuel assemblies,

Act A.2.3 & B.3 — 3. Positive reactivity additions, and

4. ~~Crane operation with loads over the fuel storage pool.~~ — LA.1

Act A.2.4 & B.4 — Immediately initiate action to restore the required sources to OPERABLE status.

SURVEILLANCE REQUIREMENTS

SR 3.8.2.1 — ~~4.8.1.2~~ For AC sources required to be OPERABLE, the SRs of TS LCO 3.8.1.1, AC Sources - Operating," except SR ~~4.8.1.1.1.b~~, SR ~~4.8.1.1.2.d.4~~, SR ~~4.8.1.1.2.d.10~~ and SR ~~4.8.1.1.2.e~~ are applicable.[2]

3.8.1.17   3.8.1.20   3.8.1.8   3.8.1.12

Act A NOTE — [1] With no AC power source to one train as a result of one offsite circuit inoperable, enter applicable conditions and ACTIONs of TS LCO ~~3.8.3.2~~, "Onsite Power Distribution Systems - Shutdown." 3.8.10

SR 3.8.2.1 NOTE — [2] The following SRs are not required to be performed:
~~SR 4.8.1.1.2.a.3~~ and
~~SR 4.8.1.1.2.d.~~

3.8.1.3, 3.8.1.9 – 3.8.1.11, 3.8.1.13 – 3.8.1.16, 3.8.1.18, and 3.8.1.19 — A.3

DISCUSSION OF CHANGES
SPECIFICATION 3.8.2

ADMINISTRATIVE CHANGES

A.1 All reformatting and renumbering is in accordance with the Combustion Engineering Plant (CEOG) Standard Technical specifications NUREG-1432, Rev. 1 (NUREG-1432). As a result, the Palo Verde Nuclear Generating Station (PVNGS) Improved Technical Specifications (ITS) should be more readable, and therefore understandable, by plant operators as well as other users. During the reformatting and renumbering of the ITS, no technical changes (either actual or interpretational) to the Current Technical Specification (CTS) were made unless they were identified and justified.

Editorial rewording (either adding or deleting) is made consistent with NUREG-1432. During NUREG-1432 development, certain wording preferences or English language conventions were adopted which resulted in no technical changes (either actual or interpretational) to the CTS.

Additional information has also been added to more fully describe each subsection. This wording is consistent with NUREG-1432. Since the design is already approved by the NRC, adding more detail does not result in a technical change.

A.2 CTS LCO 3.8.1.2.a and b states, "a. One circuit between the offsite transmission network and the onsite Class 1E distribution system, and b. One diesel generator (DG)." ITS LCO 3.8.2 states, "a. One 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." The words from ITS LCO 3.8.2.a and b are being added for clarity, and the change is administrative only, ensuring that all required loads are powered from offsite power, or that a diverse power source is available to provide electrical power support, assuming a loss of the offsite circuit. This change does not impact safety and is consistent with NUREG-1432.

A.3 CTS 3.8.1.2 Note 2 stated that all of the 18 month SRs (CTS SR 4.8.1.1.2.d) were not required to be performed. The list associated with the Note for ITS SR 3.8.2.1 of 18 month SRs not required to be performed excludes ITS SR 3.8.1.12 (corresponds to 4.8.1.1.2.d.4) and ITS SR 3.8.1.17 (corresponds to 4.8.1.1.2.d.10). However, ITS SR 3.8.1.12 and SR 3.8.1.17 are not applicable to SR 3.8.2.1 because ESF functions (i.e., AFAS and SIAS) are not required to be OPERABLE during shutdown. In addition, SR 3.8.1.17 is not applicable because the required OPERABLE DG(s) is not required to undergo periods of being load tested (parallel to the offsite circuit). This change is administrative only, does not impact safety, and is consistent with NUREG-1432.

TECHNICAL CHANGES - MORE RESTRICTIVE

M.1 CTS 3.8.1.2 APPLICABILITY states, "MODES 5 and 6." ITS 3.8.2 APPLICABILITY states, "MODES 5 and 6, During movement of irradiated fuel assemblies with the core offloaded." This change places an additional restriction on plant operation when defueled and fuel movement in the fuel storage pool is ongoing. This change assures that systems needed to mitigate a fuel handling accident are available. The CTS would require features necessary to mitigate the events that can lead to core damage during shutdown, and instrument and control capability for monitoring and maintaining the unit in Modes 5 and 6. However, CTS did not explicitly cover the condition when moving irradiated fuel with the core offloaded. The additional requirement is necessary to ensure adequate AC power is available when the vessel is unloaded and irradiated fuel is being handled. Although this is a PVNGS current operating practice, CTS did not specifically address this condition. The addition of this requirement constitutes a more restrictive change to plant operation.

M.2 CTS 3.8.1.2 Action statement does not contain an Action as specified in ITS 3.8.2.A.1 to immediately declare affected required feature(s) with no offsite power available inoperable. An offsite circuit would be considered inoperable if it were not available to one required ESF train. Although two trains are required by LCO 3.8.10, the remaining train with offsite power available may be capable of supporting sufficient required features to allow continuation of CORE ALTERATIONS and fuel movement. By the allowance of the option to declare required features inoperable, with no offsite power available, appropriate restrictions will be implemented in accordance with the affected required features LCO's Actions. The addition of this requirement constitutes a more restrictive change to plant operation. This change is consistent with NUREG-1432.

TECHNICAL CHANGES - RELOCATIONS

LA.1 ITS 3.8.2.A and B specifies three conditions that are to be met if the required offsite circuit or DG is inoperable: Suspend CORE ALTERATIONS; Suspend movement of irradiated fuel assemblies; and Initiate action to suspend operations involving positive reactivity additions. Suspension of these activities does not preclude completion of actions to establish a safe conservative condition. These Actions minimize the probability or the occurrence of postulated events.

CTS 3.8.1.2 Action statement included suspending crane operation with loads over the fuel storage pool. This is a precautionary measure in preventing a fuel handling accident without the required AC electrical sources. However, with the addition of "During movement of irradiated fuel assemblies" to the Applicability section, an additional restriction on plant operation when defueled and fuel movement in the fuel storage pool is ongoing has been imposed. This change assures that systems needed to mitigate a fuel handling accident are available. Therefore, an equivalent result has been attained and the specific requirement to suspend crane operation is no longer required. However, the requirement will be specifically stated in an Operations procedure. This change is consistent with NUREG-1432.

TECHNICAL CHANGES - LESS RESTRICTIVE

None

TECHNICAL CHANGES - CTS CHANGES

None

NO SIGNIFICANT HAZARDS CONSIDERATION
SPECIFICATION 3.8.2

ADMINISTRATIVE CHANGES
(ITS 3.8.2 Discussion of Changes Labeled A.1, A.2, and A.3)

Arizona Public Service Company, Palo Verde Nuclear Generating Station (PVNGS), Units 1, 2, and 3, is converting to the ITS as outlined in NUREG-1432, "Standard Technical Specifications, Combustion Engineering Plants." The proposed changes involve the reformatting, renumbering, rewording of the Technical Specifications (TS) and Bases with no change in intent, and the incorporation of current operating practices consistent with NUREG-1432. These changes, since they do not involve technical changes to the Current TS (CTS), are administrative. Below are the No Significant Hazards Consideration (NSHC) for the conversion of this Section/Chapter to NUREG-1432.

The Commission has provided standards for determining whether a significant hazards consideration exists as stated in 10 CFR 50.92. A proposed amendment to an operating license for a facility involves a no significant hazards consideration if operation of the facility, in accordance with a proposed amendment, would not 1) involve a significant increase in the probability or consequences of an accident previously evaluated; 2) create the possibility of a new or different kind of accident from any accident previously evaluated; or 3) involve a significant reduction in a margin of safety. A discussion of these standards as they relate to this amendment request follows:

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

The proposed changes involve reformatting, renumbering, and rewording of the CTS and Bases along with incorporation of PVNGS current operating practices and other changes to the CTS as discussed in the specific Discussion of Changes listed above in order to be consistent with NUREG-1432. The reformatting, renumbering, and rewording along with the other changes listed above, involves no technical changes to the CTS. Specifically, there will be no change in the requirements imposed on PVNGS due to these changes. During development of NUREG-1432, certain wording preferences or English language conventions were adopted. The proposed changes to this Section/Chapter are administrative in nature and do not impact initiators of any analyzed events. They also do not impact the assumed mitigation of accidents or transient events. Therefore, these changes do not involve a significant increase in the probability or consequences of an accident previously evaluated.

ADMINISTRATIVE CHANGES
(ITS 3.8.2 Discussion of Changes Labeled A.1, A.2, and A.3) (continued)

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

The proposed changes involve reformatting, renumbering, and rewording of the CTS, along with the incorporation of PVNGS current operating practices and other changes, as discussed, in order to be consistent with NUREG-1432. The proposed changes do not involve a physical alteration of the plant (no new or different type of equipment will be installed) or change the methods governing normal plant operation. The proposed changes will not impose any new or different requirements or eliminate any existing requirements. Therefore, these changes do not create the possibility of a new or different kind of accident from any accident previously evaluated.

Standard 3.-- Does the proposed change involve a significant reduction in a margin of safety?

The proposed changes involve reformatting, renumbering, and rewording of the CTS, along with the incorporation of PVNGS current operating practices and other changes, as discussed, in order to be consistent with NUREG-1432. The proposed changes are administrative in nature and will not involve any technical changes. The proposed changes will not reduce a margin of safety because they have no impact on any safety analysis assumptions. Also, because these changes are administrative in nature, no question of safety is involved. Therefore, these changes do not involve a significant reduction in a margin of safety.

TECHNICAL CHANGES - MORE RESTRICTIVE
(ITS 3.8.2 Discussion of Changes Labeled M.1 and M.2)

Arizona Public Service Company, Palo Verde Nuclear Generating Station (PVNGS), Units 1, 2, and 3 is converting to the ITS as outlined in NUREG-1432. This particular NSHC is for the changes labeled "Technical Changes - More Restrictive" described in the specific Discussion of Changes listed above. The proposed changes incorporate more restrictive changes into the CTS by either making current requirements more stringent or adding new requirements which currently do not exist.

The Commission has provided standards for determining whether a significant hazards consideration exists as stated in 10 CFR 50.92. A proposed amendment to an operating license for a facility involves a no significant hazards consideration if operation of the facility, in accordance with a proposed amendment, would not 1) involve a significant increase in the probability or consequences of an accident previously evaluated; 2) create the possibility of a new or different kind of accident from any accident previously evaluated; or 3) involve a significant reduction in a margin of safety. A discussion of these standards as they relate to this amendment request follows:

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

> The proposed changes provide more stringent requirements than previously existed in the CTS. The more stringent requirements will not result in operation that will increase the probability of initiating an analyzed event. If anything, the new requirements may decrease the probability or consequences of an analyzed event by incorporating the more restrictive changes discussed in the specific Discussion of Changes listed above. These changes will not alter assumptions relative to mitigation of an accident or transient event. The more restrictive requirements will not alter the operation and will continue to ensure process variables, structures, systems, or components are maintained consistent with safety analyses and licensing basis. These changes have been reviewed to ensure that no previously evaluated accident has been adversely affected. Therefore, these changes will not involve a significant increase in the probability or consequences of an accident evaluated.

TECHNICAL CHANGES - MORE RESTRICTIVE
(ITS 3.8.2 Discussion of Changes Labeled M.1 and M.2) (continued)

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

Making existing requirements more restrictive and adding more restrictive requirements to the CTS will not alter the plant configuration (no new or different type of equipment will be installed) or change the methods governing normal plant operation. These changes do impose different requirements. However, they are consistent with the assumptions made in the safety analyses, licensing basis, and NUREG-1432. Therefore, these changes will not create the possibility of a new or different kind of accident from any accident previously evaluated.

Standard 3.-- Does the proposed change involve a significant reduction in a margin of safety?

The proposed changes provide more stringent requirements than previously existed in the CTS. An evaluation of these changes concluded that adding these more restrictive requirements either increases or has no impact on the margin of safety. The changes provide additional restrictions which may enhance plant safety. These changes maintain requirements of the safety analysis, licensing basis, and NUREG-1432. As such, no question of safety is involved. Therefore, these changes will not involve a significant reduction in a margin of safety.

TECHNICAL CHANGES - RELOCATIONS
(ITS 3.8.2 Discussion of Changes Labeled LA.1)

Arizona Public Service Company, Palo Verde Nuclear Generating Station (PVNGS), Units 1, 2, and 3 is converting to the ITS as outlined in NUREG-1432. The proposed changes, since detail is being removed from the CTS to a Licensee Controlled Document, are less restrictive. The descriptions of these changes are in the Discussion of Changes listed above.

The Commission has provided standards for determining whether a significant hazards consideration exists as stated in 10 CFR 50.92. A proposed amendment to an operating license for a facility involves a no significant hazards consideration if operation of the facility, in accordance with a proposed amendment, would not 1) involve a significant increase in the probability or consequences of an accident previously evaluated; 2) create the possibility of a new or different kind of accident from any accident previously evaluated; or 3) involve a significant reduction in a margin of safety. A discussion of these standards as they relate to this amendment request follows:

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

> The proposed changes relocate requirements from the CTS to a Licensee Controlled Document. These changes do not result in any hardware changes or changes to plant operating practices. The details being relocated are not assumed to be an initiator of any analyzed event. The Licensee Controlled Document containing the relocated requirements will be maintained using the provisions of 10 CFR 50.59 or other specified control processes and is subject to the change control process in the Administrative Controls Section of the ITS. Since any changes to a Licensee Controlled Document will be evaluated, no increase in the probability or consequences of an accident previously evaluated will be allowed. Therefore, these changes will not involve a significant increase in the probability or consequences of an accident previously evaluated.

TECHNICAL CHANGES - RELOCATIONS
(ITS 3.8.2 Discussion of Changes Labeled LA.1) (continued)

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

The proposed changes relocate requirements from the CTS to a Licensee Controlled Document. These changes will not alter the plant configuration (no new or different type of equipment will be installed) or change the methods governing normal plant operation. These changes will not impose different requirements and adequate control of information will still be maintained. These changes will not alter assumptions made in the safety analysis or licensing basis. Therefore, these changes will not create the possibility of a new or different kind of accident from any accident previously evaluated.

Standard 3.-- Does the proposed change involve a significant reduction in a margin of safety?

The proposed changes relocate requirements from the CTS to a Licensee Controlled Document. These changes will not reduce a margin of safety since they have no impact on any safety analysis assumptions. In addition, the requirements to be transposed from the CTS to the Licensee Controlled Document are the same as the CTS. Since any future changes to this Licensee Controlled Document will be evaluated per the requirements of 10 CFR 50.59, or other specified control processes, no reduction (significant or insignificant) in a margin of safety will be allowed. Therefore, these changes will not involve a significant reduction in a margin of safety.

The NRC review provides a certain margin of safety, and although this review will no longer be performed prior to submittal, the NRC still inspects the 10 CFR 50.59 process. The proposed changes are consistent with NUREG-1432, which was approved by the NRC Staff. The change controls for proposed relocated details and requirements provide an acceptable level of regulatory authority. Revising the CTS to reflect the approved level of detail per NUREG-1432 reinforces the conclusion that there is not a significant reduction in the margin of safety. Therefore, revising the CTS to reflect the NRC accepted level of detail and requirements ensures no reduction in a margin of safety.

CE STS
NUREG-1432 REV. 1
SPECIFICATION 3.8.3
MARK UP

<CTS>
<DOC>

3.8 ELECTRICAL POWER SYSTEMS

3.8.3 Diesel Fuel Oil, Lube Oil, and Starting Air

<3.8.1.3.1>
<DOC M.1>

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

APPLICABILITY: When associated DG is required to be OPERABLE.

ACTIONS

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

	CONDITION	REQUIRED ACTION	COMPLETION TIME	
<Action a>	A. One or more DGs with fuel level < [33,000] gal and > [28,285] gal in storage tank.	A.1 Restore fuel oil level to within limits. < 80% indicated fuel level and ≥ 71% indicated fuel level	48 hours	1
<DOC M.1>	B. One or more DGs with lube oil inventory < [500] gal and > [425] gal. 168 144	B.1 Restore lube oil inventory to within limits.	48 hours	
<DOC M.2>	C. One or more DGs with stored fuel oil total particulates not within limits.	C.1 Restore fuel oil total particulates to within limits.	7 days	

(continued)

ACTIONS (continued)

	CONDITION	REQUIRED ACTION	COMPLETION TIME	
<DOC M.2>	D. One or more DGs with new fuel oil properties not within limits.	D.1 Restore stored fuel oil properties to within limits.	30 days	
<DOC M.1>	E. One or more DGs with a required starting air receiver pressure < ~~[225]~~ 235 psig and ≥ ~~[125]~~ 185 psig.	E.1 Restore starting air receiver pressure to ≥ ~~[225]~~ 235 psig.	48 hours	1
<DOC A.2>	F. Required Action and associated Completion Time not met. OR One or more DGs with diesel fuel oil, lube oil, or starting air subsystem ~~not within limits~~ inoperable for reasons other than Condition A, B, C, D, or E.	F.1 Declare associated DG inoperable.	Immediately	7

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE		FREQUENCY	
<4.8.1.3.1.1>	SR 3.8.3.1	Verify each fuel oil storage tank contains ≥ ~~[33,000] gal of fuel~~ 80% indicated fuel level	31 days	1

(continued)

SURVEILLANCE REQUIREMENTS (continued)

	SURVEILLANCE		FREQUENCY
<DOC M.1>	SR 3.8.3.2	Verify lubricating oil inventory is ≥ ~~[500]~~ 168 gal.	31 days
<DOC M.2>	SR 3.8.3.3	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
<DOC M.1>	SR 3.8.3.4	Verify each DG air start ing receiver pressure is ≥ ~~[225]~~ 235 psig.	31 days
<DOC M.3>	SR 3.8.3.5	Check for and remove accumulated water from each fuel oil storage tank.	~~[31]~~ 92 days
	~~SR 3.8.3.6~~	~~For each fuel oil storage tank:~~ ~~a. Drain the fuel oil;~~ ~~b. Remove the sediment; and~~ ~~c. Clean the tank.~~	~~10 years~~

6

CE STS
NUREG-1432 REV. 1
SPECIFICATION 3.8.3
BASES MARK UP

B 3.8 ELECTRICAL POWER SYSTEMS

B 3.8.3 Diesel Fuel Oil, Lube Oil, and Starting Air

BASES

BACKGROUND

Each diesel generator (DG) is provided with a storage tank having a fuel oil capacity sufficient to operate that diesel for a period of 7 days, while the DG is supplying maximum post loss of coolant accident load demand as discussed in the FSAR, Section [9.5.4.2] (Ref. 1). The maximum load demand is calculated using the assumption that at least two DGs are available. This onsite fuel oil capacity is sufficient to operate the DGs for longer than the time to replenish the onsite supply from outside sources.

Fuel oil is transferred from storage tank to day tank by a ~~either of two~~ transfer pump~~s~~ associated with each storage tank. Redundancy of pumps and piping precludes the failure of one pump, or the rupture of any pipe, valve, or tank to result in the loss of more than one DG. All outside tanks, pumps, and piping are located underground. (2)

For proper operation of the standby DGs, it is necessary to ensure the proper quality of the fuel oil. Regulatory Guide 1.137 (Ref. 2) addresses the recommended fuel oil practices as supplemented by ANSI N195-1976 (Ref. 3). The fuel oil properties governed by these SRs are the water and sediment content, the kinematic viscosity, specific gravity (or API gravity), and impurity level.

The DG lubrication system is designed to provide sufficient lubrication to permit proper operation of its associated DG under all loading conditions. The system is required to circulate the lube oil to the diesel engine working surfaces and to remove excess heat generated by friction during operation. Each engine oil sump contains an inventory capable of supporting a minimum of [7] days of operation. ~~[The onsite storage in addition to the engine oil sump is sufficient to ensure 7 days of continuous operation.]~~ This supply is sufficient supply to allow the operator to replenish lube oil from outside sources. (2)

~~Each DG has an air start system with adequate capacity for five successive start attempts on the DG without recharging the air start receiver(s).~~ NEW TEXT (2)

(continued)

CEOG STS BASES 3.8.3 BACKGROUND
Page B 3.8-41

Each DG has independent and redundant starting air subsystems. A DG starting subsystem provides a stored compressed air supply sufficient for accomplishing a DG start in ≤ 10 seconds. Each air receiver has been sized to accomplish 5 consecutive DG starts from the receiver design working pressure without being refilled.

BASES (continued)

APPLICABLE SAFETY ANALYSES

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

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

LCO

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

The starting air system is required to have a minimum capacity for five successive DG start attempts without recharging the air start receivers.

APPLICABILITY

The AC sources (LCO 3.8.1 and LCO 3.8.2) are required to ensure the availability of the required power to shut down the reactor and maintain it in a safe shutdown condition after an AOO or a postulated DBA. Since stored diesel fuel oil, lube oil, and starting air subsystems support LCO 3.8.1 and LCO 3.8.2, stored diesel fuel oil, lube oil and starting

(continued)

BASES

APPLICABILITY (continued)

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.

1

A.1

(i.e., < 80% indicated fuel level)

(69,700 gallons of fuel)

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

(60,500 gallons of fuel)

OR ≥ 71% indicated fuel level

B.1

168

2

With lube oil inventory < 500 gal, sufficient lubricating oil to support 7 days of continuous DG operation at full load conditions may not be available. However, the Condition is restricted to lube oil volume reductions that maintain at least a 6 day supply. This restriction allows sufficient time to obtain the requisite replacement volume. A period of 48 hours is considered sufficient to complete

(continued)

BASES

ACTIONS

B.1 (continued)

restoration of the required volume prior to declaring the DG inoperable. This period is acceptable based on the remaining capacity (> 6 days), the low rate of usage, the fact that procedures will be initiated to obtain replenishment, and the low probability of an event during this brief period.

2

INSERT NEW TEXT

C.1

3

This Condition is entered as a result of a failure to meet the acceptance criterion of SR 3.8.3.5. Normally, trending of particulate levels allows sufficient time to correct high particulate levels prior to reaching the limit of acceptability. Poor sample procedures (bottom sampling), contaminated sampling equipment, and errors in laboratory analysis can produce failures that do not follow a trend. Since the presence of particulates does not mean failure of the fuel oil to burn properly in the diesel engine, and particulate concentration is unlikely to change significantly between Surveillance Frequency intervals, and proper engine performance has been recently demonstrated (within 31 days), it is prudent to allow a brief period prior to declaring the associated DG inoperable. The 7 day Completion Time allows for further evaluation, resampling, and re-analysis of the DG fuel oil.

3

D.1

3

With the new fuel oil properties defined in the Bases for SR 3.8.3.4 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 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.

3

(continued)

CEOG STS BASES 3.8.3 ACTION B.1
Page B 3.8-44

The minimum usable level used to measure available gallons is assumed to be the top of the oil suction header in the crankcase. This is a conservative assumption, since the suction openings are in the bottom of the header, about 6 inches lower.

BASES

ACTIONS (continued)

E.1

235

~~With starting air receiver pressure < 225 psig, sufficient capacity for five successive DG start attempts does not exist. However, as long as the receiver pressure is > 125 psig, there is adequate capacity for at least one start attempt, and the DG can be considered OPERABLE while the air receiver pressure is restored to the required limit. A period of 48 hours is considered sufficient to complete restoration to the required pressure prior to declaring the DG inoperable. This period is acceptable based on the remaining air start capacity, the fact that most DG starts are accomplished on the first attempt, and the low probability of an event during this brief period.~~

185

(2)

NEW TEXT

F.1

inoperable

(7)

With a Required Action and associated Completion Time not met, or one or more DGs with diesel fuel oil, lube oil, or starting air subsystem ~~not within limits~~ for reasons other than addressed by Conditions A through E, 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 to support each DG's operation for 7 days at full load. The 7 day period is sufficient time to place the unit in a safe shutdown condition and to bring in replenishment fuel from an offsite location.

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

SR 3.8.3.2

This Surveillance ensures that sufficient lube oil inventory is available to support at least 7 days of full load

(continued)

CEOG STS BASES 3.8.3 ACTION E.1
Page B 3.8-45

There exist two independent and redundant starting air receivers for each DG. Each receiver is sized to accomplish 5 DG starts from its normal operating pressure of 250 psig, and each will start the DG in ≤ 10 seconds with a minimum pressure of 185 psig. Therefore, the DG is considered OPERABLE with one air receiver at its normal operating pressure of ≥ 235 psig indicated. If the one starting air receiver is < 235 psig and ≥ 185 psig, the starting air system is degraded and a period of 48 hours is considered sufficient to complete restoration to the required pressure prior to declaring the DG inoperable. This 48-hour period is acceptable based on the minimum starting air capacity (≥ 185 psig), the fact that the DG start must be accomplished on the first attempt (there are no sequencial starts in emergency mode), and the low probability of an event during this brief period.

Starting air receiver pressure is expected to decrease below 235 psig but remain above 185 psig during any start attempt. Following a start attempt, a recovery period of 30 minutes is considered an acceptable period of time to recharge the air receivers prior to entry into ACTION E.1

BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.3.2 (continued) 168

(2)

operation for each DG. The [500] gal requirement is based on the DG manufacturer consumption values for the run time of the DG. Implicit in this SR is the requirement to verify the capability to transfer the lube oil from its storage location to the DG, when the DG lube oil sump does not hold adequate inventory for 7 days of full load operation without the level reaching the manufacturer recommended minimum level.

INSERT NEW TEXT

A 31 day Frequency is adequate to ensure that a sufficient lube oil supply is onsite, since DG starts and run time are closely monitored by the unit staff.

SR 3.8.3.3

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

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

b. Verify in accordance with the tests specified in ASTM D975-~~[ ]~~ (Ref. 6) that the sample has an absolute specific gravity at 60/60°F of ≥ 0.83 and ≤ 0.89, or an API gravity at 60°F of ≥ 27° and ≤ 39°, a kinematic viscosity at 40°C of ≥ 1.9 centistokes and ≤ 4.1 centistokes, and a flash point ≥ 125°F; and

(4)

c. ~~Verify that the new fuel oil has a clear and bright appearance with proper color when tested in accordance with ASTM D4176-[ ] (Ref. 6).~~ NEW TEXT

(continued)

CEOG STS BASES SR 3.8.3.2
Page B 3.8-46

The minimum usable level used to measure available gallons is assumed to be the top of the oil suction header in the crankcase. This is a conservative assumption, since the suction openings are in the bottom of the header, about 6 inches lower.

CEOG STS BASES SR 3.8.3.3
Page B 3.8-46

c. Verify in accordance with the tests specified in ASTM D1796 (Ref. 6) that the sample water and sediment is $\leq$ 0.05 percent volume.

BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.3.3 (continued)

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

Within 31 days following the initial new fuel oil sample, the fuel oil is analyzed to establish that the other properties specified in Table 1 of ASTM D975~~-[ ]~~ (Ref. 7) are met for new fuel oil when tested in accordance with ASTM D975~~-[ ]~~ (Ref. 6), except that the analysis for ~~sulfur~~ cetane number may be performed in accordance with ASTM ~~D1552-[ ]~~ D976 (Ref. 6) or ASTM ~~D2622-[ ]~~ D4737 (Ref. 6). The 31 day period is acceptable because the fuel oil properties of interest, even if they were not within stated limits, would not have an immediate effect on DG operation. This Surveillance ensures the availability of high quality fuel oil for the DGs. 5

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~~-[ ]~~, Method A (Ref. 6). This method involves a gravimetric determination of total particulate concentration in the fuel oil and has a limit of 10 mg/l. It is acceptable to obtain a field sample for subsequent laboratory testing in lieu of field testing. ~~[For those designs in which the total stored fuel oil volume is contained in two or more interconnected tanks,~~ ~~each~~ E ach tank must be considered and tested separately.~~]~~ 3

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

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.8.3.4

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. [A start cycle is defined by the DG vendor, but usually is measured in terms of time (seconds or cranking) or engine cranking speed.] 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 3.8.3.5

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 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, and contaminated fuel oil, and from breakdown of the fuel oil by bacteria. Frequent checking for and removal of accumulated water minimizes fouling and provides data regarding the watertight integrity of the fuel oil system. The Surveillance Frequencies are established by Regulatory Guide 1.137 (Ref. 2). This SR is for preventative maintenance. The presence of water does not necessarily represent failure of this SR provided the accumulated water is removed during performance of the Surveillance.

oil

3

92

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

~~SR 3.8.3.6~~

~~Draining of the fuel oil stored in the supply tanks, removal of accumulated sediment, and tank cleaning are required at 10 year intervals by Regulatory Guide 1.137 (Ref. 2), paragraph 2.f. This also requires the performance of the ASME Code, Section XI (Ref. 8), examinations of the tanks. To preclude the introduction of surfactants in the fuel oil system, the cleaning should be accomplished using sodium hypochlorite solutions, or their equivalent, rather than soap or detergents. This SR is for preventative maintenance. The presence of sediment does not necessarily represent a failure of this SR, provided that accumulated sediment is removed during performance of the Surveillance.~~

6

REFERENCES

1. FSAR, Section 9.5.4.2.
2. Regulatory Guide 1.137.
3. ANSI N195-1976, Appendix B.
4. FSAR, Chapter 6.
5. FSAR, Chapter 15.
6. ASTM Standards: D4057-[ ]; D975-[ ]; D4175-[ ]; D1552-[ ]; D2622-[ ]; S2276, Method A.

   NEW TEXT
7. ASTM Standards, D975, Table 1.
8. ASME, Boiler and Pressure Vessel Code, Section XI.

CEOG STS BASES REFERENCES
Page B 3.8-49

6. ASTM Standards: D4057-81; D975-91; D976-91; D4737-90; D1796-83; D2276-89, Method A.

NUREG-1432 EXCEPTIONS
SPECIFICATION 3.8.3

1. NUREG-1432 Action 3.8.3.A and SR 3.8.3.1 refer to a measuring unit of gallons (e.g., "< [33,000] gal and > [28, 285] gal"). ITS Action 3.8.3.A and SR 3.8.3.1 refer to a percentage of indicated fuel level (e.g., "< 80% indicated fuel level and ≥ 71% indicated fuel level"). The plant specific operating practice to determine if adequate fuel exists from the control room, and the CTS measuring unit, was selected for ITS. The Bases has also been revised to be consistent with the LCO/Surveillance. The Bases provides the corresponding gallon measuring unit for the indicated fuel level. This exception is attributed to a plant specific operating practice. This exception is also attributed to bracketed parameter carried over from CTS (i.e., 80% indicated fuel level).

2. This section of the Bases has been modified to provide plant specific titles, values, or system design.

3. NUREG-1432 Bases Action C.1 and D.1 (fuel oil properties) erroneously refer to SR 3.8.3.5 (water in storage tank) and SR 3.8.3.4 (air start receiver pressure) respectively. The correct reference for each Action should be SR 3.8.3.3 (fuel oil properties). The Safety Analysis section refers to Criterion 3 of NRC Policy Statement when it should refer to Criterion 3 of 10 CFR 50.36.

4. NUREG-1432 Bases SR 3.8.3.3 refers to a test to "verify that the new fuel oil has a clear and bright appearance with proper color... ." ITS replaces that test with a test to "verify in accordance with the tests specified in ASTM D1796 (Ref. 6) that the sample water and sediment is ≤ 0.05 percent volume." PVNGS currently tests for water and sediment to satisfy the requirements of Regulatory Guide 1.137. Although the test for clear and bright appearance performed in accordance with ASTM D4176 is simple, it is also subjective. The water and sediment tests yield equivalent to, or more reliable results for, the clear and bright testing. This exception is attributed to a plant specific operating practice.

5. NUREG-1432 Bases SR 3.8.3.3 refers to a sulfur analysis exception to Table 1 of ASTM D975-[ ]. Since the 1981 revision of ASTM D975, ASTM D975-91 now includes a sulfur analysis per ASTM 4294. Therefore, an exception to sulfur analysis is not longer required. However, ASTM D975-91 currently requires a specific cetane number test that PVNGS takes exception to due to the extensiveness and costliness of the test. Therefore, the cetane number test will be done in accordance with ASTM D976 or ASTM D4737, both viable alternative ASTM methods. This exception is attributed to a plant specific operating practice.

6. NUREG-1432 SR 3.8.3.6 refers to the 10 year drain and clean of the fuel oil storage tank. TSTF-02 has been approved by the NRC relocating this SR to the PM Program. Corresponding text in the BASES section has also been removed.

7. NUREG-1432 ACTION F.1 and corresponding BASES for ACTION F.1 refer to fuel oil, lube oil, or starting air "not within limits" for reasons other than addressed by Conditions A through E. NOT WITHIN LIMITS is an undefined term, and therefore compliance would be difficult. Therefore, nonconforming conditions will be reviewed for impact on operability on these systems as part of the PVNGS Corrective Action Program. In ITS ACTION F.1, "not within limits" has been replaced with "inoperable."

PVNGS CTS
SPECIFICATION 3.8.3
MARK UP

Specification 3.8.3

A.1

3.8 ELECTRICAL POWER SYSTEMS

~~A.C. SOURCES~~ , Lube oil, and Starting Air M.1

DIESEL FUEL OIL ~~STORAGE SYSTEM - DIESEL FUEL OIL REQUIREMENTS~~

LIMITING CONDITION FOR OPERATION

<LCO 3.8.3> ~~3.8.1.3.1~~ Each diesel fuel oil ~~storage system shall be within its limits.~~ INSERT 1

APPLICABILITY: When the associated EDG is required to be OPERABLE.

ACTION:

<ACT A> a. One or more ~~With either~~ EDG fuel oil storage Tank ~~system~~ < 80% indicated fuel level but ≥ 71% indicated fuel level, restore the fuel oil level to within its limit within 48 hours ~~or~~ declare the associated EDG inoperable.[1] <ACT F>

<ACT B> b. ~~With either EDG fuel oil storage system with stored fuel oil viscosity not within limits, restore fuel oil to within limits within 30 days or declare the associated EDG inoperable.~~[1] M.2 INSERT 3

<ACT C & ACT D> c. ~~With either EDG fuel oil storage system with stored fuel oil water and sediment not within limits, immediately declare the associated EDG inoperable.~~[1]

<ACT E ACT F> INSERT 4 M.1 A.2

NOTE

[1] A separate condition entry is allowed for each EDG.

ADD ACT B M.1 INSERT 2

SURVEILLANCE REQUIREMENTS

<SR 3.8.3.1> ~~4.8.1.3.1.1~~ At least once per 31 days, verify that the fuel level in the fuel storage tank is within its limits. ≥ 80% indicated fuel level

5.0 4.8.1.3.1.2 At least once per 92 days, verify that a sample of diesel fuel from the fuel storage tank obtained in accordance with ASTM-D4176-82 is within the acceptable limits specified in Table 1 of ASTM D975-81 when checked for viscosity, water, and sediment.

<SR 3.8.3.2 to 3.8.3.5> INSERT 5 M.1 M.2 M.3

INSERT 1:

LCO 3.8.3 The stored diesel fuel oil, lube oil, and starting air subsystem shall be within limits for each required diesel generator (DG). M.1

INSERT 2:

B. One or more DGs with lube oil inventory < 168 gal and > 144 gal.
B.1 Restore lube oil inventory to within limits within 48 hours M.1

INSERT 3:

C. One or more DGs with stored fuel oil total particulates not within limits.
C.1 Restore fuel oil total particulates to within limits within 7 days. M.2

D. One or more DGs with new fuel oil properties not within limits.
D.1 Restore stored fuel oil properties to within limits within 30 days. M.2

INSERT 4:

E. One or more DGs with starting air receiver pressure < 235 psig and ≥ 185 psig.
E.1 Restore starting air receiver pressure to ≥ 235 psig within 48 hours M.1

F. Required Action and associated Completion Time not met <u>OR</u> One or more DGs with diesel fuel oil, lube oil, or starting air subsystem inoperable for reasons other than Condition A, B, C, D, or E.
F.1 Declare associated DG inoperable immediately. A.2

INSERT 5:

SR 3.8.3.2 Verify lubricating oil inventory is ≥ 168 gal every 31 days. M.1

SR 3.8.3.3 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. M.2

SR 3.8.3.4 Verify each DG starting air receiver pressure is ≥ 235 psig every 31 days. M.1

SR 3.8.3.5 Check for and remove accumulated water from each fuel oil storage tank every 92 days. M.3

(Ri 1)

ELECTRICAL POWER SYSTEMS

A.C. SOURCES

DIESEL FUEL OIL STORAGE SYSTEM - CATHODIC PROTECTION

LIMITING CONDITION FOR OPERATION

3.8.1.3.2 The Cathodic Protection System associated with the EDG diesel fuel oil storage tanks shall be OPERABLE.

APPLICABILITY: At all times.

ACTION:

a. With the cathodic protection system inoperable for more than 30 days, prepare and submit a Special Report to the Commission pursuant to TS 6.9.2 within the next 10 days outlining the cause of the malfunction and the plans for restoring the system to OPERABLE status.

b. The provisions of TS 3.0.3 are not applicable.

SURVEILLANCE REQUIREMENTS

4.8.1.3.2 Verify that the cathodic protection system is OPERABLE at the following time intervals:

1. Verify at least once per 61 days that the cathodic protection rectifiers are OPERABLE and have been inspected in accordance with Regulatory Guide 1.137.

2. Verify at least once per 12 months that the cathodic protection is OPERABLE and providing adequate protection against corrosion in accordance with Regulatory Guide 1.137.

DISCUSSION OF CHANGES
SPECIFICATION 3.8.3

ADMINISTRATIVE CHANGES

A.1 All reformatting and renumbering is in accordance with the Combustion Engineering Plant (CEOG) Standard Technical specifications NUREG-1432, Rev. 1 (NUREG-1432). As a result, the Palo Verde Nuclear Generating Station (PVNGS) Improved Technical Specifications (ITS) should be more readable, and therefore understandable, by plant operators as well as other users. During the reformatting and renumbering of the ITS, no technical changes (either actual or interpretational) to the Current Technical Specification (CTS) were made unless they were identified and justified.

Editorial rewording (either adding or deleting) is made consistent with NUREG-1432. During NUREG-1432 development, certain wording preferences or English language conventions were adopted which resulted in no technical changes (either actual or interpretational) to the CTS.

Additional information has also been added to more fully describe each subsection. This wording is consistent with NUREG-1432. Since the design is already approved by the NRC, adding more detail does not result in a technical change.

A.2 CTS 3.8.1.3.1.a and b state, "...or declare the associated EDG inoperable." ITS 3.8.3.F states, "Required Action and associated Completion Time not met. OR One or more DGs with diesel fuel oil, lube oil, or starting air subsystems not within limits for reasons other than Conditions A, B, C, D, or E. Declare associated DG inoperable immediately. This change is for clarification, it does not impact safety and is consistent with NUREG-1432.

TECHNICAL CHANGES - MORE RESTRICTIVE

M.1 CTS 3.8.1.3.1 does not identify lube oil or starting air as a requirement for AC electrical power sources required to be OPERABLE. ITS 3.8.3 Action B (lube oil inventory), Action E (starting air receiver pressure), SR 3.8.3.2 (lube oil inventory), and SR 3.8.3.4 (starting air receiver pressure) have been added. The proposed changes ensure that the condition will be corrected within 48 hours or the DG will be declared inoperable. The addition of this requirement(s) and SR constitute a more restrictive change to plant operation. This change is consistent with NUREG-1432.

M.2 CTS 3.8.1.3.1.b states in part, "...with stored fuel oil viscosity not within limits, restore fuel oil to within limits within 30 days." CTS 3.8.1.3.1.c states, "With either EDG fuel oil storage system with stored fuel oil water and sediment not within limits, immediately declare the associated EDG inoperable." Verification and testing of stored and new fuel oil in accordance with ITS 3.8.3 Action 3.8.3.C, Action 3.8.3.D, and SR 3.8.3.3 have been added. The proposed changes ensure that the condition will be corrected within the specified number of days or the DG will be declared inoperable. The addition of this requirement and SR constitute a more restrictive change to plant operation. This change is consistent with NUREG-1432.

M.3 CTS 3.8.1.3.1 does not identify SRs to check for and remove accumulated water from each fuel oil storage tank. ITS 3.8.3 SR 3.8.3.5 has been added. The addition of this SR constitutes a more restrictive change to plant operation. This change is consistent with NUREG-1432.

TECHNICAL CHANGES - RELOCATIONS

LA.1 CTS 3.8.1.3.2, Cathodic Protection System is being relocated per the Split Report because the CTS does not satisfy the criterion of 10CFR50.36 and does not need to be maintained in the ITS.

TECHNICAL CHANGES - LESS RESTRICTIVE

None

TECHNICAL CHANGES - CTS CHANGES

None

NO SIGNIFICANT HAZARDS CONSIDERATION
SPECIFICATION 3.8.3

ADMINISTRATIVE CHANGES
(ITS 3.8.3 Discussion of Changes Labeled A.1, and A.2)

Arizona Public Service Company, Palo Verde Nuclear Generating Station (PVNGS), Units 1, 2, and 3, is converting to the ITS as outlined in NUREG-1432, "Standard Technical Specifications, Combustion Engineering Plants." The proposed changes involve the reformatting, renumbering, rewording of the Technical Specifications (TS) and Bases with no change in intent, and the incorporation of current operating practices consistent with NUREG-1432. These changes, since they do not involve technical changes to the Current TS (CTS), are administrative. Below are the No Significant Hazards Consideration (NSHC) for the conversion of this Section/Chapter to NUREG-1432.

The Commission has provided standards for determining whether a significant hazards consideration exists as stated in 10 CFR 50.92. A proposed amendment to an operating license for a facility involves a no significant hazards consideration if operation of the facility, in accordance with a proposed amendment, would not 1) involve a significant increase in the probability or consequences of an accident previously evaluated; 2) create the possibility of a new or different kind of accident from any accident previously evaluated; or 3) involve a significant reduction in a margin of safety. A discussion of these standards as they relate to this amendment request follows:

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

> The proposed changes involve reformatting, renumbering, and rewording of the CTS and Bases along with incorporation of PVNGS current operating practices and other changes to the CTS as discussed in the specific Discussion of Changes listed above in order to be consistent with NUREG-1432. The reformatting, renumbering, and rewording along with the other changes listed above, involves no technical changes to the CTS. Specifically, there will be no change in the requirements imposed on PVNGS due to these changes. During development of NUREG-1432, certain wording preferences or English language conventions were adopted. The proposed changes to this Section/Chapter are administrative in nature and do not impact initiators of any analyzed events. They also do not impact the assumed mitigation of accidents or transient events. Therefore, these changes do not involve a significant increase in the probability or consequences of an accident previously evaluated.

ADMINISTRATIVE CHANGES
(ITS 3.8.3 Discussion of Changes Labeled A.1, and A.2) (continued)

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

> The proposed changes involve reformatting, renumbering, and rewording of the CTS, along with the incorporation of PVNGS current operating practices and other changes, as discussed, in order to be consistent with NUREG-1432. The proposed changes do not involve a physical alteration of the plant (no new or different type of equipment will be installed) or change the methods governing normal plant operation. The proposed changes will not impose any new or different requirements or eliminate any existing requirements. Therefore, these changes do not create the possibility of a new or different kind of accident from any accident previously evaluated.

Standard 3.-- Does the proposed change involve a significant reduction in a margin of safety?

> The proposed changes involve reformatting, renumbering, and rewording of the CTS, along with the incorporation of PVNGS current operating practices and other changes, as discussed, in order to be consistent with NUREG-1432. The proposed changes are administrative in nature and will not involve any technical changes. The proposed changes will not reduce a margin of safety because they have no impact on any safety analysis assumptions. Also, because these changes are administrative in nature, no question of safety is involved. Therefore, these changes do not involve a significant reduction in a margin of safety.

TECHNICAL CHANGES - MORE RESTRICTIVE
(ITS 3.8.3 Discussion of Changes Labeled M.1, M.2 and M.3)

Arizona Public Service Company, Palo Verde Nuclear Generating Station (PVNGS), Units 1, 2, and 3 is converting to the ITS as outlined in NUREG-1432. This particular NSHC is for the changes labeled "Technical Changes - More Restrictive" described in the specific Discussion of Changes listed above. The proposed changes incorporate more restrictive changes into the CTS by either making current requirements more stringent or adding new requirements which currently do not exist.

The Commission has provided standards for determining whether a significant hazards consideration exists as stated in 10 CFR 50.92. A proposed amendment to an operating license for a facility involves a no significant hazards consideration if operation of the facility, in accordance with a proposed amendment, would not 1) involve a significant increase in the probability or consequences of an accident previously evaluated; 2) create the possibility of a new or different kind of accident from any accident previously evaluated; or 3) involve a significant reduction in a margin of safety. A discussion of these standards as they relate to this amendment request follows:

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

The proposed changes provide more stringent requirements than previously existed in the CTS. The more stringent requirements will not result in operation that will increase the probability of initiating an analyzed event. If anything, the new requirements may decrease the probability or consequences of an analyzed event by incorporating the more restrictive changes discussed in the specific Discussion of Changes listed above. These changes will not alter assumptions relative to mitigation of an accident or transient event. The more restrictive requirements will not alter the operation and will continue to ensure process variables, structures, systems, or components are maintained consistent with safety analyses and licensing basis. These changes have been reviewed to ensure that no previously evaluated accident has been adversely affected. Therefore, these changes will not involve a significant increase in the probability or consequences of an accident evaluated.

TECHNICAL CHANGES - MORE RESTRICTIVE
(ITS 3.8.3 Discussion of Changes Labeled M.1, M.2 and M.3) (continued)

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

Making existing requirements more restrictive and adding more restrictive requirements to the CTS will not alter the plant configuration (no new or different type of equipment will be installed) or change the methods governing normal plant operation. These changes do impose different requirements. However, they are consistent with the assumptions made in the safety analyses, licensing basis, and NUREG-1432. Therefore, these changes will not create the possibility of a new or different kind of accident from any accident previously evaluated.

Standard 3.-- Does the proposed change involve a significant reduction in a margin of safety?

The proposed changes provide more stringent requirements than previously existed in the CTS. An evaluation of these changes concluded that adding these more restrictive requirements either increases or has no impact on the margin of safety. The changes provide additional restrictions which may enhance plant safety. These changes maintain requirements of the safety analysis, licensing basis, and NUREG-1432. As such, no question of safety is involved. Therefore, these changes will not involve a significant reduction in a margin of safety.

TECHNICAL CHANGES - RELOCATIONS
(ITS 3.8.3 Discussion of Changes Labeled LA.1)

Arizona Public Service Company, Palo Verde Nuclear Generating Station (PVNGS), Units 1, 2, and 3 is converting to the ITS as outlined in NUREG-1432. The proposed changes, since detail is being removed from the CTS to a Licensee Controlled Document, are less restrictive. The descriptions of these changes are in the Discussion of Changes listed above.

The Commission has provided standards for determining whether a significant hazards consideration exists as stated in 10 CFR 50.92. A proposed amendment to an operating license for a facility involves a no significant hazards consideration if operation of the facility, in accordance with a proposed amendment, would not 1) involve a significant increase in the probability or consequences of an accident previously evaluated; 2) create the possibility of a new or different kind of accident from any accident previously evaluated; or 3) involve a significant reduction in a margin of safety. A discussion of these standards as they relate to this amendment request follows:

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

> The proposed changes relocate requirements from the CTS to a Licensee Controlled Document. These changes do not result in any hardware changes or changes to plant operating practices. The details being relocated are not assumed to be an initiator of any analyzed event. The Licensee Controlled Document containing the relocated requirements will be maintained using the provisions of 10 CFR 50.59 or other specified control processes and is subject to the change control process in the Administrative Controls Section of the ITS. Since any changes to a Licensee Controlled Document will be evaluated, no increase in the probability or consequences of an accident previously evaluated will be allowed. Therefore, these changes will not involve a significant increase in the probability or consequences of an accident previously evaluated.

TECHNICAL CHANGES - RELOCATIONS
(ITS 3.8.3 Discussion of Changes Labeled LA.1) (continued)

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

The proposed changes relocate requirements from the CTS to a Licensee Controlled Document. These changes will not alter the plant configuration (no new or different type of equipment will be installed) or change the methods governing normal plant operation. These changes will not impose different requirements and adequate control of information will still be maintained. These changes will not alter assumptions made in the safety analysis or licensing basis. Therefore, these changes will not create the possibility of a new or different kind of accident from any accident previously evaluated.

Standard 3.-- Does the proposed change involve a significant reduction in a margin of safety?

The proposed changes relocate requirements from the CTS to a Licensee Controlled Document. These changes will not reduce a margin of safety since they have no impact on any safety analysis assumptions. In addition, the requirements to be transposed from the CTS to the Licensee Controlled Document are the same as the CTS. Since any future changes to this Licensee Controlled Document will be evaluated per the requirements of 10 CFR 50.59, or other specified control processes, no reduction (significant or insignificant) in a margin of safety will be allowed. Therefore, these changes will not involve a significant reduction in a margin of safety.

The NRC review provides a certain margin of safety, and although this review will no longer be performed prior to submittal, the NRC still inspects the 10 CFR 50.59 process. The proposed changes are consistent with NUREG-1432, which was approved by the NRC Staff. The change controls for proposed relocated details and requirements provide an acceptable level of regulatory authority. Revising the CTS to reflect the approved level of detail per NUREG-1432 reinforces the conclusion that there is not a significant reduction in the margin of safety. Therefore, revising the CTS to reflect the NRC accepted level of detail and requirements ensures no reduction in a margin of safety.

CE STS
NUREG-1432 REV. 1
SPECIFICATION 3.8.4
MARK UP

<Doc>
<CTS>

3.8 ELECTRICAL POWER SYSTEMS

3.8.4 DC Sources—Operating

<LCO 3.8.2.1> LCO 3.8.4 The Train A and Train B DC electrical power subsystems shall be OPERABLE.

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

ACTIONS (or both batteries in a) (, OR associated control equipment or cabling) 2 3

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

<ACT B> Insert 1 (3)

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE		FREQUENCY
<4.3.8.1.a.2>	SR 3.8.4.1	Verify battery terminal voltage is ≥ ~~129/258~~ 131 V on float charge. (2)	7 days

(continued)

INSERT FOR ITS 3.8.4
ACTION C AND D
(Units 1, 2, and 3)
INSERT 1

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. Required battery charger, or associated control equipment or cabling inoperable.	C.1 Perform SR 3.8.6.1	1 hour AND Once per 8 hours thereafter
D. Required Action and associated Completion Time of Condition C not met.	D.1 Declare associated battery inoperable.	Immediately

<DOC>
<CTS>

SURVEILLANCE REQUIREMENTS (continued)

	SURVEILLANCE	FREQUENCY
SR 3.8.4.2 <4.8.2.1.b.2>	Verify no visible corrosion at battery terminals and connectors. OR Verify battery connection resistance is ≤ ~~[1E-5 ohm]~~ for inter-cell connections, ≤ ~~[1E-5 ohm]~~ for inter-rack connections, ≤ ~~[1E-5 ohm]~~ for inter-tier connections, and ≤ ~~[1E-5 ohm]~~ for terminal connections. 150E-6 OHMS (2)	92 days
SR 3.8.4.3 <4.8.2.1.c.1>	Verify battery cells, cell plates, and racks show no visual indication of physical damage or abnormal deterioration.	18 (2) ~~[12]~~ months
SR 3.8.4.4 <4.8.2.1.c.2>	Remove visible terminal corrosion and verify battery cell to cell and terminal connections are clean and tight, and are coated with anti-corrosion material.	~~[12]~~ months 18 (2)
SR 3.8.4.5 <4.8.2.1.c.3>	Verify battery connection resistance is ≤ ~~[1E-5 ohm]~~ for inter-cell connections, ≤ ~~[1E-5 ohm]~~ for inter-rack connections, ≤ ~~[1E-5 ohm]~~ for inter-tier connections, and ≤ ~~[1E-5 ohm]~~ for terminal connections. 150 E-6 OHMS (2)	~~[12]~~ months 18 (2)

(continued)

<DOC>
<CTS>

SURVEILLANCE REQUIREMENTS (continued)

	SURVEILLANCE	FREQUENCY
<DOC L.1> <4.8.2.1.c.4> 400 Amps for Batteries A and B and ≥300 amps for Batteries C and D	SR 3.8.4.6 ------NOTE------ ~~This Surveillance shall not be performed in MODE 1, 2, 3, or 4. However, credit~~ may be taken for unplanned events that satisfy this SR. ------ Verify each battery charger supplies ≥ [400] amps at ≥ [125/250] V for ≥ [8] hours.	5 [18 months] 2
<4.8.2.1.e> <DOC L.1> <4.8.2.1.d>	SR 3.8.4.7 ------NOTES------ 1. The modified performance discharge test in SR 3.8.4.8 may be performed in lieu of the service test in SR 3.8.4.7 once per 60 months. 2. This Surveillance shall not be performed in MODE 1, 2, 3, or 4. However, credit may be taken for unplanned events that satisfy this SR. ------ Verify battery capacity is adequate to supply, and maintain in OPERABLE status, the required emergency loads for the design duty cycle when subjected to a battery service test.	[18 months]

(continued)

SA

<DOC>
<CTS>

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.8.4.8 <DOC L.1> <DOC L.2> <4.8.2.1.f> <DOC M.1>	------------------NOTE------------------ This Surveillance shall not be performed in MODE 1, 2, 3, or 4. However, credit may be taken for unplanned events that satisfy this SR. -- Verify battery capacity is ≥ ~~[80]~~ 90 (2) % of the manufacturer's rating when subjected to a performance discharge test or a modified performance discharge test.	60 months AND 12 months when battery shows degradation or has reached ~~[~~85~~]~~ (2) % of the expected life with capacity < 100% of manufacturer's rating AND 24 months when battery has reached ~~[~~85~~]~~ (2) % of the expected life with capacity ≥ 100% of manufacturer's rating

CE STS
NUREG-1432 REV. 1
SPECIFICATION 3.8.4
BASES MARK UP

B 3.8 ELECTRICAL POWER SYSTEMS

B 3.8.4 DC Sources—Operating

BASES

BACKGROUND

The station DC electrical power system provides the AC emergency power system with control power. It also provides both motive and control power to selected safety related equipment and preferred AC vital bus power (via inverters). As required by 10 CFR 50, Appendix A, GDC 17 (Ref. 1), the DC electrical power system is designed to have sufficient independence, redundancy, and testability to perform its safety functions, assuming a single failure. The DC electrical power system also conforms to the recommendations of Regulatory Guide 1.6 (Ref. 2) and IEEE-308 (Ref. 3).

The [125/~~250~~] VDC electrical power system consists of two independent and redundant safety related Class 1E DC electrical power subsystems ([Train A and Train B]). Each subsystem consists of [two] 125 VDC batteries ~~(each battery [50]% capacity)~~, the associated battery charger(s) for each ~~battery, and all~~ the associated control equipment and interconnecting cabling. Insert 1 1

~~The 250 VDC source is obtained by use of the two 125 VDC batteries connected in series.~~ 2 Additionally there is [one] ~~spare~~ backup 2 battery charger per subsystem, which provides backup service in the event that the ~~preferred~~ normal 2 battery charger is out of service. If the ~~spare~~ battery charger is substituted for one of the ~~preferred~~ battery chargers, then the requirements of independence and redundancy between subsystems are maintained.

~~During normal operation, the [125/250] VDC load is powered from the battery chargers with the batteries floating on the system. In case of loss of normal power to the battery charger, the DC load is automatically powered from the station batteries.~~ Insert 2 2

The [Train A and Train B] DC electrical power subsystems provide the control power for its associated Class 1E AC power load group, [4.16] kV switchgear, and [480] V load centers. The DC electrical power subsystems also provide DC electrical power to the inverters, which in turn power the AC vital instrument buses. 2

(continued)

INSERT FOR ITS BASES 3.8.4
BACKGROUND SECTION
(Units 1, 2, and 3)
<u>INSERT 1</u>

BASES

BACKGROUND	Each subsystem contains two DC power channels. There are four channels designated as A and C for Train A, and B and D for Train B for each unit.

INSERT FOR ITS BASES 3.8.4
BACKGROUND SECTION
(Units 1, 2, and 3)
INSERT 2

BASES

BACKGROUND	During normal operation, the normal battery charger supplies DC power to the DC control center at a float voltage of at least 135V DC. In addition to carrying the loads on the DC control center, the normal battery charger provides a float (trickle) charge to the battery to keep the battery fully charged. The battery is available as a standby DC source to carry the DC control center load automatically in case of battery charger loss. In case of complete loss of AC power, each DC control center will be fed by its associated battery for at least two hours.

BASES

BACKGROUND (continued)

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

1 2 U

Each battery has adequate storage capacity to carry the required load continuously for at least ~~2~~ hours ~~and to perform three complete cycles of intermittent loads~~ discussed in the ~~[~~FSAR, Chapter ~~[8]~~ (Ref. 4). 2

Each 125/~~250~~ 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.

2 Insert 3

The batteries for Train A and Train B DC electrical power subsystems are sized to produce required capacity at ~~80%~~ 90% of ~~nameplate rating, corresponding to warranted capacity at end of life cycles and the 100% design demand. Battery size is based on 125% of required capacity and, after selection of an available commercial battery, results in a battery capacity in excess of 150% of required capacity.~~ 2 Design Basis Manual (Ref. 12). The voltage limit is ~~2.13~~ 2.18 V per cell, which corresponds to a total minimum voltage output of ~~128~~ 131 V per battery discussed in the ~~FSAR, Chapter [8] (Ref. 4). The criteria for sizing large lead storage batteries are defined in IEEE-485 (Ref. 5).~~ 2

Each Train A and Train B DC electrical power subsystem has ample power output capacity for the steady state operation of connected loads required during normal operation, while at the same time maintaining its battery bank fully charged. Each battery charger also has sufficient capacity to restore the battery from the design minimum charge to its fully charged state within ~~24~~ 12 hours while supplying normal steady state loads discussed in the ~~[~~FSAR, Chapter [8] (Ref. 4). 2 U

APPLICABLE SAFETY ANALYSES

The initial conditions of Design Basis Accident (DBA) and transient analyses in the ~~[~~FSAR, Chapter ~~[~~6~~]~~ (Ref. 6) and Chapter ~~[~~15~~]~~ (Ref. 7), assume that Engineered Safety Feature 2 U 2 2

(continued)

INSERT FOR ITS BASES 3.8.4
BACKGROUND SECTION
(Units 1, 2, and 3)
INSERT 3

BASES

BACKGROUND	In addition, each load group contains a backup battery charger which is manually transferable to either channel of a load group. The transfer mechanism is mechanically interlocked to prevent both DC channels of a load group from being simultaneously connected to the backup battery charger.

BASES

APPLICABLE SAFETY ANALYSES (continued)

(ESF) 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 in the event of:

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

b. A worst case single failure.

The DC sources satisfy Criterion 3 of ~~the NRC Policy Statement~~. 10CFR50.36(c)(2)(ii) 1

LCO

The DC electrical power subsystems, each subsystem consisting of ~~[two]~~ batteries, battery charger ~~[~~for each battery~~]~~ (the backup battery charger, one per train, may be used to satisfy this requirement) 2 and the corresponding control equipment and interconnecting cabling supplying power to the associated bus within the train are required to be OPERABLE to ensure the availability of the required power to shut down the reactor and maintain it in a safe condition after an anticipated operational occurrence (AOO) or a postulated DBA. Loss of any train DC electrical power subsystem does not prevent the minimum safety function from being performed (Ref. 4).

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

APPLICABILITY

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

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

(continued)

BASES

APPLICABILITY (continued)

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

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

2

This condition is independent of battery charger status.

ACTIONS

A.1

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

i.e

If one of the required DC electrical power subsystems is inoperable (~~e.g.~~, inoperable battery, ~~inoperable battery charger(s), or inoperable battery charger and associated inoperable battery~~), the remaining DC electrical power subsystem has the capacity to support a safe shutdown and to mitigate an accident condition. Since a subsequent worst case single failure would, however, result in the complete loss of the remaining ~~250/~~125 VDC electrical power subsystem~~s~~ with attendant loss of ESF functions, continued power operation should not exceed 2 hours. The 2 hour Completion Time is based on Regulatory Guide 1.93 (Ref. 8) and reflects a reasonable time to assess unit status as a function of the inoperable DC electrical power subsystem and, if the DC electrical power subsystem is not restored to OPERABLE status, to prepare to effect an orderly and safe unit shutdown.

2

B.1 and B.2

(i.e., inoperable battery)

If the inoperable DC electrical power subsystem cannot be restored to OPERABLE status within the required Completion Time, the unit must be brought to a MODE in which the LCO does not apply. To achieve this status, the unit must be brought to at least MODE 3 within 6 hours and to MODE 5

of Condition A

(continued)

A

BASES

ACTIONS

B.1 and B.2 (continued)

within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging unit systems. The Completion Time to bring the unit to MODE 5 is consistent with the time required in Regulatory Guide 1.93 (Ref. 8).

Insert 4 3

SURVEILLANCE REQUIREMENTS

SR 3.8.4.1

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

SR 3.8.4.2

Visual inspection to detect corrosion of the battery cells and connections, or measurement of the resistance of each intercell, interrack, intertier, and terminal connection, provides an indication of physical damage or abnormal deterioration that could potentially degrade battery performance. 1

2

are based on calculation 1,2,3ECPK207 which states that if every terminal connection were to degrade to 150E-6 ohm, there would be sufficient battery capacity to satisfy the DBA Duty Cycle (Ref. 13).

The limits established for this SR ~~must be no more than 20% above the resistance as measured during installation or not above the ceiling value established by the manufacturer.~~

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

(continued)

Palo Verde Units 1, 2, 3

EAB

INSERT FOR ITS BASES 3.8.4
ACTIONS C AND D
(Units 1, 2, and 3)
<u>INSERT 4</u>

ACTIONS

<u>C.1</u>

Condition C represents one or both channels in a train with a loss of ability to completely respond to a long term event, and a potential loss of ability to remain energized during normal operation. Since eventual failure of the battery to maintain the required battery cell parameters is highly probable, it is imperative that the operator's attention focus on stabilizing the unit and placing an associated battery charger in service, thereby, minimizing the potential for complete loss of DC power to the affected channel. The additional time provided by the Completion Time is consistent with the battery's capability to maintain its short term capability to respond to a design basis event. It is known, however, that if a battery charger is disconnected from its associated battery, the battery will fail Category A, B, and C limits in a very short period of time. Therefore, under these conditions, the direction is to declare the affected battery inoperable immediately.

<u>D.1</u>

If the battery cell parameters cannot be maintained within Category A limits as specified in LCO 3.8.6, the short term capability of the battery is also degraded and the battery must be declared inoperable.

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.8.4.3

Visual inspection of the battery cells, cell plates, and battery racks provides an indication of physical damage or abnormal deterioration that could potentially degrade battery performance.

~~The 12 month Frequency for~~ this SR is consistent with IEEE-450 (Ref. 9), which recommends detailed visual inspection of cell condition and rack integrity ~~on a yearly basis~~. The 18 month Surveillance Frequency is consistent with expected fuel cycle lengths. (2)

SR 3.8.4.4 and SR 3.8.4.5

Visual inspection and resistance measurements of intercell, interrack, intertier, and terminal connections provide an indication of physical damage or abnormal deterioration that could indicate degraded battery condition. The anticorrosion material is used to help ensure good electrical connections and to reduce terminal deterioration. The visual inspection for corrosion is not intended to require removal of and inspection under each terminal connection. The removal of visible corrosion is a preventive maintenance SR. The presence of visible corrosion does not necessarily represent a failure of this SR provided visible corrosion is removed during performance of SR 3.8.4.4. (1)

Reviewer's Note: The requirement to verify that terminal connections are clean and tight applies only to nickel cadmium batteries as per IEEE Standard P1106, "IEEE Recommended Practice for Installation, Maintenance, Testing and Replacement of Vented Nickel - Cadmium Batteries for Stationary Applications." This requirement may be removed for lead acid batteries. (4)

The connection resistance limits for SR 3.8.4.5 ~~shall be no more than 20% above the resistance as measured during installation, or not above the ceiling value established by the manufacturer~~. (1) are (2) based on calculation 1,2,3ECPK207 which states that if every terminal connection were to degrade to 150E-6 ohms there would be sufficient battery capacity to satisfy DBA Duty Cycle (Ref. 13).

The Surveillance ~~Frequencies of 12 months is~~ consistent with IEEE-450 (Ref. 9), which recommends cell to cell and terminal connection resistance measurement ~~on a yearly basis~~. The 18 month Surveillance frequency is consistent with expected fuel cycle lengths. (2)

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.8.4.6

This SR requires that each battery charger be capable of supplying {400} amps and {250/125} V for ≥ {8} hours. These requirements are based on the design capacity of the chargers (Ref. 4). According to Regulatory Guide 1.32 (Ref. 10), the battery charger supply is required to be based on the largest combined demands of the various steady state loads and the charging capacity to restore the battery from the design minimum charge state to the fully charged state, irrespective of the status of the unit during these demand occurrences. The minimum required amperes and duration ensures that these requirements can be satisfied.

FOR BATTERIES A AND B AND 300 AMPS FOR BATTERIES C AND D,

2

The Surveillance Frequency is acceptable, given the unit conditions required to perform the test and the other administrative controls existing to ensure adequate charger performance during these {18 month} intervals. In addition, this Frequency is intended to be consistent with expected fuel cycle lengths.

This SR is modified by a Note. The reason for the Note is that ~~performing the Surveillance would perturb the electrical distribution system and challenge safety systems.~~ Credit may be taken for unplanned events that satisfy this SR.

5

SR 3.8.4.7

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

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

This SR is modified by two Notes. Note 1 allows the performance of a modified performance discharge test in lieu of a service test once per 60 months.

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.4.7 (continued)

1

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~~, (but in no case lower than the performance test rate) 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.~~

2

A modified 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.

The reason for Note 2 is that performing the Surveillance would perturb the electrical distribution system and challenge safety systems. Credit may be taken for unplanned events that satisfy this SR. 1

SR 3.8.4.8

A battery performance discharge test is a test of constant current capacity of a battery, normally done in the "as found" condition, after having been in service, to detect any change in the capacity determined by the acceptance test. The test is intended to determine overall battery degradation due to age and usage.

A battery modified performance discharge test is described in the Bases for SR 3.8.4.7. Either the battery performance discharge test or the modified performance discharge test is acceptable for satisfying SR 3.8.4.8~~; however, only~~ the modified performance discharge test may be used to satisfy

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.4.8 (continued)

SR 3.8.4.8 while satisfying the requirements of SR 3.8.4.7 at the same time. The battery performance discharge test may also be used to satisfy SR 3.8.4.8 while satisfying the requirements of 3.8.4.7 at the same time if the capacity discharge rate envelops the duty cycle of the service test described in SR 3.8.4.7. 6

The acceptance criteria for this Surveillance are consistent with IEEE-450 (Ref. 9) and IEEE-485 (Ref. 5). These references recommend that the battery be replaced if its capacity is below 80% of the manufacturer rating. A conservative capacity of ~~80%~~ 90% shows that the battery rate of deterioration is increasing, even if there is ample capacity to meet the load requirements. 1 2

The Surveillance Frequency for this test is normally 60 months. If the battery shows degradation, or if the battery has reached 85% of its expected life and capacity is < 100% of the manufacturer's rating, the Surveillance Frequency is reduced to 12 months. However, if the battery shows no degradation but has reached 85% of its expected life, the Surveillance Frequency is only reduced to 24 months for batteries that retain capacity ≥ 100% of the manufacturer's rating. Degradation is indicated ~~according to IEEE-450 (Ref. 9)~~ when the battery capacity drops by more than ~~10%~~ 5% ~~relative to its capacity on the previous performance test~~ of rated capacity from its average on previous performance tests or when it is ~~≥ 10%~~ 5% > below the manufacturer's rating. These Frequencies are consistent with the recommendations in IEEE-450 (Ref. 9). 2 2

This SR is modified by a Note. The reason for the Note is that performing the Surveillance would perturb the electrical distribution system and challenge safety systems. Credit may be taken for unplanned events that satisfy this SR. 1

REFERENCES

1. 10 CFR.50, Appendix A, GDC 17.
2. Regulatory Guide 1.6, March 10, 1971.
3. IEEE-308-~~[1978]~~ 1974 2
4. FSAR, Chapter ~~[8]~~ 8.3.2 L U
5. IEEE-485-[1983], June 1983.

(continued)

BASES

REFERENCES (continued)

LL 2

6. FSAR, Chapter ~~[~~6~~]~~.
7. FSAR, Chapter ~~[~~15~~]~~.
8. Regulatory Guide 1.93, December 1974.
9. IEEE-450-~~[1987]~~. 1980 2
10. Regulatory Guide 1.32, ~~February 1977~~ Revision 0, August 11, 1972
11. Regulatory Guide 1.129, Revision 0 December 1974.
12. Design Basis Manual, "Class 1E 125 VDC Power System."
2
13. Calc 1,2,3 ECPK207

NUREG-1432 EXCEPTIONS
SPECIFICATION 3.8.4

1. Grammar and/or editorial changes have been made to enhance clarity. No technical or intent changes to the Specification are made by this change.

2. The plant specific title, nomenclature, number, parameter/value, reference, system description, system design, operating practices or analysis description was used (additions, deletions, and/or changes are included). Plant specific parameters/values are directly transferred from the CTS to the ITS.

3. ITS 3.8.4 contains two additional Actions (C and D) that address the Condition of no battery chargers on a DC bus. These Actions allow continued operation providing the associated battery cell parameters meet Category A requirements. This is acceptable because the battery is monitored on an increased Frequency which takes into account a battery's ability to maintain its short term capability to respond to a design basis event. If the battery cell parameters cannot be maintained within Category A limits, the short term capability of the battery is degraded. This will then require monitoring battery cell parameters per LCO 3.8.6. Although this is a deviation from NUREG-1432, it is consistent with PVNGS licensing basis.

4. This is a reviewers note that does not serve any importance to the Bases and is, therefore, being deleted.

5. ITS 3.8.4.6 removes the limitation in the Note that states, "This Surveillance shall not be performed in Mode 1, 2, 3, or 4." This is acceptable because PVNGS has a spare or "swing" battery charger for each train. This allows a normal battery charger to be tested while the swing charger carries the DC bus. This also allows the swing charger to be tested while the normal battery chargers carry their respective DC buses. This change is consistent with PVNGS licensing basis.

6. NUREG-1432 SR 3.8.4.8 Bases only allows the modified performance discharge test to satisfy the requirements of SR 3.8.4.8 while satisfying the requirements of SR 3.8.4.7 at the same time. ITS SR 3.8.4.8 Bases allows the performance discharge test to satisfy the requirements of SR 3.8.4.8 while satisfying the requirements of SR 3.8.4.7 at the same time. ITS SR 3.8.4.8 allows this because the capacity discharge rate envelops the duty cycle of the service test described in SR 3.8.4.7 (i.e. the discharge current through the performance discharge test is > the largest current load of the service test duty cycle). Our present performance discharge test meets the definition of a "modified performance discharge test" based on the above discussion. Therefore, the PVNGS performance discharge test can be used to satisfy SR 3.8.4.8 while satisfying the requirements of SR 3.8.4.7 at the same time. This change is consistent with PVNGS licensing basis.

7. NUREG-1432 SR 3.8.4.8 Bases states, "The voltage requirements are based on nominal design voltage of the battery and are consistent with the initial voltages assumed in the battery sizing calculations." ITS SR 3.8.4.8 Bases deletes the phrase "and are consistent with the voltages assumed in the battery sizing calculations." This is acceptable because battery voltage is not considered for sizing requirements. This is based on IEEE 485, Recommended Practice for Sizing Large lead Storage Batteries for Generating Stations and Substations. This change is consistent with PVNGS licensing basis.

PVNGS CTS
SPECIFICATION 3.8.4
MARK UP

A.1

3.8 ELECTRICAL POWER SYSTEMS

3.8.4 ~~3/4.8.2~~ D.C. SOURCES

OPERATNG

~~LIMITING CONDITION FOR OPERATION~~

The Train A and Train B DC electrical power subsystems

LCO 3.8.4 ~~3.8.2.1~~ ~~As a minimum the D.C. trains listed in Table 3.8-1~~ shall be OPERABLE ~~and energized.~~ A.2

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

ACTION: or both batteries in a DC electrical power subsystem or associated control equipment or cabling inoperable A.7

ACT A A.3 a. ~~With~~ one ~~of the required D.C. trains~~ inoperable, restore the inoperable ~~D.C. trains~~ to OPERABLE status within 2 hours or be

ACT B in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

LA.3

ACT C b. ~~With~~ one of the required chargers inoperable, ~~either provide charging capability to the affected channel with the associated backup battery charger, or~~ demonstrate the OPERABILITY of its associated battery bank by performing Surveillance Requirement ~~4.8.2.1a.1~~ within 1 hour, and at least once per 8 hours thereafter. If any Category A limit in Table 4.8-2 is not met, declare the battery inoperable. 3.8.6.1

ITS 3.8.4

ITS 3.8.6

ITS 3.8.4 ACT D Insert 1 A.1

SURVEILLANCE REQUIREMENTS

ITS 3.8.4 ~~4.8.2.1~~ Each 125-volt battery bank and charger shall be demonstrated OPERABLE:

ITS 3.8.4/3.8.6

SR 3.8.4.1 a. At least once per 7 days by verifying that:

1. The parameters in Table 4.8-2 meet the Category A limits, and

ITS 3.8.4

SR 3.8.4.1 2. The total battery terminal voltage is greater than or equal to ~~129 volts on float charge (Exide) or~~ 131 volts on float charge (AT&T).

A6

ADD NOTE
THIS SURVEILLANCE SHALL NOT BE PERFORMED IN MODE 1, 2, 3, OR 4. HOWEVER, CREDIT MAY BE TAKEN FOR UNPLANNED EVENTS THAT SATISFY THIS SR

SR 3.8.4.7
SR 3.8.4.8

SR 3.8.4.6

L.1

INSERT FOR CTS 3.8.2.1
ACTION D
(Units 1, 2, and 3)
INSERT 1

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
D. Required Action and associated Completion Time of Condition C not met.	D.1 Declare associated battery inoperable.	Immediately

SPECIFICATION 3.8.4
(3.8.4/3.8.6)

A.1

ELECTRICAL POWER SYSTEMS

SURVEILLANCE REQUIREMENTS (Continued)

ITS 3.8.6

b. At least once per 92 days and within 7 days after a battery discharge with battery terminal voltage below 105 volts, or battery overcharge with battery terminal voltage above 150 volts, by verifying that:

1. The parameters in Table 4.8-2 meet the Category B limits,

ITS 3.8.4

SR 3.8.4.2 2. There is no visible corrosion at either terminals or connectors, or the connection resistance of these items is less than 150 x 10^{-6} ohms, and

ITS 3.8.6

3. The average electrolyte temperature of six connected cells is above 60°F.

ITS 3.8.4

c. At least once per 18 months by verifying that:

SR 3.8.4.3 1. The cells, cell plates, and battery racks show no visual indication of physical damage or abnormal deterioration,

SR 3.8.4.4 2. The cell-to-cell and terminal connections are clean, tight, and coated with anticorrosion material,

SR 3.8.4.5 3. The resistance of each cell-to-cell and terminal connection is less than or equal to 150 x 10^{-6} ohms, and

SR 3.8.4.6 4. The battery charger will supply at least 400 amperes for batteries A and B and 300 amperes for batteries C and D at 125 volts for at least 8 hours.

A.4

SR 3.8.4.7 d. At least once per 18 months, ~~during shutdown~~, by verifying that the battery capacity is adequate to supply and maintain in OPERABLE status ~~all of the actual or simulated~~ emergency loads for the design duty cycle when the battery is subjected to a battery service test.

A.5

A.4

SR 3.8.4.8 e. At least once per 60 months, ~~during shutdown~~, by verifying that the battery capacity is at least ~~80% (Exide) or~~ 90% (AT&T) of the manufacturer's rating when subjected to a performance discharge test.

A.6

SR 3.8.4.7 Note 1 ~~This~~ performance discharge test may be performed in lieu of the battery service test required by Surveillance Requirement ~~4.8.2.1d~~. 3.8.4.7

once per 60 months

M.2

SR 3.8.4.8 f. Annual performance discharge tests of battery capacity shall be given to any battery that shows signs of degradation or has reached 85% of the service life expected for the application. Degradation is indicated when the battery capacity drops more than ~~10% (Exide) or~~ 5% (AT&T) of rated capacity from its average on previous performance tests, ~~or is below 90% (Exide)~~ or 95% (AT&T) of the manufacturer's rating.

The modified

A.8

A.6

LA.1

M.1

ADD SR 3.8.4.8 3rd Frequency

OR MODIFIED PERFORMANCE DISCHARGE TEST.

L.2

3/4 8-10

LA2

TABLE 3.8-1

D.C. ELECTRICAL SOURCES

Train A

CHANNEL A	CHANNEL C
125V bus E-PKA-M41	125V D.C. bus E-PKC-M43
125V D.C. battery bank E-PKA-F11	125 V D.C. battery bank E-PKC-F13
Battery charger E-PKA-H11	Battery charger E-PKC-H13
or	or
Backup battery charger E-PKA-H15 (AC)	Backup battery charger E-PKA-H15 (AC)

Train B

CHANNEL B	CHANNEL D
125V D.C. bus E-PKB-M42	125V D.C. bus E-PKD-M44
125V D.C. battery bank E-PKB-F12	125V D.C. battery bank E-PKD-F14
Battery charger E-PKB-H12	Battery charger E-PKD-H14
or	or
Backup battery charger E-PKB-H16 (BD)	Backup battery charger E-PKB-H16 (BD)

SPECIFICATION 3.8.4

A.6

TABLE 4.8-2 (EXIDE)

BATTERY SURVEILLANCE REQUIREMENTS

	CATEGORY A(1)	CATEGORY B(2)	
Parameter	Limits for each designated pilot cell	Limits for each connected cell	Allowable(3) value for each connected cell
Electrolyte Level	>Minimum level indication mark, and ≤ ¼" above maximum level indication mark	>Minimum level indication mark, and ≤ ¼" above maximum level indication mark	Above top of plates, and not overflowing
Float Voltage	≥ 2.13 volts	≥ 2.13 volts(a)	> 2.07 volts
Specific Gravity(b)		≥ 1.195	Not more than 0.020 below the average of all connected cells
	≥ 1.200(c)	Average of all connected cells > 1.205	Average of all connected cells ≥ 1.195(c)

(1) For any Category A parameter(s) outside the limit(s) shown, the battery may be considered OPERABLE provided that within 24 hours all the Category B measurements are taken and found to be within their allowable values, and provided all Category A and B parameter(s) are restored to within limits within the next 6 days.

(2) For any Category B parameter(s) outside the limit(s) shown, the battery may be considered OPERABLE provided that the Category B parameters are within their allowable values and provided the Category B parameter(s) are restored to within limits within 7 days.

(3) Any Category B parameter not within its allowable value, declare the battery inoperable.

(a) Corrected for average electrolyte temperature.

(b) Corrected for electrolyte temperature and level.

(c) Or battery charging current is less than 2 amps when on charge.

SPECIFICATION 3.8.4
(3.8.4 / 3.8.6)

ITS 3.8.6

TABLE 4.8-2 (AT&T)

BATTERY SURVEILLANCE REQUIREMENTS

	CATEGORY A(1)	CATEGORY B(2)	
Parameter	Limits for each designated pilot cell	Limits for each connected cell	Allowable(3) value for each connected cell
Electrolyte Level	>Minimum level indication mark, and $\leq$ ¼" above maximum level indication mark	>Minimum level indication mark, and $\leq$ ¼" above maximum level indication mark	Above top of plates, and not overflowing
Float Voltage	$\geq$ 2.18 volts	$\geq$ 2.18 volts(a)	$\geq$ 2.14 volts
Specific Gravity(b)		$\geq$ 1.280	Not more than 0.020 below the average of all connected cells
	$\geq$ 1.290(c)	Average of all connected cells > 1.290	Average of all connected cells $\geq$ 1.280(c)

(1) For any Category A parameter(s) outside the limit(s) shown, the battery may be considered OPERABLE provided that within 24 hours all the Category B measurements are taken and found to be within their allowable values, and provided all Category A and B parameter(s) are restored to within limits within the next 6 days.

(2) For any Category B parameter(s) outside the limit(s) shown, the battery may be considered OPERABLE provided that the Category B parameters are within their allowable values and provided the Category B parameter(s) are restored to within limits within 7 days.

(3) Any Category B parameter not within its allowable value, declare the battery inoperable.

(a) Corrected for average electrolyte temperature.

(b) Corrected for electrolyte temperature and level.

(c) Or battery charging current is less than 2 amps when on charge.

ITS 3.8.6

DISCUSSION OF CHANGES
SPECIFICATION 3.8.4

ADMINISTRATIVE CHANGES

A.1 All reformatting and renumbering is in accordance with the Combustion Engineering Plant (CEOG) Standard Technical Specifications NUREG-1432, Rev. 1 (NUREG-1432). As a result, the Palo Verde Nuclear Generating Station (PVNGS) Improved Technical Specifications (ITS) should be more readable, and therefore understandable, by plant operators as well as other users. During the reformatting and renumbering of the ITS, no technical changes (either actual or interpretational) to the Current Technical Specification (CTS) were made unless they were identified and justified.

Editorial rewording (either adding or deleting) is made consistent with NUREG-1432. During NUREG-1432 development, certain wording preferences or English language conventions were adopted which resulted in no technical changes (either actual or interpretational) to the CTS.

Additional information has also been added to more fully describe each subsection. This wording is consistent with NUREG-1432. Since the design is already approved by the NRC, adding more detail does not result in a technical change.

A.2 CTS LCO 3.8.2.1 states, "As minimum the DC trains listed in Table 3.8-1 shall be OPERABLE and energized". ITS LCO 3.8.4. only requires the DC trains to be Operable. PVNGS design is such that normal lineup (operation) has the battery chargers, being supplied by their associated 480 V AC MCCs, supplying their associated DC buses and the batteries connected to their associated DC buses on a trickle charge from the associated battery charger. The only time this would not be the case is during loss of offsite power event or loss of the MCC that supplies the battery charger. Therefore, during normal operations and by design, the DC trains remain Operable and energized. As such, deleting the word "energized" in the ITS does not change any design or PVNGS current operating practices. This change is administrative and is consistent with NUREG-1432.

A.3 CTS 3.8.2.1 Action a states in part, "With one of the required DC trains..." ITS Action A states, "One battery or associated control equipment or cabling inoperable". The ITS does not use the phrase "of the required". The ITS LCO requires that Train A and B DC electrical power subsystems be Operable. This is the same intent of the CTS LCO which requires both DC trains to be Operable which in turn means that both channels per train must be Operable. Based on the LCO, all 4 DC channels must be Operable in Modes 1, 2, 3, and 4. Therefore, using the phrase "of the required" may be considered confusing since all 4 channels (2 channels per train) must be Operable. This change does not alter the intent of any requirements. This change is consistent with NUREG-1432.

A.4 CTS 4.8.2.1.d and 4.8.2.1.e state that the SR shall be performed at 18 and 60 months "During Shutdown". ITS SR 3.8.4.7 and 3.8.4.8 maintains the same Frequency, however, deletes the phrase "During Shutdown". The intent of the ITS is that SRs with a Frequency of 18 or 60 months will be performed during shutdown conditions. This change does not alter any intent of the CTS and is considered administrative. This change is consistent with NUREG-1432.

A.5 CTS 4.8.2.1.d states in part, "...maintain in OPERABLE status all of the actual and simulated emergency loads....". ITS SR 3.8.4.7 states, "verify battery capacity is adequate to supply, and maintain in OPERABLE status, the required emergency Loads....". Although the ITS deletes the wording "ACTUAL AND SIMULATED", the intent is still implied in the phrase "required emergency loads". This change is in presentation only and is considered administrative. This change is consistent with NUREG-1432.

A.6 CTS 4.8.2.1.a.2 states, "The total battery terminal voltage is greater than or equal to 129 volts on Float charge (Exide) or 131 volts on Flat charge (AT&T)". PVNGS no longer uses Exide batteries therefore, any reference in the Exide batteries in the CTS will not be incorporated into the ITS. Reference to Exide Batteries in CTS 4.8.2.1.e and 4.8.2.1.f as well as Table 4.8-2 (Exide), have also been deleted. This is an administrative change and consistent with NUREG-1432.

A.7 CTS uses the phrase "DC trains inoperable" in the LCO statement. ITS 3.8.4 uses the phrase "battery or associated control equipment or cabling inoperable." ITS more clearly defines what is meant by the phrase "DC trains inoperable" by replacing it with "battery or associated control equipment or cabling inoperable." This change more clearly defines PVNGS operating practice in application of the LCO. CTS clearly separates the battery chargers into a separate Action that gives allowance for continued operation providing the associated battery meets Category A criteria. If the battery fails to meet Category A requirements then CTS Action (a) is entered. The phrase "battery or associated control equipment or cabling inoperable" was added to ensure the correct Action, CTS Action (b), is entered for an inoperable battery charger. This change does not alter any intent of the CTS and is considered administrative. This change is consistent with NUREG-1432.

A.8 CTS 3.8.2.1 allows the performance test to be performed in lieu of the battery service test. ITS 3.8.4 only allows the modified performance test to be performed in lieu of the battery service test. At PVNGS, because of the physical design/capacity of the AT&T round cell batteries, the performance test is the modified performance test. The battery performance test is can be used to satisfy SR 3.8.3.8 while satisfying the requirements of SR 3.8.4.7 at the same time. This is allowed because the capacity discharge rate envelops the duty cycle of the service test described in SR 3.8.4.7. This change is consistent with NUREG-1432.

TECHNICAL CHANGES - MORE RESTRICTIVE

M.1 CTS 4.8.2.1.e and 4.8.2.1.f require verifying battery capacity at least once every 60 months and at 12 months when the battery shows degradation (capacity < 100%) or has reached 85% of the service life expected for the application respectively. This is consistent with the ITS however, ITS SR 3.8.4.8 adds a 3rd Frequency. The additional Frequency requires a battery performance discharge test at least every 24 months when the battery has reached 85% of the expected life with capacity > 100% of manufacturer's rating. The addition of this requirement constitutes a more restrictive change to PVNGS current operating practices. This change is consistent with NUREG-1432.

M.2 ITS 3.8.4 only allows the modified performance test to substitute for the battery service test for a maximum of 60 months. CTS 3.8.2.1 has no such restriction. The addition of this restriction constitutes a more restrictive change to PVNGS operating practices. This is acceptable because it is intended that the battery service test be performed at least once within the 60 month limit. This ensures that battery service test criteria are satisfied because the modified performance test could be changed to not fully meet the intent of the battery service test. This change is consistent with NUREG-1432.

TECHNICAL CHANGES - RELOCATIONS

LA.1 CTS 3.8.2.1, SR 4.8.2.1.f, contains detailed information that describes what a degraded battery constitutes. ITS SR 3.8.4.8 does not contain this information. This information is not required to determine the Operability of a system, component or structure and therefore is being relocated, because of the level of detail, to the associated Bases Section. The SR along with the associated description in the Bases is appropriate to ensure that a degraded battery identified and tested. In addition, this requirement does not meet the criterion of 10 CFR 50.36 (c) (2) (ii) for inclusion into ITS.

Any changes to the Bases will be in accordance with Chapter 5.0 Bases Control Program. Any technical changes to plant procedures will be in accordance with the PVNGS procedure control process. This provides an equivalent level of control and is an administrative change with no impact on the margin of safety. This requirement is not required to be in ITS to provide adequate protection of public health and safety. Therefore, relocation of this requirement to a Licensee Controlled Document is acceptable and is consistent with NUREG-1432.

LA.2 CTS Table 3.8-1 provides a diagram specifically showing what comprises a DC train. ITS 3.8.4 does not contain this information in the LCO. This information is not required to determine OPERABILITY of the DC System and therefore is being relocated to the Bases section. The Bases section refers to LCO 3.8.9 for a description of the DC electrical power distribution systems. The LCO along with the associated description in the Bases is appropriate to ensure the required DC trains are Operable. In addition, this requirement does not meet the criterion of 10 CFR 50.36 (c) (2) (ii) for inclusion into ITS.

Any changes to the Bases will be in accordance with Chapter 5.0 Bases Control Program. Any technical changes to plant procedures will be in accordance with the PVNGS procedure control process. This provides an equivalent level of control and is an administrative change with no impact on the margin of safety. This requirement is not required to be in ITS to provide adequate protection of public health and safety. Therefore, relocation of this requirement to a Licensee Controlled Document is acceptable and is consistent with NUREG-1432.

LA.3 CTS Action (b) states in part, "...either provide charging capability to the affected channel with the associated backup battery charger, or..." ITS 3.8.4, Action C, does not contain this information. This information details specific actions to restore operability. This information is not required to determine the Operability of a system, component or structure and therefore is being relocated to the associated Bases Section. ITS Action C along with the associated description in the Bases is appropriate to ensure that operability is restored. In addition, this requirement does not meet the criterion of 10 CFR 50.36 (c) (2) (ii) for inclusion into ITS.

Any changes to the Bases will be in accordance with Chapter 5.0 Bases Control Program. Any technical changes to plant procedures will be in accordance with the PVNGS procedure control process. This provides an equivalent level of control and is an administrative change with no impact on the margin of safety. This requirement is not required to be in ITS to provide adequate protection of public health and safety. Therefore, relocation of this requirement to a Licensee Controlled Document is acceptable and is consistent with NUREG-1432.

TECHNICAL CHANGES - LESS RESTRICTIVE

L.1 ITS 3.8.4 adds the following Note to SRs 3.8.4.7 and 3.8.4.8, "This Surveillance shall not be performed in MODE 1, 2, 3, and 4. However, credit may be taken for unplanned events that satisfy this SR". ITS 3.8.4 adds the second sentence of this Note to SR 3.8.4.6. The CTS does not contain the allowance to take credit for unplanned events. Allowing unplanned events to take credit for Surveillance performance constitutes a less restrictive change. This is acceptable because there is no reason why an unplanned event would not suffice for satisfactory performance of the test provided sufficient information is collected to satisfy Surveillance test requirements. Operability can be demonstrated since the equipment itself cannot discriminate between an unplanned event or Surveillance performance. This change is consistent with NUREG-1432.

L.2 CTS 4.2.8.1.e requires a performance discharge test be conducted at least once per 60 months. ITS SR 3.8.4.8 allows the flexibility to perform a modified performance test instead of a full performance test. The addition of this option constitutes a less restrictive change. This is acceptable because of 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. 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. This change is consistent with NUREG-1432.

TECHNICAL CHANGES - CTS CHANGES

None

NO SIGNIFICANT HAZARDS CONSIDERATION
SPECIFICATION 3.8.4

ADMINISTRATIVE CHANGES
(ITS 3.8.4 Discussion of Changes Labeled A.1, A.2, A.3, A.4, A.5, A.6, A.7 and A.8)

Arizona Public Service Company, Palo Verde Nuclear Generating Station (PVNGS), Units 1, 2, and 3, is converting to the ITS as outlined in NUREG-1432, "Standard Technical Specifications, Combustion Engineering Plants." The proposed changes involve the reformatting, renumbering, rewording of the Technical Specifications (TS) and Bases with no change in intent, and the incorporation of current operating practices consistent with NUREG-1432. These changes, since they do not involve technical changes to the Current TS (CTS), are administrative. Below are the No Significant Hazards Consideration (NSHC) for the conversion of this Section/Chapter to NUREG-1432.

The Commission has provided standards for determining whether a significant hazards consideration exists as stated in 10 CFR 50.92. A proposed amendment to an operating license for a facility involves a no significant hazards consideration if operation of the facility, in accordance with a proposed amendment, would not 1) involve a significant increase in the probability or consequences of an accident previously evaluated; 2) create the possibility of a new or different kind of accident from any accident previously evaluated; or 3) involve a significant reduction in a margin of safety. A discussion of these standards as they relate to this amendment request follows:

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

> The proposed changes involve reformatting, renumbering, and rewording of the CTS and Bases along with incorporation of PVNGS current operating practices and other changes to the CTS as discussed in the specific Discussion of Changes listed above in order to be consistent with NUREG-1432. The reformatting, renumbering, and rewording along with the other changes listed above, involves no technical changes to the CTS. Specifically, there will be no change in the requirements imposed on PVNGS due to these changes. During development of NUREG-1432, certain wording preferences or English language conventions were adopted. The proposed changes to this Section/Chapter are administrative in nature and do not impact initiators of any analyzed events. They also do not impact the assumed mitigation of accidents or transient events. Therefore, these changes do not involve a significant increase in the probability or consequences of an accident previously evaluated.

ADMINISTRATIVE CHANGES
(ITS 3.8.4 Discussion of Changes Labeled A.1, A.2, A.3, A.4, A.5, A.6, A.7 and A.8) (continued)

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

> The proposed changes involve reformatting, renumbering, and rewording of the CTS, along with the incorporation of PVNGS current operating practices and other changes, as discussed, in order to be consistent with NUREG-1432. The proposed changes do not involve a physical alteration of the plant (no new or different type of equipment will be installed) or change the methods governing normal plant operation. The proposed changes will not impose any new or different requirements or eliminate any existing requirements. Therefore, these changes do not create the possibility of a new or different kind of accident from any accident previously evaluated.

Standard 3.-- Does the proposed change involve a significant reduction in a margin of safety?

> The proposed changes involve reformatting, renumbering, and rewording of the CTS, along with the incorporation of PVNGS current operating practices and other changes, as discussed, in order to be consistent with NUREG-1432. The proposed changes are administrative in nature and will not involve any technical changes. The proposed changes will not reduce a margin of safety because they have no impact on any safety analysis assumptions. Also, because these changes are administrative in nature, no question of safety is involved. Therefore, these changes do not involve a significant reduction in a margin of safety.

TECHNICAL CHANGES - MORE RESTRICTIVE
(ITS 3.8.4 Discussion of Changes Labeled M.1 and M.2)

Arizona Public Service Company, Palo Verde Nuclear Generating Station (PVNGS), Units 1, 2, and 3 is converting to the ITS as outlined in NUREG-1432. This particular NSHC is for the changes labeled "Technical Changes - More Restrictive" described in the specific Discussion of Changes listed above. The proposed changes incorporate more restrictive changes into the CTS by either making current requirements more stringent or adding new requirements which currently do not exist.

The Commission has provided standards for determining whether a significant hazards consideration exists as stated in 10 CFR 50.92. A proposed amendment to an operating license for a facility involves a no significant hazards consideration if operation of the facility, in accordance with a proposed amendment, would not 1) involve a significant increase in the probability or consequences of an accident previously evaluated; 2) create the possibility of a new or different kind of accident from any accident previously evaluated; or 3) involve a significant reduction in a margin of safety. A discussion of these standards as they relate to this amendment request follows:

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

> The proposed changes provide more stringent requirements than previously existed in the CTS. The more stringent requirements will not result in operation that will increase the probability of initiating an analyzed event. If anything, the new requirements may decrease the probability or consequences of an analyzed event by incorporating the more restrictive changes discussed in the specific Discussion of Changes listed above. These changes will not alter assumptions relative to mitigation of an accident or transient event. The more restrictive requirements will not alter the operation and will continue to ensure process variables, structures, systems, or components are maintained consistent with safety analyses and licensing basis. These changes have been reviewed to ensure that no previously evaluated accident has been adversely affected. Therefore, these changes will not involve a significant increase in the probability or consequences of an accident evaluated.

TECHNICAL CHANGES - MORE RESTRICTIVE
(ITS 3.8.4 Discussion of Changes Labeled M.1 and M.2) (continued)

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

Making existing requirements more restrictive and adding more restrictive requirements to the CTS will not alter the plant configuration (no new or different type of equipment will be installed) or change the methods governing normal plant operation. These changes do impose different requirements. However, they are consistent with the assumptions made in the safety analyses, licensing basis, and NUREG-1432. Therefore, these changes will not create the possibility of a new or different kind of accident from any accident previously evaluated.

Standard 3.-- Does the proposed change involve a significant reduction in a margin of safety?

The proposed changes provide more stringent requirements than previously existed in the CTS. An evaluation of these changes concluded that adding these more restrictive requirements either increases or has no impact on the margin of safety. The changes provide additional restrictions which may enhance plant safety. These changes maintain requirements of the safety analysis, licensing basis, and NUREG-1432. As such, no question of safety is involved. Therefore, these changes will not involve a significant reduction in a margin of safety.

TECHNICAL CHANGES - RELOCATIONS
(ITS 3.8.4 Discussion of Changes Labeled LA.1, LA.2, and LA.3)

Arizona Public Service Company, Palo Verde Nuclear Generating Station (PVNGS), Units 1, 2, and 3 is converting to the ITS as outlined in NUREG-1432. The proposed changes, since detail is being removed from the CTS to a Licensee Controlled Document, are less restrictive. The descriptions of these changes are in the Discussion of Changes listed above.

The Commission has provided standards for determining whether a significant hazards consideration exists as stated in 10 CFR 50.92. A proposed amendment to an operating license for a facility involves a no significant hazards consideration if operation of the facility, in accordance with a proposed amendment, would not 1) involve a significant increase in the probability or consequences of an accident previously evaluated; 2) create the possibility of a new or different kind of accident from any accident previously evaluated; or 3) involve a significant reduction in a margin of safety. A discussion of these standards as they relate to this amendment request follows:

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

> The proposed changes relocate requirements from the CTS to a Licensee Controlled Document. These changes do not result in any hardware changes or changes to plant operating practices. The details being relocated are not assumed to be an initiator of any analyzed event. The Licensee Controlled Document containing the relocated requirements will be maintained using the provisions of 10 CFR 50.59 or other specified control processes and is subject to the change control process in the Administrative Controls Section of the ITS. Since any changes to a Licensee Controlled Document will be evaluated, no increase in the probability or consequences of an accident previously evaluated will be allowed. Therefore, these changes will not involve a significant increase in the probability or consequences of an accident previously evaluated.

TECHNICAL CHANGES - RELOCATIONS
(ITS 3.8.4 Discussion of Changes Labeled LA.1, LA.2, and LA.3) (continued)

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

The proposed changes relocate requirements from the CTS to a Licensee Controlled Document. These changes will not alter the plant configuration (no new or different type of equipment will be installed) or change the methods governing normal plant operation. These changes will not impose different requirements and adequate control of information will still be maintained. These changes will not alter assumptions made in the safety analysis or licensing basis. Therefore, these changes will not create the possibility of a new or different kind of accident from any accident previously evaluated.

Standard 3.-- Does the proposed change involve a significant reduction in a margin of safety?

The proposed changes relocate requirements from the CTS to a Licensee Controlled Document. These changes will not reduce a margin of safety since they have no impact on any safety analysis assumptions. In addition, the requirements to be transposed from the CTS to the Licensee Controlled Document are the same as the CTS. Since any future changes to this Licensee Controlled Document will be evaluated per the requirements of 10 CFR 50.59, or other specified control processes, no reduction (significant or insignificant) in a margin of safety will be allowed. Therefore, these changes will not involve a significant reduction in a margin of safety.

The NRC review provides a certain margin of safety, and although this review will no longer be performed prior to submittal, the NRC still inspects the 10 CFR 50.59 process. The proposed changes are consistent with NUREG-1432, which was approved by the NRC Staff. The change controls for proposed relocated details and requirements provide an acceptable level of regulatory authority. Revising the CTS to reflect the approved level of detail per NUREG-1432 reinforces the conclusion that there is not a significant reduction in the margin of safety. Therefore, revising the CTS to reflect the NRC accepted level of detail and requirements ensures no reduction in a margin of safety.

TECHNICAL CHANGES - LESS RESTRICTIVE
(ITS 3.8.4 Discussion of Changes Labeled L.1)

Arizona Public Service Company, Palo Verde Nuclear Generating Station (PVNGS), Units 1, 2, and 3 is converting to the ITS as outlined in NUREG-1432. The proposed change involves making the CTS less restrictive. Below is the description of this less restrictive change and the NSHC for the conversion to NUREG 1432.

L.1 ITS 3.8.4 adds the following Note to SRs 3.8.4.7 and 3.8.4.8, "This Surveillance shall not be performed in MODE 1, 2, 3, and 4. However, credit may be taken for unplanned events that satisfy this SR". ITS 3.8.4 adds the second sentence of this Note to SR 3.8.4.6. The CTS does not contain the allowance to take credit for unplanned events. Allowing unplanned events to take credit for Surveillance performance constitutes a less restrictive change. This is acceptable because there is no reason why an unplanned event would not suffice for satisfactory performance of the test provided sufficient information is collected to satisfy Surveillance test requirements. Operability can be demonstrated since the equipment itself cannot discriminate between an unplanned event or Surveillance performance. This change is consistent with NUREG-1432.

The Commission has provided standards for determining whether a significant hazards consideration exists as stated in 10 CFR 50.92. A proposed amendment to an operating license for a facility involves a no significant hazards consideration if operation of the facility, in accordance with a proposed amendment, would not 1) involve a significant increase in the probability or consequences of an accident previously evaluated; 2) create the possibility of a new or different kind of accident from any accident previously evaluated; or 3) involve a significant reduction in a margin of safety. A discussion of these standards as they relate to this amendment request follows:

TECHNICAL CHANGES - LESS RESTRICTIVE
(ITS 3.8.4 Discussion of Changes Labeled L.1) (continued)

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

The proposed change adds a Note to SRs 3.8.4.6, 3.8.4.7 and 3.8.4.8 which allows these SRs not to be performed in Modes 1, 2, 3, or 4. However, credit may be taken for unplanned events that satisfy these SRs. The reason for the Note is that performing the Surveillance would perturb the Electrical Distribution System and challenge safety systems. This change will not affect the probability of an accident. Not requiring the performance of these SRs while in Modes 1, 2, 3 or 4 is not an initiator of any analyzed event. The consequences of an accident is not significantly affected by this change. The change does not alter assumptions relative to the mitigation of an analyzed event. Therefore, the change will not involve a significant increase in the probability or consequence of an accident previously evaluated.

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

The proposed change adding the subject Note does not physically alter the plant (no new or different type of equipment will be installed. The change does not require any new or unusual operator actions. Therefore, this change does not create the possibility of a new or different kind of accident from any accident previously evaluated.

Standard 3.-- Does the proposed change involve a significant reduction in a margin of safety?

The proposed change adds a Note to SRs 3.8.4.6, 3.8.4.7, and 3.8.4.8 providing flexibility to the CTS by not requiring these SRs to be performed while in Modes 1, 2, 3, or 4. In addition, the Note allows credit to be taken in the case where an unplanned event occurs that satisfies the SR. The margin of safety is not affected by this change. The reason for the Note is that performing the SR during MODES 1, 2, 3, or 4 would perturb the Electrical Distribution System and challenge safety systems. Therefore, the change does not involve a significant reduction in a margin of safety.

TECHNICAL CHANGES - LESS RESTRICTIVE
(ITS 3.8.4 Discussion of Changes Labeled L.2)

Arizona Public Service Company, Palo Verde Nuclear Generating Station (PVNGS), Units 1, 2, and 3 is converting to the ITS as outlined in NUREG-1432. The proposed change involves making the CTS less restrictive. Below is the description of this less restrictive change and the NSHC for conversion to NUREG-1432.

L.2 CTS 4.2.8.1.e requires a performance discharge test be conducted at least once per 60 months. ITS SR 3.8.4.8 allows the flexibility to perform a modified performance test instead of a full performance test. The addition of this option constitutes a less restrictive change. This is acceptable because of 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. 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. This change is consistent with NUREG-1432.

The Commission has provided standards for determining whether a significant hazards consideration exists as stated in 10 CFR 50.92. A proposed amendment to an operating license for a facility involves a no significant hazards consideration if operation of the facility, in accordance with a proposed amendment, would not 1) involve a significant increase in the probability or consequences of an accident previously evaluated; 2) create the possibility of a new or different kind of accident from any accident previously evaluated; or 3) involve a significant reduction in a margin of safety. A discussion of these standards as they relate to this amendment request follows:

TECHNICAL CHANGES - LESS RESTRICTIVE
(ITS 3.8.4 Discussion of Changes Labeled L.2) (continued)

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

The propose change this change adds an allowance to perform a modified performance discharge test in lieu of a performance discharge test. The DC electrical power sources are use to support mitigation of the consequences of an accident; however, they are not considered the initiator of any previously analyzed accident. As such, the performance of a modified performance discharge test in lieu of a performance discharge test will not increase the probability of any accident previously evaluated. The proposed SR continues to provide adequate assurance of Operable batteries since the modified performance discharge test represents similar test of battery capacity. The only difference between the two tests is that the modified performance discharge test consists of a one-minute rate during the first minute. The remainder of the test is identical to the performance discharge test. This change will not affect the probability of an accident.

The addition of using a modified performance test for the 60 month battery discharge test is not an initiator of any analyzed event. The consequences of an accident is not significantly affected by this change.

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

The proposed change allows performance of a modified performance discharge test in lieu of a performance discharge test. This change will not physically alter the plant (no new or different type of equipment will be installed. The change does not require any new or unusual operator actions. Therefore, this change does not create the possibility of a new or different kind of accident from any accident previously evaluated.

TECHNICAL CHANGES - LESS RESTRICTIVE
(ITS 3.8.4 Discussion of Changes Labeled L.2) (continued)

Standard 3.-- Does the proposed change involve a significant reduction in a margin of safety?

The proposed change adds an allowance to perform a modified performance discharge test in lieu of a performance discharge test. This change does not involve a significant reduction in a margin of safety since the proposed substitution of the modified performance discharge test, in lieu of a performance discharge test, continues to provide adequate indication that the battery is capable of performing its design function. The ampere-hours removed by a rated one minute discharge represents a very small portion of the battery capacity, thus the test rate can be changed to that of the performance test without compromising the results of the performance discharge test. Therefore, the change does not involve a significant reduction in a margin of safety.

CE STS
NUREG-1432 REV. 1
SPECIFICATION 3.8.5
MARK UP

3.8 ELECTRICAL POWER SYSTEMS

3.8.5 DC Sources—Shutdown

LCO 3.8.5 DC electrical power subsystem shall be OPERABLE to support the DC electrical power distribution subsystem(s) required by LCO 3.8.10, "Distribution Systems—Shutdown."

<LCO 3.8.2.2>
<DOC A.2>

APPLICABILITY: MODES 5 and 6,
During movement of irradiated fuel assemblies. with the core off loaded

<DOC M.1>

4

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more required DC electrical power subsystems inoperable. (batteries, associated control equipment or cabling)	A.1 Declare affected required feature(s) inoperable.	Immediately
	OR	
	A.2.1 Suspend CORE ALTERATIONS.	Immediately
	AND	
	A.2.2 Suspend movement of irradiated fuel assemblies.	Immediately
	AND	
	A.2.3 Initiate action to suspend operations involving positive reactivity additions.	Immediately
	AND	
		(continued)

<ACT a>
<DOC M.2>
<DOC M.3>

2
3

<DOC>
<CTS>

ACTIONS

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

<ACT b> Insert 1 — 3

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.8.5.1 <DOC L.2>	------------------NOTE------------------ The following SRs are not required to be performed: SR 3.8.4.6, SR 3.8.4.7, and SR 3.8.4.8. ---------------------------------------	
<4.8.2.2> <DOC L.1>	For DC sources required to be OPERABLE, the following SRs are applicable: SR 3.8.4.1 SR 3.8.4.4 SR 3.8.4.7 SR 3.8.4.2 SR 3.8.4.5 SR 3.8.4.8. SR 3.8.4.3 SR 3.8.4.6	In accordance with applicable SRs

INSERT FOR ITS 3.8.5
ACTION B AND C
(Units 1, 2, and 3)
INSERT 1

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. Required battery charger, or associated control equipment or cabling inoperable.	B.1 Perform SR 3.8.6.1	1 hour AND Once per 8 hours thereafter
C. Required Action and associated Completion Time of Condition B not met.	C.1 Declare associated battery inoperable.	Immediately

CE STS

NUREG-1432 REV. 1

SPECIFICATION 3.8.5

BASES MARK UP

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."

---

u 2

APPLICABLE SAFETY ANALYSES

The initial conditions of Design Basis Accident (DBA) and transient analyses in the FSAR, Chapter 6 (Ref. 1) and Chapter 15 (Ref. 2), assume that Engineered Safety Feature (ESF) 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 the requirements for the supported systems' OPERABILITY.

The OPERABILITY of the minimum DC electrical power sources during MODES 5 and 6, and during movement of irradiated fuel assemblies ~~ensures that~~: with the core off loaded 4

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

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

c. Adequate DC electrical power is provided to mitigate events postulated during shutdown, such as a fuel handling accident.

The DC sources satisfy Criterion 3 of ~~the NRC Policy Statement~~.
10CFR 50.36 (c)(2)(ii) 1

LCO

The DC electrical power subsystems, each subsystem consisting of two batteries, one battery charger per battery, and the corresponding control equipment and interconnecting cabling within the train, are required to be

(continued)

BASES

LCO (continued)

OPERABLE to support required trains of distribution systems required OPERABLE by LCO 3.8.10, "Distribution Systems—Shutdown." This ensures the availability of sufficient DC electrical power sources to operate the unit in a safe manner and to mitigate the consequences of postulated events during shutdown (e.g., fuel handling accidents).

APPLICABILITY

The DC electrical power sources required to be OPERABLE in MODES 5 and 6, and during movement of irradiated fuel assemblies with the core offloaded provide assurance that: (4)

a. Required features needed to mitigate a fuel handling accident are available;

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

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

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

ACTIONS

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

If two 125 VDC trains are required per LCO 3.8.10, the remaining train with DC power available may be capable of supporting sufficient systems to allow continuation of CORE ALTERATIONS and fuel movement. By allowing the option to declare required features inoperable with the associated DC power source(s) inoperable, appropriate restrictions will be implemented in accordance with the affected required features LCO ACTIONS. In many instances, this option may involve undesired administrative efforts. Therefore, the allowance for sufficiently conservative actions is made (i.e., to suspend CORE ALTERATIONS, movement of irradiated fuel assemblies, and operations involving positive reactivity additions). The Required Action to suspend positive reactivity additions does not preclude actions to (1)

(continued)

BASES

ACTIONS

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

maintain or increase reactor vessel inventory, provided the required SDM is maintained.

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

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

Insert 1

3

SURVEILLANCE REQUIREMENTS

SR 3.8.5.1

SR 3.8.5.1 states that Surveillances required by SR 3.8.4.1 through SR 3.8.4.8 are applicable in these MODES. See the corresponding Bases for LCO 3.8.4 for a discussion of each SR.

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

REFERENCES

1. FSAR, Chapter ~~[~~6~~]~~.
2. FSAR, Chapter ~~[~~15~~]~~.

U

2

Palo Verde Units 1,2,3

A

INSERT FOR ITS BASES3.8.5
ACTIONS C AND D
(Units 1, 2, and 3)

INSERT 1

BASES

ACTIONS

B.1

Condition B represents one channel with a loss of ability to completely respond to a long term event, and a potential loss of ability to remain energized during normal operation. Since eventual failure of the battery to maintain the required battery cell parameters is highly probable, it is imperative that the operator's attention focus on stabilizing the unit and placing an associated battery charger (normal or backup) in service, thereby, minimizing the potential for complete loss of DC power to the affected channel. The additional time provided by the Completion Time is consistent with the battery's capability to maintain its short term capability to respond to a design basis event.

C.1

If the battery cell parameters cannot be maintained within Category A limits as specified in LCO 3.8.6, the short term capability of the battery is also degraded and the battery must be declared inoperable.

NUREG-1432 EXCEPTIONS
SPECIFICATION 3.8.5

1. Grammar and/or editorial changes have been made to enhance clarity. No technical or intent changes to the Specification are made by this change.

2. The plant specific titles, nomenclature, number, parameter/value, reference, system description, system design, operating practices or analysis description was used (additions, deletions, and/or changes are included). Plant specific parameters/values are directly transferred from the CTS to the ITS.

3. ITS 3.8.5 contains two additional Actions (B and C) that address the Condition of no battery chargers on a DC bus. These Actions allow continued operation providing the associated battery cell parameters meet Category A requirements. This is acceptable because the battery is monitored on an increased Frequency which takes into account a battery's ability to maintain its short term capability to respond to a design basis event. If the battery cell parameters cannot be maintained within Category A limits, the short term capability of the battery is degraded. This will then require monitoring battery cell parameters per LCO 3.8.6. Although this is a deviation from NUREG-1432, it is consistent with PVNGS licensing basis.

4. The Applicability of ITS LCO 3.8.5 has been modified to state, "During movement of irradiated fuel assemblies with the core off loaded." NUREG-1432, LCO 3.8.5 Applicability, does not contain the phrase "with the core off loaded" in its Applicability. This is acceptable because LCO 3.8.5, Required Actions A.2.1 and A.2.3, do not specify credible actions if moving irradiated fuel assemblies while in Mode 1, 2, 3, and 4. If moving irradiated fuel assemblies in Modes 1, 2, 3, or 4, the fuel movement is independent of reactor operations, therefore, suspending CORE ALTERATIONS or eliminating operations involving positive reactivity additions(LCO 3.8.5 Required Actions A.2.1 and A.2.3) on a reactor at power is not realistic or credible. This change is also in keeping with NUREG-1432 format in that Actions that address movement of irradiated fuels assemblies while shutdown are addressed in an LCO that is obviously written for shutdown conditions. This change is consistent with NUREG-1432.

PVNGS CTS
SPECIFICATION 3.8.5
MARK UP

A.2

A.1

3.8 ELECTRICAL POWER SYSTEMS

3.8.5 D.C. SOURCES - Shutdown

SHUTDOWN

~~LIMITING CONDITION FOR OPERATION~~

TO SUPPORT THE DC electrical power distribution subsystem(s) required by LCO 3.8.10, "Distribution Systems - Shutdown."

electrical power subsystem

LCO 3.8.5 ~~3.8.2.2~~ ~~As a minimum, one~~ D.C. ~~train as listed in Table 3.8-1~~ shall be OPERABLE ~~and energized~~.

M.3

APPLICABILITY: MODES 5 and 6. During movement of irradiated fuel assemblies with the core off loaded M.1

batteries, associated control equipment or cabling

ACTION: One or more

L.3

ACT A ~~With a~~ required ~~battery bank~~ inoperable, immediately suspend all operations involving CORE ALTERATIONS, positive reactivity changes ~~or~~ AND movement of irradiated fuel; initiate corrective action to restore the required D.C. train to OPERABLE status as soon as possible.

ADD REQ ACT A.1 OR

M.2

LA.1

ACT B ~~With a~~ required charger inoperable, either provide charging capability to the affected channel with the associated backup battery charger, or demonstrate the OPERABILITY of its associated battery bank by performing Surveillance Requirement ~~4.8.2.1a.1~~ within 1 hour, and at least once per 8 hours thereafter. If any Category A limit in

ACT C Table ~~4.8-2~~ is not met, declare the battery inoperable.

3.8.6.1 3.8.6.1

SURVEILLANCE REQUIREMENTS

L.1

SR 3.8.5.1 ~~4.8.2.2~~ The above required 125-volt battery banks and chargers shall be demonstrated OPERABLE per Surveillance Requirement ~~4.8.2.1~~.

SR 3.8.4.1 SR 3.8.4.5
SR 3.8.4.2 SR 3.8.4.6
SR 3.8.4.3 SR 3.8.4.7
SR 3.8.4.4 SR 3.8.4.8

ADD NOTE TO SR 3.8.5.1 L.2

DISCUSSION OF CHANGES
SPECIFICATION 3.8.5

ADMINISTRATIVE CHANGES

A.1 All reformatting and renumbering is in accordance with the Combustion Engineering Plant (CEOG) Standard Technical Specifications NUREG-1432, Rev. 1 (NUREG-1432). As a result, the Palo Verde Nuclear Generating Station (PVNGS) Improved Technical Specifications (ITS) should be more readable, and therefore understandable, by plant operators as well as other users. During the reformatting and renumbering of the ITS, no technical changes (either actual or interpretational) to the Current Technical Specification (CTS) were made unless they were identified and justified.

Editorial rewording (either adding or deleting) is made consistent with NUREG-1432. During NUREG-1432 development, certain wording preferences or English language conventions were adopted which resulted in no technical changes (either actual or interpretational) to the CTS.

Additional information has also been added to more fully describe each subsection. This wording is consistent with NUREG-1432. Since the design is already approved by the NRC, adding more detail does not result in a technical change.

A.2 CTS LCO 3.8.2.2 states, "As minimum one DC train listed in Table 3.8-1 shall be OPERABLE and energized". ITS LCO 3.8.4. only requires the DC trains required by LCO 3.8.10 to be Operable. PVNGS design is such that normal lineup (operation) has the battery chargers, being supplied by their associated 480 V AC MCCs, supplying their associated DC buses and the batteries connected to their associated DC buses on a trickle charge from the associated battery charger. The only time this would not be the case is during loss of offsite power event or loss of the MCC that supplies the battery charger. Therefore, during normal operations and by design, the required DC trains remain Operable and energized. As such, deleting the word "energized" in the ITS does not change any design or PVNGS current operating practices. This change is administrative and is consistent with NUREG-1432.

TECHNICAL CHANGES - MORE RESTRICTIVE

M.1 CTS Applicability is only for Modes 5 and 6. ITS Applicability is also for Modes 5 and 6 however, adds "During movement of irradiated fuel assemblies with the core off loaded." This is a more restrictive change. The additional Applicability condition provides further assurance that required features needed to mitigate a fuel handling accident are available. The CTS would require features necessary to: 1) Mitigate the events that can lead to core damage during shutdown. and 2) Instrument and control capability for monitoring and maintaining the unit in Modes 5 an 6 however, didn't really cover the condition of moving irradiated fuel with the core off loaded. The additional requirement is necessary to ensure adequate DC power is available when the vessel is unloaded and irradiated fuel is being handled. Although this is PVNGS current operating practice, CTS was mute on this condition. The addition of this requirement (condition) constitutes a more restrictive change to PVNGS plant operation. This change is consistent with NUREG-1432.

M.2 CTS 3.8.2.2. Action a states in part, "... positive reactivity changes or movement of irradiated fuel ..." ITS 3.8.5 Action A requires suspending CORE ALTERATION and movement of irradiated fuel. Replacing the "or" (CTS) with an "and" (ITS) removes flexibility by eliminating an option to be taken. Adding the "and" now makes the optional Action become a required Action. The addition of the "and" constitutes a more restrictive change to PVNGS operating practices. This change is consistent with NUREG-1432.

M.3 CTS 3.8.2.2 Action a states in part, "... required battery bank ..." ITS 3.8.5 Action A states in part, "... required batteries, associated control equipment or cabling ..." The addition of this information places additional requirements in the ITS Action that did not exist in CTS Action. The addition of this information in the Action constitutes a more restrictive change to PVNGS plant operation. This is acceptable because "associated control equipment and cabling" are considered part of the DC electrical subsystem as defined in the Bases. This change is consistent with NUREG-1432.

TECHNICAL CHANGES - RELOCATIONS

LA.1 CTS 3.8.2.2 Action b contains information detailing the option to place the backup battery charger in service. This information is not required to determine OPERABILITY of the DC power subsystem and therefore is being relocated to the Bases section. The LCO Action along with the associated description in the Bases is appropriate to ensure the required DC trains are Operable. In addition, this requirement does not meet the criterion of 10 CFR 50.36 (c) (2) (ii) for inclusion into ITS.

Any changes to the Bases will be in accordance with Chapter 5.0 Bases Control Program. Any technical changes to plant procedures will be in accordance with the PVNGS procedure control process. This provides an equivalent level of control and is an administrative change with no impact on the margin of safety. This requirement is not required to be in ITS to provide adequate protection of public health and safety. Therefore, relocation of this requirement to a Licensee Controlled Document is acceptable and is consistent with NUREG-1432.

TECHNICAL CHANGES - LESS RESTRICTIVE

L.1 CTS 4.8.2.2 requires the 125-volt battery banks and chargers shall be demonstrated OPERABLE per SR 4.8.2.1. CTS SR 4.8.2.1 contains numerous SRs. ITS 3.8.5.1 specifically identifies which SRs are applicable. As such, several of the SRs required by the CTS 4.8.2.1 (including those relocated to ITS LCO 3.8.6) are not applicable as part of ITS SR 3.8.5.1. This is therefore a less restrictive requirement.

L.2 ITS SR 3.8.5.1 adds a Note stating, "The following SRs are not required to be performed: SR 3.8.4.6, SR 3.8.4.7, and 3.8.4.8". SR 3.8.4.6 verifies that the battery charger supplies specific amps at a voltage for a specified period of time. SR 3.8.4.7 verifies battery capacity, while SR 3.8.4.8 verifies battery capacity per a discharge test. The CTS does not contain such a Note not requiring the subject SRs to be performed. The ITS Note was specifically added to preclude Operable DC sources from being discharged below their capability to provide the required power supply or otherwise rendered inoperable during the performance of SRs. It is the intent that these SRs must still be capable of being met (i.e., applicable), but actual performance is not required.

L.3 ITS 3.8.4 has an additional Required Action (A.1) that states "Declare affected required feature(s) inoperable." CTS 3.8.2.2 does not contain this Required Action. The addition of this Required Action constitutes a less restrictive change to PVNGS operating practices because it offers an option to suspending CORE ALTERATIONS, suspending movement of irradiated fuel, and initiating action to suspend operations involving positive reactivity additions.. This is acceptable because it allows the option to declare affected required feature(s), associated with an inoperable inverter(s), inoperable. This ensures appropriate restrictions are implemented in accordance with the affected required feature(s) LCOs' Required Actions due to inverter(s) inoperability. This change is consistent with NUREG-1432.

TECHNICAL CHANGES - CTS CHANGES

None

NO SIGNIFICANT HAZARDS CONSIDERATION
SPECIFICATION 3.8.5

ADMINISTRATIVE CHANGES
(ITS 3.8.5 Discussion of Changes Labeled A.1 and A.2)

Arizona Public Service Company, Palo Verde Nuclear Generating Station (PVNGS), Units 1, 2, and 3, is converting to the ITS as outlined in NUREG-1432, "Standard Technical Specifications, Combustion Engineering Plants." The proposed changes involve the reformatting, renumbering, rewording of the Technical Specifications (TS) and Bases with no change in intent, and the incorporation of current operating practices consistent with NUREG-1432. These changes, since they do not involve technical changes to the Current TS (CTS), are administrative. Below are the No Significant Hazards Consideration (NSHC) for the conversion of this Section/Chapter to NUREG-1432.

The Commission has provided standards for determining whether a significant hazards consideration exists as stated in 10 CFR 50.92. A proposed amendment to an operating license for a facility involves a no significant hazards consideration if operation of the facility, in accordance with a proposed amendment, would not 1) involve a significant increase in the probability or consequences of an accident previously evaluated; 2) create the possibility of a new or different kind of accident from any accident previously evaluated; or 3) involve a significant reduction in a margin of safety. A discussion of these standards as they relate to this amendment request follows:

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

> The proposed changes involve reformatting, renumbering, and rewording of the CTS and Bases along with incorporation of PVNGS current operating practices and other changes to the CTS as discussed in the specific Discussion of Changes listed above in order to be consistent with NUREG-1432. The reformatting, renumbering, and rewording along with the other changes listed above, involves no technical changes to the CTS. Specifically, there will be no change in the requirements imposed on PVNGS due to these changes. During development of NUREG-1432, certain wording preferences or English language conventions were adopted. The proposed changes to this Section/Chapter are administrative in nature and do not impact initiators of any analyzed events. They also do not impact the assumed mitigation of accidents or transient events. Therefore, these changes do not involve a significant increase in the probability or consequences of an accident previously evaluated.

ADMINISTRATIVE CHANGES
(ITS 3.8.5 Discussion of Changes Labeled (A.1 and A.2) (continued)

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

The proposed changes involve reformatting, renumbering, and rewording of the CTS, along with the incorporation of PVNGS current operating practices and other changes, as discussed, in order to be consistent with NUREG-1432. The proposed changes do not involve a physical alteration of the plant (no new or different type of equipment will be installed) or change the methods governing normal plant operation. The proposed changes will not impose any new or different requirements or eliminate any existing requirements. Therefore, these changes do not create the possibility of a new or different kind of accident from any accident previously evaluated.

Standard 3.-- Does the proposed change involve a significant reduction in a margin of safety?

The proposed changes involve reformatting, renumbering, and rewording of the CTS, along with the incorporation of PVNGS current operating practices and other changes, as discussed, in order to be consistent with NUREG-1432. The proposed changes are administrative in nature and will not involve any technical changes. The proposed changes will not reduce a margin of safety because they have no impact on any safety analysis assumptions. Also, because these changes are administrative in nature, no question of safety is involved. Therefore, these changes do not involve a significant reduction in a margin of safety.

TECHNICAL CHANGES - MORE RESTRICTIVE
(ITS 3.8.5 Discussion of Changes Labeled M.1, M.2 and M.3)

Arizona Public Service Company, Palo Verde Nuclear Generating Station (PVNGS), Units 1, 2, and 3 is converting to the ITS as outlined in NUREG-1432. This particular NSHC is for the changes labeled "Technical Changes - More Restrictive" described in the specific Discussion of Changes listed above. The proposed changes incorporate more restrictive changes into the CTS by either making current requirements more stringent or adding new requirements which currently do not exist.

The Commission has provided standards for determining whether a significant hazards consideration exists as stated in 10 CFR 50.92. A proposed amendment to an operating license for a facility involves a no significant hazards consideration if operation of the facility, in accordance with a proposed amendment, would not 1) involve a significant increase in the probability or consequences of an accident previously evaluated; 2) create the possibility of a new or different kind of accident from any accident previously evaluated; or 3) involve a significant reduction in a margin of safety. A discussion of these standards as they relate to this amendment request follows:

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

> The proposed changes provide more stringent requirements than previously existed in the CTS. The more stringent requirements will not result in operation that will increase the probability of initiating an analyzed event. If anything, the new requirements may decrease the probability or consequences of an analyzed event by incorporating the more restrictive changes discussed in the specific Discussion of Changes listed above. These changes will not alter assumptions relative to mitigation of an accident or transient event. The more restrictive requirements will not alter the operation and will continue to ensure process variables, structures, systems, or components are maintained consistent with safety analyses and licensing basis. These changes have been reviewed to ensure that no previously evaluated accident has been adversely affected. Therefore, these changes will not involve a significant increase in the probability or consequences of an accident evaluated.

TECHNICAL CHANGES - MORE RESTRICTIVE
(ITS 3.8.5 Discussion of Changes Labeled M.1, M.2 and M.3) (continued)

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

Making existing requirements more restrictive and adding more restrictive requirements to the CTS will not alter the plant configuration (no new or different type of equipment will be installed) or change the methods governing normal plant operation. These changes do impose different requirements. However, they are consistent with the assumptions made in the safety analyses, licensing basis, and NUREG-1432. Therefore, these changes will not create the possibility of a new or different kind of accident from any accident previously evaluated.

Standard 3.-- Does the proposed change involve a significant reduction in a margin of safety?

The proposed changes provide more stringent requirements than previously existed in the CTS. An evaluation of these changes concluded that adding these more restrictive requirements either increases or has no impact on the margin of safety. The changes provide additional restrictions which may enhance plant safety. These changes maintain requirements of the safety analysis, licensing basis, and NUREG-1432. As such, no question of safety is involved. Therefore, these changes will not involve a significant reduction in a margin of safety.

TECHNICAL CHANGES - RELOCATIONS
(ITS 3.8.5 Discussion of Changes Labeled LA.1)

Arizona Public Service Company, Palo Verde Nuclear Generating Station (PVNGS), Units 1, 2, and 3 is converting to the ITS as outlined in NUREG-1432. The proposed changes, since detail is being removed from the CTS to a Licensee Controlled Document, are less restrictive. The descriptions of these changes are in the Discussion of Changes listed above.

The Commission has provided standards for determining whether a significant hazards consideration exists as stated in 10 CFR 50.92. A proposed amendment to an operating license for a facility involves a no significant hazards consideration if operation of the facility, in accordance with a proposed amendment, would not 1) involve a significant increase in the probability or consequences of an accident previously evaluated; 2) create the possibility of a new or different kind of accident from any accident previously evaluated; or 3) involve a significant reduction in a margin of safety. A discussion of these standards as they relate to this amendment request follows:

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

> The proposed changes relocate requirements from the CTS to a Licensee Controlled Document. These changes do not result in any hardware changes or changes to plant operating practices. The details being relocated are not assumed to be an initiator of any analyzed event. The Licensee Controlled Document containing the relocated requirements will be maintained using the provisions of 10 CFR 50.59 or other specified control processes and is subject to the change control process in the Administrative Controls Section of the ITS. Since any changes to a Licensee Controlled Document will be evaluated, no increase in the probability or consequences of an accident previously evaluated will be allowed. Therefore, these changes will not involve a significant increase in the probability or consequences of an accident previously evaluated.

TECHNICAL CHANGES - RELOCATIONS
(ITS 3.8.5 Discussion of Changes Labeled LA.1) (continued)

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

The proposed changes relocate requirements from the CTS to a Licensee Controlled Document. These changes will not alter the plant configuration (no new or different type of equipment will be installed) or change the methods governing normal plant operation. These changes will not impose different requirements and adequate control of information will still be maintained. These changes will not alter assumptions made in the safety analysis or licensing basis. Therefore, these changes will not create the possibility of a new or different kind of accident from any accident previously evaluated.

Standard 3.-- Does the proposed change involve a significant reduction in a margin of safety?

The proposed changes relocate requirements from the CTS to a Licensee Controlled Document. These changes will not reduce a margin of safety since they have no impact on any safety analysis assumptions. In addition, the requirements to be transposed from the CTS to the Licensee Controlled Document are the same as the CTS. Since any future changes to this Licensee Controlled Document will be evaluated per the requirements of 10 CFR 50.59, or other specified control processes, no reduction (significant or insignificant) in a margin of safety will be allowed. Therefore, these changes will not involve a significant reduction in a margin of safety.

The NRC review provides a certain margin of safety, and although this review will no longer be performed prior to submittal, the NRC still inspects the 10 CFR 50.59 process. The proposed changes are consistent with NUREG-1432, which was approved by the NRC Staff. The change controls for proposed relocated details and requirements provide an acceptable level of regulatory authority. Revising the CTS to reflect the approved level of detail per NUREG-1432 reinforces the conclusion that there is not a significant reduction in the margin of safety. Therefore, revising the CTS to reflect the NRC accepted level of detail and requirements ensures no reduction in a margin of safety.

TECHNICAL CHANGES - LESS RESTRICTIVE
(ITS 3.8.5 Discussion of Changes Labeled L.1)

Arizona Public Service Company, Palo Verde Nuclear Generating Station (PVNGS), Units 1, 2, and 3 is converting to the ITS as outlined in NUREG-1432. The proposed change involves making the CTS less restrictive. Below is the description of this less restrictive change and the NSHC for the conversion to NUREG 1432.

L.1 CTS 4.8.2.2 requires the 125-volt battery banks and chargers shall be demonstrated OPERABLE per SR 4.8.2.1. CTS SR 4.8.2.1 contains numerous SRs. ITS 3.8.5.1 specifically identifies which SRs are applicable. As such, several of the SRs required by the CTS 4.8.2.1 (including those relocated to ITS LCO 3.8.6) are not applicable as part of ITS SR 3.8.5.1. This is therefore a less restrictive requirement.

The Commission has provided standards for determining whether a significant hazards consideration exists as stated in 10 CFR 50.92. A proposed amendment to an operating license for a facility involves a no significant hazards consideration if operation of the facility, in accordance with a proposed amendment, would not 1) involve a significant increase in the probability or consequences of an accident previously evaluated; 2) create the possibility of a new or different kind of accident from any accident previously evaluated; or 3) involve a significant reduction in a margin of safety. A discussion of these standards as they relate to this amendment request follows:

TECHNICAL CHANGES - LESS RESTRICTIVE
(ITS 3.8.5 Discussion of Changes Labeled L.1) (continued)

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

This change will not affect the probability of an accident. The subject SRs CTS 4.8.2.1.a.1. 4.8.2.1.b.1 and 4.8.2.1.b.3 will be performed as part of ITS 3.8.6. Performance or non-performance of the subject SRs are not an initiator of any analyzed event. The consequences of an accident is not significantly affected by this change since the subject CTS SRs will be performed at the same Frequency per ITS 3.8.6.

The change does not alter assumptions relative to the mitigation of an analyzed event. Therefore, the change will not involve a significant increase in the probability of consequence of an accident previously evaluated.

CTS SR 4.8.2.2 requires the 125 Volt battery banks and chargers shall be demonstrated Operable per CTS 4.8.2.1. This CTS SR contains several SRs demonstrating battery and charger Operability. ITS 3.8.5.1 also identifies several SRs which are required to demonstrate DC sources to be Operable. ITS 3.8.5.1 however, does not require SRs CTS 4.8.2.1.a.1, 4.8.2.1.b.1 and 4.8.2.1.b.3 to be performed as a function of ITS 3.8.5.1. CTS 4.8.2.1 would require these SRs to be performed.

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

The proposed change provides some flexibility in that SRs 4.8.2.1.a.1, 4.8.2.1.b.1 and 4.8.2.1.b.3 do not have to be performed under the same conditions in the ITS. This change will not physically alter the plant (no new or different type of equipment will be installed. The change does not require any new or unusual operator actions. Therefore, this change does not create the possibility of a new or different kind of accident from any accident previously evaluated.

TECHNICAL CHANGES - LESS RESTRICTIVE
(ITS 3.8.5 Discussion of Changes Labeled L.1) (continued)

Standard 3. -- Does the proposed change involve a significant reduction in a margin of safety?

The proposed change eliminates the need to perform CTS SRs 4.8.2.1.a.1, 4.8.2.1.b.1 or 4.8.2.1.b.3 in order to demonstrate the battery and charger Operable. These SRs will be performed per ITS 3.8.6. The battery and chargers will still be sufficiently tested demonstrating Operability. Therefore, the change does not involve a significant reduction in a margin of safety.

TECHNICAL CHANGES - LESS RESTRICTIVE
(ITS 3.8.5 Discussion of Changes Labeled L.2)

Arizona Public Service Company, Palo Verde Nuclear Generating Station (PVNGS), Units 1, 2, and 3 is converting to the ITS as outlined in NUREG-1432. The proposed change involves making the CTS less restrictive. Below is the description of this less restrictive change and the NSHC for conversion to NUREG-1432.

L.2 ITS SR 3.8.5.1 adds a Note stating, "The following SRs are not required to be performed: SR 3.8.4.6, SR 3.8.4.7, and 3.8.4.8". SR 3.8.4.6 verifies that the battery charger supplies specific amps at a voltage for a specified period of time. SR 3.8.4.7 verifies battery capacity, while SR 3.8.4.8 verifies battery capacity per a discharge test. The CTS does not contain such a Note not requiring the subject SRs to be performed. The ITS Note was specifically added to preclude Operable DC sources from being discharged below their capability to provide the required power supply or otherwise rendered inoperable during the performance of SRs. It is the intent that these SRs must still be capable of being met (i.e., applicable), but actual performance is not required.

The Commission has provided standards for determining whether a significant hazards consideration exists as stated in 10 CFR 50.92. A proposed amendment to an operating license for a facility involves a no significant hazards consideration if operation of the facility, in accordance with a proposed amendment, would not 1) involve a significant increase in the probability or consequences of an accident previously evaluated; 2) create the possibility of a new or different kind of accident from any accident previously evaluated; or 3) involve a significant reduction in a margin of safety. A discussion of these standards as they relate to this amendment request follows:

TECHNICAL CHANGES - LESS RESTRICTIVE
(ITS 3.8.5 Discussion of Changes Labeled L.2) (continued)

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

ITS 3.8.5 adds a Note which does not require SRs 3.8.4.6, 3.8.4.7 or 3.8.4.8 to be performed for when DC sources are required to be Operable. The purpose of the Note is to preclude requiring the Operable DC sources from being discharged below their capability to provide the required power supply or otherwise rendered inoperable during the performance of the SRs. Although the subject SRs are not required to be performed, it is the intent that they must still be capable of being met, but actual performance is not required. This change will not affect the probability of an accident. The consequences of an accident is not significantly affected by this change. The change does not alter assumptions relative to the mitigation of an analyzed event. Therefore, the change will not involve a significant increase in the probability or consequence of an accident previously evaluated.

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

This change will not physically alter the plant (no new or different type of equipment will be installed. The change does not require any new or unusual operator actions. Therefore, this change does not create the possibility of a new or different kind of accident from any accident previously evaluated.

Standard 3.-- Does the proposed change involve a significant reduction in a margin of safety?

The proposed change adds a Note not requiring ITS SRs 3.8.4.6, 3.8.4.7, or 3.8.4.8 to be performed for DC sources required to be Operable. The Note is specifically added to preclude requiring the Operable DC sources from being discharged below their capability to provide the required power supply or otherwise rendered inoperable during the performance of SRs. It is the intent that these SRs must still be capable of being met, but actual performance is not required. Although not required to be performed per ITS SR 3.8.5.1, SR 3.8.5.6, 3.8.5.7 and 3.8.5.8 will be performed at their specified Frequencies. Therefore, demonstrating Operability. Therefore, the change does not involve a significant reduction in a margin of safety.

TECHNICAL CHANGES - LESS RESTRICTIVE
(ITS 3.8.5 Discussion of Changes Labeled L.3)

Arizona Public Service Company, Palo Verde Nuclear Generating Station (PVNGS), Units 1, 2, and 3 is converting to the ITS as outlined in NUREG-1432. The proposed change involves making the CTS less restrictive. Below is the description of this less restrictive change and the NSHC for conversion to NUREG-1432.

L.3 ITS 3.8.4 has an additional Required Action (A.1) that states "Declare affected required feature(s) inoperable." CTS 3.8.2.2 does not contain this Required Action. The addition of this Required Action constitutes a less restrictive change to PVNGS operating practices because it offers an option to suspending CORE ALTERATIONS, suspending movement of irradiated fuel, and initiating action to suspend operations involving positive reactivity additions.. This is acceptable because it allows the option to declare affected required feature(s), associated with an inoperable inverter(s), inoperable. This ensures appropriate restrictions are implemented in accordance with the affected required feature(s) LCOs' Required Actions due to inverter(s) inoperability. This change is consistent with NUREG-1432.

The Commission has provided standards for determining whether a significant hazards consideration exists as stated in 10 CFR 50.92. A proposed amendment to an operating license for a facility involves a no significant hazards consideration if operation of the facility, in accordance with a proposed amendment, would not 1) involve a significant increase in the probability or consequences of an accident previously evaluated; 2) create the possibility of a new or different kind of accident from any accident previously evaluated; or 3) involve a significant reduction in a margin of safety. A discussion of these standards as they relate to this amendment request follows:

TECHNICAL CHANGES - LESS RESTRICTIVE
(ITS 3.8.5 Discussion of Changes Labeled L.3) (continued)

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

> The proposed change affords the option to declare affected required feature(s) inoperable rather than suspend CORE ALTERATIONS, suspend movement of irradiated fuel assemblies, and initiate action to suspend operations involving positive reactivity additions. Though suspending CORE ALTERATIONS, movement of irradiated fuel assemblies, and initiating action to suspend operations involving positive reactivity additions are derived from design basis accidents, the option to declare affected required feature(s) inoperable will ensure appropriate LCOs are entered and appropriate compensatory actions are performed. The Action to declare affected required feature(s) inoperable or to suspend CORE ALTERATIONS, suspend movement of irradiated fuel assemblies, and initiate action to suspend operations involving positive reactivity additions minimizes the probability of the occurrence of postulated events. This change will not affect the probability of an accident. The Action to declare affected required feature(s) inoperable is not an initiator of any analyzed event. The consequences of an accident are not significantly affected by this change. Also, this Action ensures appropriate restrictions are implemented in accordance with the affected required features LCOs' Required Actions due to inverter(s) inoperability. The change does not alter assumptions relative to the mitigation of an analyzed event. Therefore, the change will not involve a significant increase in the probability or consequence of an accident previously evaluated.

TECHNICAL CHANGES - LESS RESTRICTIVE
(ITS 3.8.5 Discussion of Changes Labeled L.3) (continued)

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

The proposed change affords the option to declare affected required feature(s) inoperable rather than suspend CORE ALTERATIONS, suspend movement of irradiated fuel assemblies, and initiate action to suspend operations involving positive reactivity additions. While loss of a required support function (inverters), during shutdown conditions is an unanalyzed condition, the unit will declare the required support feature(s) inoperable, or secure various evolutions (Core Alterations, movement of irradiated fuel, operations involving positive reactivity changes). As a result, this change will not allow continued CORE ALTERATIONS, movement of irradiated fuel assemblies, or positive reactivity additions unless appropriate compensatory Actions (declaring affected required feature(s) inoperable)are taken. This change will not physically alter the plant (no new or different type of equipment will be installed). The change does not require any new or unusual operator actions. Therefore, this change does not create the possibility of a new or different kind of accident from any accident previously evaluated.

Standard 3.-- Does the proposed change involve a significant reduction in a margin of safety?

The proposed change affords the option to declare affected required feature(s) inoperable rather than suspend CORE ALTERATIONS, suspend movement of irradiated fuel assemblies, and initiate action to suspend operations involving positive reactivity additions. The margin of safety is not affected by this change. Whether declaring affected required feature(s) inoperable or suspending CORE ALTERATIONS, movement of irradiated fuel assemblies, and initiating action to suspend operations involving positive reactivity additions, appropriate LCOs are entered and appropriate compensatory Actions are performed. Therefore, the change does not involve a significant reduction in a margin of safety.

CE STS
NUREG-1432 REV. 1
SPECIFICATION 3.8.6
MARK UP

<DOC>
<CTS>

3.8 ELECTRICAL POWER SYSTEMS

3.8.6 Battery Cell Parameters

LCO 3.8.6 Battery cell parameters for the Train A and Train B batteries shall be within the limits of Table 3.8.6-1.

<DOC M1>

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

<DOC M1>

ACTIONS

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

CONDITION	REQUIRED ACTION	COMPLETION TIME
<DOC M.1> <DOC L.5> A. One or more batteries with one or more battery cell parameters not within Category A or B limits.	A.1 Verify pilot cells electrolyte level and float voltage meet Table 3.8.6-1 Category C limits.	1 hour 2
	AND	
<TABLE 4.8-2>	A.2 Verify battery cell parameters meet Table 3.8.6-1 Category C limits.	24 hours *AND* Once per 7 days thereafter
	AND	
<DOC L.1> <TABLE 4.8-2>	A.3 Restore battery cell parameters to Category A and B limits of Table 3.8.6-1.	31 days

(continued)

<DOC>
<CTS>

ACTIONS (continued)

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

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
<4.8.2.1.9.1> SR 3.8.6.1 Verify battery cell parameters meet Table 3.8.6-1 Category A limits.	7 days

(continued)

<DOC>
<CTS>

SURVEILLANCE REQUIREMENTS (continued)

	SURVEILLANCE	FREQUENCY
SR 3.8.6.2 <4.8.2.1.b.1>	Verify battery cell parameters meet Table 3.8.6-1 Category B limits.	92 days AND Once within ~~24 hours~~ 7 days (3) after battery discharge < ~~[110]~~ 105 (2) V AND Once within ~~24 hours~~ after battery overcharge > [150] V (2)
SR 3.8.6.3 <4.8.2.1.b.3>	Verify average electrolyte temperature of representative cells is ≥ [60]°F. (2)	92 days

Palo Verde Units 1, 2, 3

A

<DOC>
<CTS>

Table 3.8.6-1 (page 1 of 1)
Battery Surveillance Requirements

<TABLE 4.8-2>

PARAMETER	CATEGORY A: LIMITS FOR EACH DESIGNATED PILOT CELL	CATEGORY B: LIMITS FOR EACH CONNECTED CELL	CATEGORY C: ALLOWABLE LIMITS FOR EACH CONNECTED CELL
Electrolyte Level	> Minimum level indication mark, and ≤ ¼ inch above maximum level indication mark[a]	> Minimum level indication mark, and ≤ ¼ inch above maximum level indication mark[a]	Above top of plates, and not overflowing
Float Voltage	≥ 2.1~~3~~ 8 V	≥ 2.1~~3~~ 8 V	> 2.~~07~~ 14 V
Specific Gravity[b][c]	≥ ~~[1.200]~~ 1.290	≥ ~~[1.195]~~ 1.280	Not more than 0.020 below average connected cells AND Average of all connected cells ≥ ~~[1.195]~~ 1.28

2

<DOC L.3> (a) It is acceptable for the electrolyte level to temporarily increase above the specified maximum during equalizing charges provided it is not overflowing.

<DOC L.2> (b) Corrected for electrolyte temperature and level. Level correction is not required, however, when battery charging is < ~~[2]~~ amps when on float charge.

<DOC M.2> (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.

CE STS
NUREG-1432 REV. 1
SPECIFICATION 3.8.6
BASES MARK UP

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."

2

APPLICABLE SAFETY ANALYSES

The initial conditions of u Design Basis Accident (DBA) and transient analyses in the FSAR, Chapter ~~[6]~~ (Ref. 1) and Chapter ~~[15]~~ (Ref. 2), assume Engineered Safety Feature (ESF) 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. 1

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

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

b. A worst case single failure.

Battery cell parameters satisfy Criterion 3 of ~~the NRC Policy Statement~~. 10CFR50.36(c)(2)(ii) 1

LCO

Battery cell parameters must remain within acceptable limits to ensure availability of the required DC power to shut down the reactor and maintain it in a safe condition after an anticipated operational occurrence (AOO) or a postulated DBA. Electrolyte limits and cell voltage are conservatively established, allowing continued DC electrical system function even with Category A and B limits not met. 1 Train A batteries are composed of the channel A and channel C batteries. Train B batteries are composed of the channel B and channel D batteries. 2

(continued)

AS

BASES (continued)

APPLICABILITY

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

are

and cell voltage

1

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, the battery is degraded but there is still sufficient capacity to perform the intended function. Therefore, the affected battery is not required to be considered inoperable solely as a result of Category A or B limits not met, and 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). This check will provide a quick indication of the status of the remainder of the battery cells. One hour provides time to inspect the electrolyte level and to confirm the float voltage of the pilot cells. One hour is considered a reasonable amount of time to perform the required verification.

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

1

electrolyte level, temperature, cell voltage, and

(continued)

BASES

ACTIONS

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

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

B.1

With one or more batteries with one or more battery cell parameters outside the Category C limit for any connected cell, sufficient capacity to supply the maximum expected load requirement is not assured and the corresponding DC electrical power subsystem must be declared inoperable. Additionally, other potentially extreme conditions, such as not completing any of the Required Actions of Condition A within the required Completion Time or average electrolyte temperature of representative cells falling below 60°F, are also cause for immediately declaring the associated DC electrical power subsystem inoperable. 1

SURVEILLANCE REQUIREMENTS

SR 3.8.6.1

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

SR 3.8.6.2

3

The quarterly inspection of specific gravity and voltage is consistent with IEEE-450 (Ref. 3). In addition, within ~~24 hours~~ 7 days of a battery discharge < ~~[110]~~ 105 (2) V or a battery overcharge > [150] V, the battery must be demonstrated to meet Category B limits. Transients, such as motor starting transients, which may momentarily cause battery voltage to drop to ≤ ~~[110]~~ 105 (2) V, do not constitute a battery discharge

(continued)

Palo Verde Units 1,2,3

BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.6.2 (continued)

provided the battery terminal voltage and float current return to pre-transient values. This inspection is also consistent with IEEE-450 (Ref. 3), which recommends special inspections following a severe discharge or overcharge, to ensure that no significant degradation of the battery occurs as a consequence of such discharge or overcharge.

SR 3.8.6.3

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

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

Table 3.8.6-1

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

Category A defines the normal parameter limit for each designated pilot cell in each battery. The cells selected as pilot cells are those whose 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 ½ 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~~ (a) to Table 3.8.6-1 permits the electrolyte level to be above the specified maximum level during equalizing charge, provided it is not overflowing. These limits ensure that the plates

(continued)

BASES

SURVEILLANCE REQUIREMENTS

Table 3.8.6-1 (continued)

suffer no physical damage, and that adequate electron transfer capability is maintained in the event of transient conditions. IEEE-450 (Ref. 3) recommends that electrolyte level readings should be made only after the battery has been at float charge for at least 72 hours.

4

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 battery vendor 2.18 2 2.18

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

2 1.29

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

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

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

1.28 2 1.29

(continued)

BASES

SURVEILLANCE REQUIREMENTS

Table 3.8.6-1 (continued)

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

The Category C limit specified for electrolyte level (above the top of the plates and not overflowing) ensures that the plates suffer no physical damage and maintain adequate electron transfer capability. The ~~Category C Allowable Value for float voltage is based on IEEE-450 (Ref. 3)~~ Vendor recommendations, which states that a cell voltage of ~~2.07~~ 2.14 V or below, under float conditions and not caused by elevated temperature of the cell, indicates internal cell problems and may require cell replacement. 4

The Category C limit of average specific gravity ≥ ~~1.195~~ 1.28 is based on manufacturer recommendations (0.020 below the manufacturer recommended fully charged, nominal specific gravity). In addition to that limit, it is required that the specific gravity for each connected cell must be no less than 0.020 below the average of all connected cells. This limit ensures that the effect of a highly charged or new cell does not mask overall degradation of the battery. 2

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

Because of specific gravity gradients that are produced during the recharging process, delays of several days may occur while waiting for the specific gravity to stabilize. A stabilized charger current is an acceptable alternative to specific gravity measurement for determining the state of charge. This phenomenon is discussed in IEEE-450 (Ref. 3). Footnote (c) to Table 3.8.6-1 allows the float charge current to be used as an alternate to specific gravity for

(continued)

BASES

SURVEILLANCE REQUIREMENTS

Table 3.8.6-1 (continued)

up to [7] days following a battery equalizing 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.

~~Reviewer's Note: The value of [2] amps used in footnote (b) and (c) is the nominal value for float current established by the battery vendor as representing a fully charged battery with an allowance for overall battery condition.~~ 1

REFERENCES

1. FSAR, Chapter [6] U 2
2. FSAR, Chapter [15].
3. IEEE-450-[1980].

Bb Verb. Units 1,2,3

NUREG-1432 EXCEPTIONS
SPECIFICATION 3.8.6

1. Grammar and/or editorial changes have been made to enhance clarity. No technical or intent changes to the Specification are made by this change.

2. The plant specific titles, nomenclature, number, parameter/value, reference, system description, system design, operating practices or analysis description was used (additions, deletions, and/or changes are included). Plant specific parameters/values are directly transferred from the CTS to the ITS.

3. NUREG-1432 SR 3.8.6.2 requires that battery cell parameters be checked to meet Category B limits within 24 hours of a battery discharge (< 105 V) or overcharge (> 150 V). ITS SR 3.8.6.2 performs this SR, for the same reason, within 7 days after battery discharge or overcharge, rather than within 24 hours. This is acceptable because IEEE-450 recommends a period of several days prior to verifying cell parameters (electrolyte level and specific gravity) to allow battery parameters to stabilize. This is a deviation from NUREG-1432 but is consistent with PVNGS licensing basis.

4. NUREG-1432 Specification 3.8.6 Bases makes several references to IEEE-450 for minimum cell voltage limits. ITS references the specific battery manufacturer (AT&T) for batteries used at PVNGS for minimum cell voltage limits. This is acceptable because PVNGS uses a high acid concentration electrolyte in its batteries which is not assumed by IEEE-450. Although most information in IEEE-450 is applicable to PVNGS batteries, the information concerning minimum cell voltage limits are not applicable to PVNGS. This is a deviation from NUREG-1432 but is consistent with PVNGS licensing basis.

PVNGS CTS
SPECIFICATION 3.8.6
MARK UP

SPECIFICATION 3.8.6
(3.8.4/3.8.6)

3.8 ELECTRICAL POWER SYSTEMS A.1

3.8.6 ~~3/4.8.2~~ ~~D.C.~~ SOURCES BATTERY CELL PARAMETERS

~~OPERATNG~~

~~LIMITING CONDITION FOR OPERATION~~

ITS 3.8.6

ITS 3.8.4 3.8.2.1 As a minimum the D.C. trains listed in Table 3.8-1 shall be OPERABLE and energized.

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

ACTION:

a. With one of the required D.C. trains inoperable, restore the inoperable D.C. trains to OPERABLE status within 2 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

b. With one of the required chargers inoperable, either provide charging capability to the affected channel with the associated backup battery charger, or demonstrate the OPERABILITY of its associated battery bank by performing Surveillance Requirement 4.8.2.1a.1. within M.1

ITS 3.8.4 1 hour, and at least once per 8 hours thereafter. If any Category A and B

ITS 3.8.6 Cond A limit in Table ~~4.8-2~~ 3.8.6-1 is not met, declare the battery inoperable. L.5

ITS 3.8.4 A.1

SURVEILLANCE REQUIREMENTS

ITS 3.8.4 4.8.2.1 Each 125-volt battery bank and charger shall be demonstrated OPERABLE:

ITS 3.8.4/3.8.6 ~~a.~~ At least once per 7 days by verifying that:

SR 3.8.6.1 ~~1.~~ The parameters in Table ~~4.8-2~~ 3.8.6-1 meet the Category A limits, and

ITS 3.8.4 2. The total battery terminal voltage is greater than or equal to 129 volts on float charge (Exide) or 131 volts on float charge (AT&T).

M.1

ADD LCO 3.8.6
Applicability
ACT note
REQ ACT A
ACT B

SPECIFICATION 3.8.6
(3.8.4 / 3.8.6)

ELECTRICAL POWER SYSTEMS

SURVEILLANCE REQUIREMENTS (Continued)

ITS 3.8.6

SR 3.8.6.2

~~b.~~ At least once per 92 days and within 7 days after a battery discharge with battery terminal voltage below 105 volts, or battery overcharge with battery terminal voltage above 150 volts, by verifying that:

~~1.~~ The parameters in Table ~~4.8-2~~ 3.8.6-1 meet the Category B limits,

ITS 3.8.4

2. There is no visible corrosion at either terminals or connectors, or the connection resistance of these items is less than 150 x 10^{-6} ohms, and

ITS 3.8.6

SR 3.8.6.3

~~3.~~ The average electrolyte temperature of six connected cells is above 60°F.

ITS 3.8.4

c. At least once per 18 months by verifying that:

1. The cells, cell plates, and battery racks show no visual indication of physical damage or abnormal deterioration,

2. The cell-to-cell and terminal connections are clean, tight, and coated with anticorrosion material,

3. The resistance of each cell-to-cell and terminal connection is less than or equal to 150 x 10^{-6} ohms, and

4. The battery charger will supply at least 400 amperes for batteries A and B and 300 amperes for batteries C and D at 125 volts for at least 8 hours.

d. At least once per 18 months, during shutdown, by verifying that the battery capacity is adequate to supply and maintain in OPERABLE status all of the actual or simulated emergency loads for the design duty cycle when the battery is subjected to a battery service test.

e. At least once per 60 months, during shutdown, by verifying that the battery capacity is at least 80% (Exide) or 90% (AT&T) of the manufacturer's rating when subjected to a performance discharge test. This performance discharge test may be performed in lieu of the battery service test required by Surveillance Requirement 4.8.2.1d.

f. Annual performance discharge tests of battery capacity shall be given to any battery that shows signs of degradation or has reached 85% of the service life expected for the application. Degradation is indicated when the battery capacity drops more than 10% (Exide) or 5% (AT&T) of rated capacity from its average on previous performance tests, or is below 90% (Exide) or 95% (AT&T) of the manufacturer's rating.

TABLE 4.8-2 (EXIDE)

BATTERY SURVEILLANCE REQUIREMENTS

	CATEGORY A(1)	CATEGORY B(2)	
Parameter	Limits for each designated pilot cell	Limits for each connected cell	Allowable(3) value for each connected cell
Electrolyte Level	>Minimum level indication mark, and ≤ ¼" above maximum level indication mark	>Minimum level indication mark, and ≤ ¼" above maximum level indication mark	Above top of plates, and not overflowing
Float Voltage	≥ 2.13 volts	≥ 2.13 volts(a)	> 2.07 volts
Specific Gravity(b)		≥ 1.195	Not more than 0.020 below the average of all connected cells
	≥ 1.200(c)	Average of all connected cells > 1.205	Average of all connected cells ≥ 1.195(c)

(1) For any Category A parameter(s) outside the limit(s) shown, the battery may be considered OPERABLE provided that within 24 hours all the Category B measurements are taken and found to be within their allowable values, and provided all Category A and B parameter(s) are restored to within limits within the next 6 days.

(2) For any Category B parameter(s) outside the limit(s) shown, the battery may be considered OPERABLE provided that the Category B parameters are within their allowable values and provided the Category B parameter(s) are restored to within limits within 7 days.

(3) Any Category B parameter not within its allowable value, declare the battery inoperable.

(a) Corrected for average electrolyte temperature.

(b) Corrected for electrolyte temperature and level.

(c) Or battery charging current is less than 2 amps when on charge.

A.2

A1

TABLE 3.8.6-1

~~TABLE 4.8-2 (AT&T)~~

BATTERY SURVEILLANCE REQUIREMENTS

<TABLE 3.8.6.1>

Parameter	CATEGORY A(1)	CATEGORY B(2)	CATEGORY C
	Limits for each designated pilot cell	Limits for each connected cell	Allowable(3) value for each connected cell
Electrolyte Level	>Minimum level indication mark, and ≤ ¼" above maximum level indication mark (a) L.3	>Minimum level indication mark, and ≤ ¼" above maximum level indication mark (a) L.3	Above top of plates, and not overflowing
Float Voltage	≥ 2.18 volts	≥ 2.18 volts ~~(a)~~ L.4	> 2.14 volts
Specific Gravity(b)(c) M.2		≥ 1.280	Not more than 0.020 below the average of all connected cells
	≥ 1.290 ~~(c)~~ M.2	LA.1 ~~Average of all connected cells > 1.290~~	Average of all connected cells ≥ 1.280 ~~(c)~~ M.2

<ACT A> (1) For any Category A parameter(s) outside the limit(s) shown, the battery may be considered OPERABLE provided that within 24 hours all the Category ~~B~~ C measurements are taken and found to be within their allowable values, and provided all Category A and B parameter(s) are restored to within limits within the next ~~7~~ 31 days. L1

<ACT A> (2) For any Category B parameter(s) outside the limit(s) shown, the battery may be considered OPERABLE provided that the Category ~~B~~ C parameters are within their allowable values and provided the Category B parameter(s) are restored to within limits within ~~7~~ 31 days.

<ACT B> (3) Any Category ~~B~~ C parameter not within its allowable value, declare the battery inoperable.

~~(a) Corrected for average electrolyte temperature.~~ L.4

<TABLE 3.8.6-1> (b) Corrected for electrolyte temperature and level. Level correction is not required ~~however, when battery charging is < 2 amps when on float charge.~~ L.2

(c) ~~Or battery charging current is less than 2 amps when on 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. M.2

L.3 (a) It is acceptable for the electrolyte level to temporarily increase above the specified maximum during equalizing charges provided it is not overflowing.

DISCUSSION OF CHANGES
SPECIFICATION 3.8.6

ADMINISTRATIVE CHANGES

A.1 All reformatting and renumbering is in accordance with the Combustion Engineering Plant (CEOG) Standard Technical Specifications NUREG-1432, Rev. 1 (NUREG-1432). As a result, the Palo Verde Nuclear Generating Station (PVNGS) Improved Technical Specifications (ITS) should be more readable, and therefore understandable, by plant operators as well as other users. During the reformatting and renumbering of the ITS, no technical changes (either actual or interpretational) to the Current Technical Specification (CTS) were made unless they were identified and justified.

Editorial rewording (either adding or deleting) is made consistent with NUREG-1432. During NUREG-1432 development, certain wording preferences or English language conventions were adopted which resulted in no technical changes (either actual or interpretational) to the CTS.

Additional information has also been added to more fully describe each subsection. This wording is consistent with NUREG-1432. Since the design is already approved by the NRC, adding more detail does not result in a technical change.

A.2 CTS 3.8.2.1, Table 4.8-2, contains battery parameter requirements for Exide batteries. ITS 3.8.6, Table 3.8.6-1, does not contain any information regarding Exide batteries. This is acceptable because PVNGS does not use any Exide batteries, therefore, the information concerning Exide batteries is not necessary. Removal of this information will prevent application of Exide battery parameters to AT&T batteries. This change is in presentation only and is considered administrative. This change does not alter any intent of the CTS and is consistent with NUREG-1432.

TECHNICAL CHANGES - MORE RESTRICTIVE

M.1 ITS LCO 3.8.6 has been added stating, "Battery cell parameters for the Train A and Train B batteries shall be within the limits of Table 3.8.6-1". This has been added in order to combine all battery cell parameters and limits in one Specification (ITS 3.8.6). As a result, all other battery cell parameters LCOs, Actions, and SRs are also moved to ITS 3.8.6.

ITS 3.8.6 Applicability states, "when associated DC electrical power subsystems are required to be OPERABLE". This covers the current MODES 1, 2, 3, 4, 5, 6 and fuel handling requirements, and is actually more restrictive for the DC power subsystems since, a) the DG DC source Applicability has been changed (LCO 3.8.5) to include fuel handling and b) more than one of the DGs and station service batteries may be required in MODES 5 and 6 since the DC sources Applicability has been changed.

ITS 3.8.6 adds a Note to the Actions stating, "Separate Conditions entry is allowed for each battery". This Note provides more explicit instruction for proper application of the Actions. In conjunction with ITS 1.3, "Completion Times," this Note provides direction consistent with the intent of the Required Actions for inoperable battery cell parameters for each battery. It is intended that each Required Action be applied regardless of it having been applied previously for inoperable battery cell parameters associated with a different battery.

ITS 3.8.6 Condition A is added to require the batteries to meet limits specified in Table 3.8.6-1 to remain Operable. Required Actions and Completion Times which are stated are consistent with IEEE-450.

ITS 3.8.6 Condition B is added to provide a Required Action and Associated Completion Time if Condition A is not met OR if one or more batteries have average electrolyte temperature of the representative cells not within limits OR if two cells in one or more batteries have two or more battery cell parameters not within Category C limits. This part of Condition B is based on PVNGS current operating practice and licensing bases. The current licensing bases implies that a station battery is considered inoperable if more than one cell is out of service. In this condition, a cell will be considered out of service if two or more battery cell parameters are not within Category C values. Also, if electrolyte average temperature is < 60°F, Battery capacity will be reduced or inhibited. If any of these conditions are not met, Required Action B.1 requires the associated battery to be declared inoperable immediately. Even though the CTS does not have a similar Action, if the CTS Surveillances were not met, the battery would be declared inoperable.

The addition of the LCO, Applicability, Action Note, and Actions constitutes a more restrictive change to PVNGS plant operation. This is acceptable based on the previous discussions. These changes are consistent with NUREG-1432.

M.2 ITS 3.8.6, Table 3.8.6-1, places additional requirements on using battery charge current of < 2 amps as a temporary substitute for specific gravity. ITS states, "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." CTS 3.8.2.1, Table 4.8-2, makes no mention of these additional requirements for use of battery charge current of < 2 amps as a temporary substitute for specific gravity. CTS does allow use of a charging current < 2 amps as a substitute for specific gravity but it lacks the additional requirements found in the ITS. The addition of these requirements is a more restrictive change to PVNGS operating practices. This is acceptable 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. Also, following a minor battery recharge (such as an 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. This change is consistent with NUREG-1432.

TECHNICAL CHANGES - RELOCATIONS

LA.1 CTS 3.8.2.1, Table 4.8-2, provides the specific gravity for the average of all connected cells, Category B limits. This requirement is not necessary to determine the Operability of a system, component, or structure and therefore is being relocated to a Licensee Controlled document (i.e. plant procedures, Bases Section, or etc.). The CTS Category B Allowable Values already contain the minimum specific gravity for the average of all connected cells, which encompasses the Category B Limit. The Category B Allowable Value of specific gravity for the average of all connected cells is being retained in the conversion.

Any changes to the Bases will be in accordance with Chapter 5.0 Bases Control Program. Any technical changes to plant procedures will be in accordance with the PVNGS procedure control process. This provides an equivalent level of control and is an administrative change with no impact on the margin of safety. This requirement is not required to be in ITS to provide adequate protection of public health and safety. Therefore, relocation of this requirement to a Licensee Controlled Document is acceptable and is consistent with NUREG-1432.

TECHNICAL CHANGES - LESS RESTRICTIVE

L.1 CTS 3.8.2.1, Table 4.8-2, only allows 6 days and 7 days to restore battery cell parameters to within Category A and B limits, respectively. ITS 3.8.6 allows a total of 31 days to restore battery cell parameters to within Category A and B limits. Extending the period of time to restore battery cell parameters to within Category A and B limits is a less restrictive change. This is acceptable because while battery capacity is degraded, sufficient capacity exists to perform its intended function and to allow time to fully restore the battery cell parameters to normal limits. This change is consistent with NUREG-1432.

L.2 ITS 3.8.6, Table 3.8.6-1, states in part, "... Level correction is not required, however, when battery charging is < 2 amps when on float charge." CTS 3.8.2.1, Table 4.8-2, makes no mention of this allowance as it pertains to battery specific gravity correction for electrolyte level variations. Not requiring specific gravity correction, based on electrolyte level, when battery charging is < 2 amps when on float charge is a less restrictive change. This is acceptable because a charge current of less than 2 amps ensures gas generated during charging does not cause apparent expansion of the electrolyte. Therefore, the need for level correction is not necessary. This change is consistent with NUREG-1432.

L.3 ITS 3.8.6, Table 3.8.6-1, states, "It is acceptable for the electrolyte level to temporarily increase above the specified maximum during equalizing charges provided it is not overflowing." CTS 3.8.2.1, Table 4.8-2, has no such exception to electrolyte level. Allowing electrolyte level to temporarily increase above the specified maximum during equalizing charges is a less restrictive change. This is acceptable because apparent electrolyte level is dependent upon the charging rate. Gas generated during charging causes an apparent expansion of the electrolyte (IEEE-450). As stated by IEE-450, electrolyte level above the high-level mark is not objectionable. Electrolyte levels above the high-level mark will not affect safety or capacity unless the cell reaches an electrolyte overflow condition. This change is consistent with NUREG-1432.

L.4 CTS 3.8.2.1, Table 4.8-2, states that float voltage is corrected for average electrolyte temperature. ITS 3.8.6 does not contain this information. Removal of this information is a less restrictive change. This is acceptable because the PVNGS battery manufacturer and IEEE-450 do not recommend correcting float voltage for average electrolyte temperature. This change is consistent with NUREG-1432.

L.5 CTS 3.8.2.1, Action b, states that if Category A limits cannot be met, declare the battery inoperable. ITS 3.8.6, Action A, requires increased monitoring to ensure Category C limits are met and to restore the battery to Category A and B limits within 31 days. Not requiring battery inoperability declaration when Category A limits are not met constitutes a less restrictive change. This is acceptable because not meeting Category A or B limits means the battery is degraded but still capable of performing its intended function. This change is consistent with NUREG-1432.

TECHNICAL CHANGES - CTS CHANGES

None

NO SIGNIFICANT HAZARDS CONSIDERATION
SPECIFICATION 3.8.6

ADMINISTRATIVE CHANGES
(ITS 3.8.6 Discussion of Changes Labeled A.1 and A.2)

Arizona Public Service Company, Palo Verde Nuclear Generating Station (PVNGS), Units 1, 2, and 3, is converting to the ITS as outlined in NUREG-1432, "Standard Technical Specifications, Combustion Engineering Plants." The proposed changes involve the reformatting, renumbering, rewording of the Technical Specifications (TS) and Bases with no change in intent, and the incorporation of current operating practices consistent with NUREG-1432. These changes, since they do not involve technical changes to the Current TS (CTS), are administrative. Below are the No Significant Hazards Consideration (NSHC) for the conversion of this Section/Chapter to NUREG-1432.

The Commission has provided standards for determining whether a significant hazards consideration exists as stated in 10 CFR 50.92. A proposed amendment to an operating license for a facility involves a no significant hazards consideration if operation of the facility, in accordance with a proposed amendment, would not 1) involve a significant increase in the probability or consequences of an accident previously evaluated; 2) create the possibility of a new or different kind of accident from any accident previously evaluated; or 3) involve a significant reduction in a margin of safety. A discussion of these standards as they relate to this amendment request follows:

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

> The proposed changes involve reformatting, renumbering, and rewording of the CTS and Bases along with incorporation of PVNGS current operating practices and other changes to the CTS as discussed in the specific Discussion of Changes listed above in order to be consistent with NUREG-1432. The reformatting, renumbering, and rewording along with the other changes listed above, involves no technical changes to the CTS. Specifically, there will be no change in the requirements imposed on PVNGS due to these changes. During development of NUREG-1432, certain wording preferences or English language conventions were adopted. The proposed changes to this Section/Chapter are administrative in nature and do not impact initiators of any analyzed events. They also do not impact the assumed mitigation of accidents or transient events. Therefore, these changes do not involve a significant increase in the probability or consequences of an accident previously evaluated.

ADMINISTRATIVE CHANGES
(ITS 3.8.6 Discussion of Changes Labeled (A.1 and A.2) (continued)

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

> The proposed changes involve reformatting, renumbering, and rewording of the CTS, along with the incorporation of PVNGS current operating practices and other changes, as discussed, in order to be consistent with NUREG-1432. The proposed changes do not involve a physical alteration of the plant (no new or different type of equipment will be installed) or change the methods governing normal plant operation. The proposed changes will not impose any new or different requirements or eliminate any existing requirements. Therefore, these changes do not create the possibility of a new or different kind of accident from any accident previously evaluated.

Standard 3.-- Does the proposed change involve a significant reduction in a margin of safety?

> The proposed changes involve reformatting, renumbering, and rewording of the CTS, along with the incorporation of PVNGS current operating practices and other changes, as discussed, in order to be consistent with NUREG-1432. The proposed changes are administrative in nature and will not involve any technical changes. The proposed changes will not reduce a margin of safety because they have no impact on any safety analysis assumptions. Also, because these changes are administrative in nature, no question of safety is involved. Therefore, these changes do not involve a significant reduction in a margin of safety.

TECHNICAL CHANGES - MORE RESTRICTIVE
(ITS 3.8.6 Discussion of Changes Labeled M.1 and M.2)

Arizona Public Service Company, Palo Verde Nuclear Generating Station (PVNGS), Units 1, 2, and 3 is converting to the ITS as outlined in NUREG-1432. This particular NSHC is for the changes labeled "Technical Changes - More Restrictive" described in the specific Discussion of Changes listed above. The proposed changes incorporate more restrictive changes into the CTS by either making current requirements more stringent or adding new requirements which currently do not exist.

The Commission has provided standards for determining whether a significant hazards consideration exists as stated in 10 CFR 50.92. A proposed amendment to an operating license for a facility involves a no significant hazards consideration if operation of the facility, in accordance with a proposed amendment, would not 1) involve a significant increase in the probability or consequences of an accident previously evaluated; 2) create the possibility of a new or different kind of accident from any accident previously evaluated; or 3) involve a significant reduction in a margin of safety. A discussion of these standards as they relate to this amendment request follows:

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

The proposed changes provide more stringent requirements than previously existed in the CTS. The more stringent requirements will not result in operation that will increase the probability of initiating an analyzed event. If anything, the new requirements may decrease the probability or consequences of an analyzed event by incorporating the more restrictive changes discussed in the specific Discussion of Changes listed above. These changes will not alter assumptions relative to mitigation of an accident or transient event. The more restrictive requirements will not alter the operation and will continue to ensure process variables, structures, systems, or components are maintained consistent with safety analyses and licensing basis. These changes have been reviewed to ensure that no previously evaluated accident has been adversely affected. Therefore, these changes will not involve a significant increase in the probability or consequences of an accident evaluated.

TECHNICAL CHANGES - MORE RESTRICTIVE
(ITS 3.8.6 Discussion of Changes Labeled M.1 and M.2) (continued)

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

Making existing requirements more restrictive and adding more restrictive requirements to the CTS will not alter the plant configuration (no new or different type of equipment will be installed) or change the methods governing normal plant operation. These changes do impose different requirements. However, they are consistent with the assumptions made in the safety analyses, licensing basis, and NUREG-1432. Therefore, these changes will not create the possibility of a new or different kind of accident from any accident previously evaluated.

Standard 3.-- Does the proposed change involve a significant reduction in a margin of safety?

The proposed changes provide more stringent requirements than previously existed in the CTS. An evaluation of these changes concluded that adding these more restrictive requirements either increases or has no impact on the margin of safety. The changes provide additional restrictions which may enhance plant safety. These changes maintain requirements of the safety analysis, licensing basis, and NUREG-1432. As such, no question of safety is involved. Therefore, these changes will not involve a significant reduction in a margin of safety.

TECHNICAL CHANGES - RELOCATIONS
(ITS 3.8.6 Discussion of Changes Labeled LA.1)

Arizona Public Service Company, Palo Verde Nuclear Generating Station (PVNGS), Units 1, 2, and 3 is converting to the ITS as outlined in NUREG-1432. The proposed changes, since detail is being removed from the CTS to a Licensee Controlled Document, are less restrictive. The descriptions of these changes are in the Discussion of Changes listed above.

The Commission has provided standards for determining whether a significant hazards consideration exists as stated in 10 CFR 50.92. A proposed amendment to an operating license for a facility involves a no significant hazards consideration if operation of the facility, in accordance with a proposed amendment, would not 1) involve a significant increase in the probability or consequences of an accident previously evaluated; 2) create the possibility of a new or different kind of accident from any accident previously evaluated; or 3) involve a significant reduction in a margin of safety. A discussion of these standards as they relate to this amendment request follows:

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

> The proposed changes relocate requirements from the CTS to a Licensee Controlled Document. These changes do not result in any hardware changes or changes to plant operating practices. The details being relocated are not assumed to be an initiator of any analyzed event. The Licensee Controlled Document containing the relocated requirements will be maintained using the provisions of 10 CFR 50.59 or other specified control processes and is subject to the change control process in the Administrative Controls Section of the ITS. Since any changes to a Licensee Controlled Document will be evaluated, no increase in the probability or consequences of an accident previously evaluated will be allowed. Therefore, these changes will not involve a significant increase in the probability or consequences of an accident previously evaluated.

TECHNICAL CHANGES - RELOCATIONS
(ITS 3.8.6 Discussion of Changes Labeled LA.1) (continued)

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

The proposed changes relocate requirements from the CTS to a Licensee Controlled Document. These changes will not alter the plant configuration (no new or different type of equipment will be installed) or change the methods governing normal plant operation. These changes will not impose different requirements and adequate control of information will still be maintained. These changes will not alter assumptions made in the safety analysis or licensing basis. Therefore, these changes will not create the possibility of a new or different kind of accident from any accident previously evaluated.

Standard 3.-- Does the proposed change involve a significant reduction in a margin of safety?

The proposed changes relocate requirements from the CTS to a Licensee Controlled Document. These changes will not reduce a margin of safety since they have no impact on any safety analysis assumptions. In addition, the requirements to be transposed from the CTS to the Licensee Controlled Document are the same as the CTS. Since any future changes to this Licensee Controlled Document will be evaluated per the requirements of 10 CFR 50.59, or other specified control processes, no reduction (significant or insignificant) in a margin of safety will be allowed. Therefore, these changes will not involve a significant reduction in a margin of safety.

The NRC review provides a certain margin of safety, and although this review will no longer be performed prior to submittal, the NRC still inspects the 10 CFR 50.59 process. The proposed changes are consistent with NUREG-1432, which was approved by the NRC Staff. The change controls for proposed relocated details and requirements provide an acceptable level of regulatory authority. Revising the CTS to reflect the approved level of detail per NUREG-1432 reinforces the conclusion that there is not a significant reduction in the margin of safety. Therefore, revising the CTS to reflect the NRC accepted level of detail and requirements ensures no reduction in a margin of safety.

TECHNICAL CHANGES - LESS RESTRICTIVE
(ITS 3.8.6 Discussion of Changes Labeled L.1)

Arizona Public Service Company, Palo Verde Nuclear Generating Station (PVNGS), Units 1, 2, and 3 is converting to the ITS as outlined in NUREG-1432. The proposed change involves making the CTS less restrictive. Below is the description of this less restrictive change and the NSHC for the conversion to NUREG 1432.

L.1 CTS 3.8.2.1, Table 4.8-2, only allows 6 days and 7 days to restore battery cell parameters to within Category A and B limits, respectively. ITS 3.8.6 allows a total of 31 days to restore battery cell parameters to within Category A and B limits. Extending the period of time to restore battery cell parameters to within Category A and B limits is a less restrictive change. This is acceptable because while battery capacity is degraded, sufficient capacity exists to perform its intended function and to allow time to fully restore the battery cell parameters to normal limits. This change is consistent with NUREG-1432.

The Commission has provided standards for determining whether a significant hazards consideration exists as stated in 10 CFR 50.92. A proposed amendment to an operating license for a facility involves a no significant hazards consideration if operation of the facility, in accordance with a proposed amendment, would not 1) involve a significant increase in the probability or consequences of an accident previously evaluated; 2) create the possibility of a new or different kind of accident from any accident previously evaluated; or 3) involve a significant reduction in a margin of safety. A discussion of these standards as they relate to this amendment request follows:

TECHNICAL CHANGES - LESS RESTRICTIVE
(ITS 3.8.6 Discussion of Changes Labeled L.1) (continued)

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

The proposed change increases the amount of time, from 6 or 7 days (Category A or B respectively) to 31 days, to restore battery cell parameters to within Category A and B limits. Battery cell parameters are not derived from design basis accidents. They are prescribed to ensures the battery is capable of meeting its safety analysis requirements. This change will not affect the probability of an accident. The time allowed to restore battery parameter limits is not an initiator of any analyzed event. The consequences of an accident are not significantly affected by this change. Also though battery capacity is degraded, sufficient capacity exists to perform its intended function and to allow time to fully restore battery cell parameters to within limits. The change does not alter assumptions relative to the mitigation of an analyzed event. Therefore, the change will not involve a significant increase in the probability or consequence of an accident previously evaluated.

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

The proposed change increases the amount of time, from 6 or 7 days (Category A or B respectively) to 31 days, to restore battery cell parameters to within Category A and B limits. Though battery capacity is degraded, sufficient capacity exists to perform its intended function and to allow time to fully restore battery cell parameters to within limits. As a result, this change will not allow continued operation with a battery unable to perform its intended function. This change will not physically alter the plant (no new or different type of equipment will be installed). The change does not require any new or unusual operator actions. Therefore, this change does not create the possibility of a new or different kind of accident from any accident previously evaluated.

TECHNICAL CHANGES - LESS RESTRICTIVE
(ITS 3.8.6 Discussion of Changes Labeled L.1) (continued)

Standard 3.-- Does the proposed change involve a significant reduction in a margin of safety?

The proposed change increases the amount of time, from 6 or 7 days (Category A or B respectively) to 31 days, to restore battery cell parameters to within Category A and B limits. The margin of safety is not affected by this change. While operation is allowed to continue for 31 days after failure to meet Category A or B limits, sufficient capacity exists to perform its intended function and to allow time to fully restore battery cell parameters to within limits. Therefore, the change does not involve a significant reduction in a margin of safety.

TECHNICAL CHANGES - LESS RESTRICTIVE
(ITS 3.8.6 Discussion of Changes Labeled L.2)

Arizona Public Service Company, Palo Verde Nuclear Generating Station (PVNGS), Units 1, 2, and 3 is converting to the ITS as outlined in NUREG-1432. The proposed change involves making the CTS less restrictive. Below is the description of this less restrictive change and the NSHC for conversion to NUREG-1432.

L.2 ITS 3.8.6, Table 3.8.6-1, states in part, "... Level correction is not required, however, when battery charging is < 2 amps when on float charge." CTS 3.8.2.1, Table 4.8-2, makes no mention of this allowance as it pertains to battery specific gravity correction for electrolyte level variations. Not requiring specific gravity correction, based on electrolyte level, when battery charging is < 2 amps when on float charge is a less restrictive change. This is acceptable because a charge current of less than 2 amps ensures gas generated during charging does not cause apparent expansion of the electrolyte. Therefore, the need for level correction is not necessary. This change is consistent with NUREG-1432.

The Commission has provided standards for determining whether a significant hazards consideration exists as stated in 10 CFR 50.92. A proposed amendment to an operating license for a facility involves a no significant hazards consideration if operation of the facility, in accordance with a proposed amendment, would not 1) involve a significant increase in the probability or consequences of an accident previously evaluated; 2) create the possibility of a new or different kind of accident from any accident previously evaluated; or 3) involve a significant reduction in a margin of safety. A discussion of these standards as they relate to this amendment request follows:

TECHNICAL CHANGES - LESS RESTRICTIVE
(ITS 3.8.5 Discussion of Changes Labeled L.2) (continued)

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

The proposed change does not require electrolyte level correction when battery charging is < 2 amps when on float charge. Correction of specific gravity, based on electrolyte level, is not derived from design basis accidents. Specific gravity correction based on electrolyte level is normally prescribed when charging current is > 2 amps because gas generated during the charge causes apparent expansion of the electrolyte. This change will not affect the probability of an accident. Not requiring electrolyte level correction when battery charging is < 2 amps when on float charge is not an initiator of any analyzed event. The consequences of an accident are not significantly affected by this change. Also this change is based on information in IEEE-450, Recommended Practice for Maintenance, Testing, and Replacement of Large Lead Storage Batteries for Generating Stations and Substations, which is an industry accepted standard. The change does not alter assumptions relative to the mitigation of an analyzed event. Therefore, the change will not involve a significant increase in the probability or consequence of an accident previously evaluated.

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

The proposed change does not require electrolyte level correction when battery charging is < 2 amps when on float charge. This action is based on information in IEEE-450, Recommended Practice for Maintenance, Testing, and Replacement of Large Lead Storage Batteries for Generating Stations and Substations, which states that specific gravity correction is done based on charging current because of apparent expansion of the electrolyte. As a result, this change will not affect battery Operability or a battery's ability to perform its intended function. This change will not physically alter the plant (no new or different type of equipment will be installed). The change does not require any new or unusual operator actions. Therefore, this change does not create the possibility of a new or different kind of accident from any accident previously evaluated.

TECHNICAL CHANGES - LESS RESTRICTIVE
(ITS 3.8.5 Discussion of Changes Labeled L.2) (continued)

Standard 3.-- Does the proposed change involve a significant reduction in a margin of safety?

The proposed change does not require electrolyte level correction when battery charging is < 2 amps when on float charge. The margin of safety is not affected by this change. Not requiring specific gravity correction, based on electrolyte level, when charging current is < 2 amps does not affect the ability of a battery to perform its intended function. Also, this change is based on information in IEEE-450, Recommended Practice for Maintenance, Testing, and Replacement of Large Lead Storage Batteries for Generating Stations and Substations, which is an industry accepted standard. Therefore, the change does not involve a significant reduction in a margin of safety.

TECHNICAL CHANGES - LESS RESTRICTIVE
(ITS 3.8.6 Discussion of Changes Labeled L.3)

Arizona Public Service Company, Palo Verde Nuclear Generating Station (PVNGS), Units 1, 2, and 3 is converting to the ITS as outlined in NUREG-1432. The proposed change involves making the CTS less restrictive. Below is the description of this less restrictive change and the NSHC for conversion to NUREG-1432.

L.3 ITS 3.8.6, Table 3.8.6-1, states, "It is acceptable for the electrolyte level to temporarily increase above the specified maximum during equalizing charges provided it is not overflowing." CTS 3.8.2.1, Table 4.8-2, has no such exception to electrolyte level. Allowing electrolyte level to temporarily increase above the specified maximum during equalizing charges is a less restrictive change. This is acceptable because apparent electrolyte level is dependent upon the charging rate. Gas generated during charging causes an apparent expansion of the electrolyte (IEEE-450). As stated by IEE-450, electrolyte level above the high-level mark is not objectionable. Electrolyte levels above the high-level mark will not affect safety or capacity unless the cell reaches an electrolyte overflow condition. This change is consistent with NUREG-1432.

The Commission has provided standards for determining whether a significant hazards consideration exists as stated in 10 CFR 50.92. A proposed amendment to an operating license for a facility involves a no significant hazards consideration if operation of the facility, in accordance with a proposed amendment, would not 1) involve a significant increase in the probability or consequences of an accident previously evaluated; 2) create the possibility of a new or different kind of accident from any accident previously evaluated; or 3) involve a significant reduction in a margin of safety. A discussion of these standards as they relate to this amendment request follows:

TECHNICAL CHANGES - LESS RESTRICTIVE
(ITS 3.8.6 Discussion of Changes Labeled L.3) (continued)

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

The proposed change allows electrolyte level to temporarily increase above the specified maximum during equalization charges provided it is not overflowing. Allowing electrolyte level to temporarily increase above the specified maximum, provided it is not overflowing, is not derived from design basis accidents. Electrolyte level requirements ensure battery plates are covered so that the battery will be capable of performing its intended function. This change will not affect the probability of an accident. Allowing electrolyte level to temporarily increase above the specified maximum during equalization charges, provided it is not overflowing, is not an initiator of any analyzed event. The consequences of an accident are not significantly affected by this change. Also, as stated by IEE-450, "electrolyte level above the high-level mark is not objectionable. Electrolyte levels above the high-level mark will not affect safety or capacity unless the cell reaches an electrolyte overflow condition." The change does not alter assumptions relative to the mitigation of an analyzed event. Therefore, the change will not involve a significant increase in the probability or consequence of an accident previously evaluated.

TECHNICAL CHANGES - LESS RESTRICTIVE
(ITS 3.8.6 Discussion of Changes Labeled L.3) (continued)

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

The proposed change allows electrolyte level to temporarily increase above the specified maximum during equalization charges provided it is not overflowing. This allowance is based on information in IEEE-450, Recommended Practice for Maintenance, Testing, and Replacement of Large Lead Storage Batteries for Generating Stations and Substations, which states that electrolyte levels above the high-level mark will not affect safety or capacity unless the cell reaches an electrolyte overflow condition. As a result, this change will not affect battery Operability or a battery's ability to perform its intended function. This change will not physically alter the plant (no new or different type of equipment will be installed). The change does not require any new or unusual operator actions. Therefore, this change does not create the possibility of a new or different kind of accident from any accident previously evaluated.

Standard 3.-- Does the proposed change involve a significant reduction in a margin of safety?

The proposed change allows electrolyte level to temporarily increase above the specified maximum during equalization charges provided it is not overflowing. The margin of safety is not affected by this change. Allowing electrolyte levels above the high-level mark will not affect safety or capacity unless the cell reaches an electrolyte overflow condition. Electrolyte level above the specified maximum does not necessarily affect the ability of a battery to perform its intended function. Also, this change is based on information in IEEE-450, Recommended Practice for Maintenance, Testing, and Replacement of Large Lead Storage Batteries for Generating Stations and Substations, which is an industry accepted standard. Therefore, the change does not involve a significant reduction in a margin of safety.

TECHNICAL CHANGES - LESS RESTRICTIVE
(ITS 3.8.6 Discussion of Changes Labeled L.4)

Arizona Public Service Company, Palo Verde Nuclear Generating Station (PVNGS), Units 1, 2, and 3 is converting to the ITS as outlined in NUREG-1432. The proposed change involves making the CTS less restrictive. Below is the description of this less restrictive change and the NSHC for conversion to NUREG-1432.

L.4 CTS 3.8.2.1, Table 4.8-2, states that float voltage is corrected for average electrolyte temperature. ITS 3.8.6 does not contain this information. Removal of this information is a less restrictive change. This is acceptable because the PVNGS battery manufacturer and IEEE-450 do not recommend correcting float voltage for average electrolyte temperature. This change is consistent with NUREG-1432.

The Commission has provided standards for determining whether a significant hazards consideration exists as stated in 10 CFR 50.92. A proposed amendment to an operating license for a facility involves a no significant hazards consideration if operation of the facility, in accordance with a proposed amendment, would not 1) involve a significant increase in the probability or consequences of an accident previously evaluated; 2) create the possibility of a new or different kind of accident from any accident previously evaluated; or 3) involve a significant reduction in a margin of safety. A discussion of these standards as they relate to this amendment request follows:

TECHNICAL CHANGES - LESS RESTRICTIVE
(ITS 3.8.5 Discussion of Changes Labeled L.4) (continued)

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

The proposed change removes the requirement to correct float voltage for average electrolyte temperature. Correcting float voltage for average electrolyte temperature is not derived from design basis accidents. Correcting float voltage for average electrolyte temperature was originally performed because cell voltage would vary dependent on temperature. This change will not affect the probability of an accident. Not correcting float voltage for average electrolyte temperature is not an initiator of any analyzed event. The consequences of an accident are not significantly affected by this change. Also, the PVNGS battery manufacturer and IEEE-450 do not recommend correcting float voltage for average electrolyte temperature. Although battery cell voltage will vary with temperature it does not vary significantly to warrant temperature correction. The change does not alter assumptions relative to the mitigation of an analyzed event. Therefore, the change will not involve a significant increase in the probability or consequence of an accident previously evaluated.

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

The proposed change removes the requirement to correct float voltage for average electrolyte temperature. The PVNGS battery manufacturer and IEEE-450 do not recommend correcting float voltage for average electrolyte temperature. As a result, this change will not affect battery Operability or a battery's ability to perform its intended function. This change will not physically alter the plant (no new or different type of equipment will be installed). The change does not require any new or unusual operator actions. Therefore, this change does not create the possibility of a new or different kind of accident from any accident previously evaluated.

Standard 3.-- Does the proposed change involve a significant reduction in a margin of safety?

The proposed change removes the requirement to correct float voltage for average electrolyte temperature. The margin of safety is not affected by this change. Although battery cell voltage will vary with temperature it does not vary significantly to warrant temperature correction. Also, the PVNGS battery manufacturer and IEEE-450 do not recommend correcting float voltage for average electrolyte temperature. Therefore, the change does not involve a significant reduction in a margin of safety.

TECHNICAL CHANGES - LESS RESTRICTIVE
(ITS 3.8.6 Discussion of Changes Labeled L.5)

Arizona Public Service Company, Palo Verde Nuclear Generating Station (PVNGS), Units 1, 2, and 3 is converting to the ITS as outlined in NUREG-1432. The proposed change involves making the CTS less restrictive. Below is the description of this less restrictive change and the NSHC for conversion to NUREG-1432.

L.5 CTS 3.8.2.1, Action b, states that if Category A limits cannot be met, declare the battery inoperable. ITS 3.8.6, Action A, requires increased monitoring to ensure Category C limits are met and to restore the battery to Category A and B limits within 31 days. Not requiring battery inoperability declaration when Category A limits are not met constitutes a less restrictive change. This is acceptable because not meeting Category A or B limits means the battery is degraded but still capable of performing its intended function. This change is consistent with NUREG-1432.

The Commission has provided standards for determining whether a significant hazards consideration exists as stated in 10 CFR 50.92. A proposed amendment to an operating license for a facility involves a no significant hazards consideration if operation of the facility, in accordance with a proposed amendment, would not 1) involve a significant increase in the probability or consequences of an accident previously evaluated; 2) create the possibility of a new or different kind of accident from any accident previously evaluated; or 3) involve a significant reduction in a margin of safety. A discussion of these standards as they relate to this amendment request follows:

TECHNICAL CHANGES - LESS RESTRICTIVE
(ITS 3.8.6 Discussion of Changes Labeled L.5) (continued)

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

The proposed change does not require declaration of battery inoperability when Category A or B limits are not met. Battery cell parameters are not derived from design basis accidents. They are prescribed to ensures the battery is capable of meeting its safety analysis requirements. This change will not affect the probability of an accident. Not meeting Category A or B limits is not an initiator of any analyzed event. The consequences of an accident are not significantly affected by this change. Also though battery capacity is degraded, sufficient capacity exists to perform its intended function. The change does not alter assumptions relative to the mitigation of an analyzed event. Therefore, the change will not involve a significant increase in the probability or consequence of an accident previously evaluated.

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

The proposed change does not require declaration of battery inoperability when Category A or B limits are not met. Though battery capacity is degraded, sufficient capacity exists to perform its intended function. As a result, this change will not allow continued operation with a battery unable to perform its intended function. This change will not physically alter the plant (no new or different type of equipment will be installed). The change does not require any new or unusual operator actions. Therefore, this change does not create the possibility of a new or different kind of accident from any accident previously evaluated.

Standard 3.-- Does the proposed change involve a significant reduction in a margin of safety?

The proposed change does not require declaration of battery inoperability when Category A or B limits are not met. The margin of safety is not affected by this change. While operation is allowed to continue with Category A or B limits not met, sufficient capacity exists for the battery to perform its intended function. Therefore, the change does not involve a significant reduction in a margin of safety.

CE STS
NUREG-1432 REV. 1
SPECIFICATION 3.8.7
MARK UP

<DOC>
<CTS>

3.8 ELECTRICAL POWER SYSTEMS

3.8.7 Inverters—Operating

<LCO 3.8.3.1> LCO 3.8.7 The required Train A and Train B inverters shall be OPERABLE.

<LCO 3.8.3.1 footnote *>

---NOTE---

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

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

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

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(2) (2) (2) (3) (2)

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

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
<3.8.3.1 ACT b> A. One ~~required~~ inverter inoperable.	A.1 ---NOTE--- Enter applicable Conditions and Required Actions of LCO 3.8.9, "Distribution Systems - Operating" with any vital instrument bus de-energized. ------ (2) Restore inverter to OPERABLE status.	 24 hours

(continued)

ACTIONS (continued)

	CONDITION	REQUIRED ACTION		COMPLETION TIME
<3.8.3.1 ACT b>	B. Required Action and associated Completion Time not met.	B.1	Be in MODE 3.	6 hours
		AND		
		B.2	Be in MODE 5.	36 hours

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE		FREQUENCY
<4.8.3.1> <DOC M2>	SR 3.8.7.1	Verify correct inverter voltage, [frequency,] and alignment to required AC vital buses. 4	7 days

CE STS
NUREG-1432 REV. 1
SPECIFICATION 3.8.7
BASES MARK UP

B 3.8 ELECTRICAL POWER SYSTEMS

B 3.8.7 Inverters—Operating

BASES

by being powered from the 125 VDC battery source

BACKGROUND

The inverters are the preferred source of power for the AC vital buses because of the stability and reliability they achieve. The function of the inverter is to provide AC instrument electrical power to the vital buses. ~~The inverters can be powered from an internal AC source/rectifier or from the station battery. The station battery provides~~ an uninterruptible power source for the instrumentation and controls for the Reactor Protective System (RPS) and the Engineered Safety Feature Actuation System (ESFAS). Specific details on inverters and their operating characteristics are ~~found in the FSAR, Chapter 8~~ (Ref. 1). There are two inverters per train (A and B) which totals to four inverters per unit.

instrument AC , thus providing

APPLICABLE SAFETY ANALYSES

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

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

instrument

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

b. A worst case single failure.

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

(continued)

BASES (continued)

LCO

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

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

2 AC instrument 2

OPERABLE inverters require the associated vital bus to be powered by the inverter with output voltage and frequency within tolerances, and power input to the inverter from a (125 VDC) station battery. Alternatively, power supply may be from an internal AC source via rectifier as long as the station battery is available as the uninterruptible power supply. 4 2 3

instrument 2

This LCO is modified by a Note that allows one two inverter to be disconnected from a common battery for < 24 hours, if the vital bus(es) is powered from a Class 1E constant voltage transformer or inverter using internal AC source during the period and all other inverters are operable. This allows an equalizing charge to be placed on one battery. If the inverter(s) were not disconnected, the resulting voltage condition might damage the inverter(s). These provisions minimize the loss of equipment that would occur in the event of a loss of offsite power. The 24 hour time period for the allowance minimizes the time during which a loss of offsite power could result in the loss of equipment energized from the affected AC vital bus while taking into consideration the time required to perform an equalizing charge on the battery bank.

2 AC regulator 2 its associated 3 was 1 instrument

the 2

The intent of this Note is to limit the number of inverters that may be disconnected. Only those inverters associated with the single battery undergoing an equalizing charge may be disconnected. All other inverters must be aligned to their associated batteries, regardless of the number of inverters or unit design. connected 1

and aligned to their associated AC vital instrument bus. 2

(continued)

Palo Verde Units 1,2,3 A

BASES (continued)

APPLICABILITY

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

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

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

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

ACTIONS

A.1

2

With a required inverter inoperable, its associated AC vital (2) instrument bus becomes inoperable until it is ~~manually~~ re-energized from its Class 1E constant voltage source ~~transformer~~ regulator ~~or inverter using internal AC source~~. (3)

Required Action A.1 is modified by a Note, which states to enter the applicable conditions and Required Actions of LCO 3.8.9, "Distribution Systems—Operating," when Condition A is entered with one AC vital instrument (2) bus de-energized. This ensures the AC vital bus is re-energized within 2 hours. (2)

Required Action A.1 allows 24 hours to fix the inoperable inverter and return it to service. The 24 hour limit is based upon engineering judgment, taking into consideration the time required to repair an inverter and the additional risk to which the unit is exposed because of the inverter inoperability. This has to be balanced against the risk of an immediate shutdown, along with the potential challenges to safety systems such a shutdown might entail. When the AC vital bus is powered from its constant voltage source, it is relying upon interruptible AC electrical power sources (offsite and onsite). The uninterruptible inverter source to the AC vital (2) Instrument buses is the preferred source for powering instrumentation trip setpoint devices.

(continued)

BASES

ACTIONS (continued)

B.1 and B.2

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

SURVEILLANCE REQUIREMENTS

SR 3.8.7.1

2 instrument

This Surveillance verifies that the inverters are functioning properly with all required circuit breakers closed and AC vital buses energized from the inverter. The verification of proper voltage ~~and frequency~~ output ensures that the required power is readily available for the instrumentation of the RPS and ESFAS connected to the AC vital buses. The 7 day Frequency takes into account the redundant capability of the inverters and other indications available in the control room that alert the operator to inverter malfunctions. 4

REFERENCES

1. UFSAR, Chapter ~~[~~8~~]~~.
2. UFSAR, Chapter ~~[~~6~~]~~.
3. UFSAR, Chapter ~~[14]~~ 15

2

NUREG-1432 EXCEPTIONS
SPECIFICATION 3.8.7

1. Grammar and/or editorial changes have been made to enhance clarity. No technical or intent changes to the Specification are made by this change.

2. The plant specific titles, nomenclature, number, parameter/value, reference, system description, system design, operating practices or analysis description was used (additions, deletions, and/or changes are included). Plant specific parameters/values are directly transferred from the CTS to the ITS.

3. NUREG-1432 LCO and Bases makes reference to an inverter having an internal AC source that is an alternative to normal inverter output. ITS 3.8.7 LCO and Bases makes no reference to an internal AC source that is an alternative to normal inverter output. The removal of this information clarifies that the inverters do not have an alternate AC rectified source to supply the AC vital buses which is an alternative to normal inverter, DC to AC, output. The removed information is consistent with PVNGS design. This change is consistent with PVNGS licensing basis.

4. ITS SR 3.8.7.1 removes any reference to "frequency" in the Surveillance and the Bases section. The inverters have an "insynch" alarm switch that continuously monitors inverter frequency. If inverter frequency should deviate beyond the alarm setpoint the control room is notified via the "inverter trouble" alarm. Therefore, there is no need to monitor inverter frequency with a Surveillance since it is continuously monitored by the inverter with the "insynch" alarm switch. This change is consistent with PVNGS licensing basis.

PVNGS CTS
SPECIFICATION 3.8.7
MARK UP

Specification 3.8.7

(3.8.7/3.8.9)

A.1

3.8

ELECTRICAL POWER SYSTEMS

3/4 ~~8.3 ONSITE POWER DISTRIBUTION SYSTEMS~~

3.8.7

~~OPERATING~~ Inverters - Operating

~~LIMITING CONDITION FOR OPERATION~~

The required Train A and Train B inverters shall be OPERABLE.

LCO 3.8.7

ITS 3.8.7

~~3.8.3.1 The following electrical busses shall be energized in the specified manner with tie breakers open between redundant busses within the unit.~~

ITS 3.8.9

a. Train "A" A.C. emergency busses consisting of:

1. 4160-volt ESF Bus #E-PBA-S03
2. 480-volt ESF Load Center #E-PGA-L31
   a. MCC E-PHA-M31
3. 480-volt ESF Load Center #EPGA-L33
   a. MCC E-PHA-M33
   b. MCC E-PHA-M37
4. 480-volt ESF Load Center #E-PGA-L35
   a. MCC E-PHA-M35

b. Train "B" A.C. emergency busses consisting of:

1. 4160-volt ESF Bus #E-PBB-S04
2. 480-volt ESF Load Center #E-PGB-L32
   a. MCC E-PHB-M32
   b. MCC E-PHB-M38
3. 480-volt ESF Load Center #E-PGB-L34
   a. MCC E-PHB-M34
4. 480-volt ESF Load Center #E-PGB-L36
   a. MCC E-PHB-M36

ITS 3.8.9

ITS 3.8.7

~~c.~~ ~~120-volt Channel A Vital A.C. Bus #E-PNA-D25 energized from its associated inverter connected to D.C. Channel A*.~~

~~d.~~ ~~120-volt Channel B Vital A.C. Bus #E-PNB-D26 energized from its associated inverter connected to D.C. Channel B*.~~

~~e.~~ ~~120-volt Channel C Vital A.C. Bus #E-PNC-D27 energized from its associated inverter connected to D.C. Channel C*.~~

~~f.~~ ~~120-volt Channel D Vital A.C. Bus #E-PND-D28 energized from its associated inverter connected to D.C. Channel D*.~~

LA.1

ITS 3.8.7

ITS 3.8.9

g. 125-volt D.C. Channel A energized from Battery Bank E-PKA-F11.

h. 125-volt D.C. Channel B energized from Battery Bank E-PKB-F12.

i. 125-volt D.C. Channel C energized from Battery Bank E-PKC-F13.

ITS 3.8.9

j. 125-volt D.C. Channel D energized from Battery Bank E-PKD-F14.

ITS 3.8.7

M.1

LCO 3.8.7 Note

*~~Two~~ one inverter~~s~~ may be disconnected its associated AC from ~~their~~ its D.C. bus for up to 24 hours, as necessary, for the purpose of performing an equalizing charge on ~~their~~ its associated battery bank provided (1) ~~their~~ its vital bus~~ses are~~ is energized, and (2) ~~the~~ all other AC vital busses ~~associated with the other battery bank~~ are energized from their associated inverters and connected to their associated D.C. bus.

M.1

Specification 3.8.7
(3.8.7 / 3.8.9)

3.8 ELECTRICAL POWER SYSTEMS

3.8.7 Inverters - Operating

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

ITS 3.8.7 ACTION:

ITS 3.8.9 a. With one of the required divisions of A.C. ESF busses not fully energized, reenergize the division within 8 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

ITS 3.8.9

ITS 3.8.7 ACT A ~~b.~~ With one A.C. vital bus either not energized from its associated inverter inverter, or with the inverter not connected to its associated D.C. bus: (1) reenergize the A.C. vital bus within 2 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN

ITS 3.8.9

ITS 3.8.7 ACT A ~~within the following 30 hours and (2)~~ reenergize the A.C. vital bus from its associated inverter connected to its associated D.C. bus within 24 hours or be in at least HOT STANDBY within the next 6 hours

ITS 3.8.7 ACT B and in COLD SHUTDOWN within the following 30 hours.

ITS 3.8.9 c. With one D.C. bus not energized from its associated battery bank, reenergize the D.C. bus from its associated battery bank within 2 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours

ITS 3.8.9

ITS 3.8.7 SURVEILLANCE REQUIREMENTS

SR 3.8.7.1 ~~4.8.3.1~~ The specified AC vital instrument busses shall be determined energized ~~in the required manner~~ at least once per 7 days by verifying correct ~~breaker~~ inverter alignment and ~~indicated~~ voltage ~~on the busses~~. LA.1 M.2

DISCUSSION OF CHANGES
SPECIFICATION 3.8.7

ADMINISTRATIVE CHANGES

A.1 All reformatting and renumbering is in accordance with Combustion Engineering Plant (CEOG) Standard Technical Specifications NUREG-1432, Rev. 1 (NUREG-1432). As a result, the Palo Verde Nuclear Generating Station (PVNGS) Improved Technical Specifications (ITS) should be more readable, and therefore understandable, by plant operators as well as other users. During the reformatting and renumbering of the ITS, no technical changes (either actual or interpretational) to the Current Technical Specifications (CTS) were made unless they were identified and justified.

Editorial rewording (either adding or deleting) is made consistent with NUREG-1432. During NUREG-1432 development, certain wording preferences or English language conventions were adopted which resulted in no technical changes (either actual or interpretational) the CTS.

Additional information has also been added to more fully describe each subsection. This wording is consistent with NUREG-1432. Since the design is already approved by the NRC, adding more detail does not result in a technical change.

TECHNICAL CHANGES - MORE RESTRICTIVE

M.1 ITS 3.8.7 only allows one inverter to be disconnected from its associated DC bus for the purpose of performing an equalizing charge on the associated battery. CTS 3.8.3.1 allows two inverters to be disconnected from their associated DC busses for the same purpose. The added constraint of allowing only one inverter to be disconnected from its associated DC bus for the purpose of performing an equalizing charge on the associated battery is a more restrictive change to PVNGS plant operation. This is acceptable because an additional single failure could result in the minimum required ESF functions not being supported. This change is consistent with NUREG-1432.

M.2 ITS SR 3.8.7.1 requires verification of proper inverter voltage output. CTS 4.8.3.1 only requires that voltage be present at the inverter output. The addition of this requirement to the Surveillance constitutes a more restrictive change to PVNGS operating practices. This is acceptable because this ensures proper AC output voltage from the inverter for use in the AC vital buses. This change is consistent with NUREG-1432.

TECHNICAL CHANGES - RELOCATIONS

LA.1 CTS LCO 3.8.3.1 contains detailed information that describes, what buses and components constitute an Operable inverter. ITS 3.8.7 does not contain this information in the LCO. This information, because of the level of detail, is located in the associated Bases Section. The LCO along with the associated description in the Bases is appropriate to ensure the required train A, B, C, and D inverters are Operable. In addition, this requirement does not meet the criterion of 10 CFR 50.36 (c) (2) (ii) for inclusion into ITS.

Any changes to the Bases will be in accordance with Chapter 5.0 Bases Control Program. Any technical changes to plant procedures will be in accordance with the PVNGS procedure control process. This provides an equivalent level of control and is an administrative change with no impact on the margin of safety. This requirement is not required to be in ITS to provide adequate protection of public health and safety. Therefore, relocation of this requirement to a Licensee Controlled Document is acceptable and is consistent with NUREG-1432.

TECHNICAL CHANGES - LESS RESTRICTIVE

None

TECHNICAL CHANGES - CTS CHANGES

None

NO SIGNIFICANT HAZARDS CONSIDERATION
SPECIFICATION 3.8.7

ADMINISTRATIVE CHANGES
(ITS 3.8.7 Discussion of Changes Labeled A.1)

Arizona Public Service Company, Palo Verde Nuclear Generating Station (PVNGS), Units 1, 2, and 3, is converting to the ITS as outlined in NUREG-1432, "Standard Technical Specifications, Combustion Engineering Plants." The proposed changes involve the reformatting, renumbering, rewording of the Technical Specifications (TS) and Bases with no change in intent, and the incorporation of current operating practices consistent with NUREG-1432. These changes, since they do not involve technical changes to the Current TS (CTS), are administrative. Below are the No Significant Hazards Consideration (NSHC) for the conversion of this Section/Chapter to NUREG-1432.

The Commission has provided standards for determining whether a significant hazards consideration exists as stated in 10 CFR 50.92. A proposed amendment to an operating license for a facility involves a no significant hazards consideration if operation of the facility, in accordance with a proposed amendment, would not 1) involve a significant increase in the probability or consequences of an accident previously evaluated; 2) create the possibility of a new or different kind of accident from any accident previously evaluated; or 3) involve a significant reduction in a margin of safety. A discussion of these standards as they relate to this amendment request follows:

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

> The proposed changes involve reformatting, renumbering, and rewording of the CTS and Bases along with incorporation of PVNGS current operating practices and other changes to the CTS as discussed in the specific Discussion of Changes listed above in order to be consistent with NUREG-1432. The reformatting, renumbering, and rewording along with the other changes listed above, involves no technical changes to the CTS. Specifically, there will be no change in the requirements imposed on PVNGS due to these changes. During development of NUREG-1432, certain wording preferences or English language conventions were adopted. The proposed changes to this Section/Chapter are administrative in nature and do not impact initiators of any analyzed events. They also do not impact the assumed mitigation of accidents or transient events. Therefore, these changes do not involve a significant increase in the probability or consequences of an accident previously evaluated.

ADMINISTRATIVE CHANGES
(ITS 3.8.7 Discussion of Changes Labeled A.1) (continued)

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

> The proposed changes involve reformatting, renumbering, and rewording of the CTS, along with the incorporation of PVNGS current operating practices and other changes, as discussed, in order to be consistent with NUREG-1432. The proposed changes do not involve a physical alteration of the plant (no new or different type of equipment will be installed) or change the methods governing normal plant operation. The proposed changes will not impose any new or different requirements or eliminate any existing requirements. Therefore, these changes do not create the possibility of a new or different kind of accident from any accident previously evaluated.

Standard 3.-- Does the proposed change involve a significant reduction in a margin of safety?

> The proposed changes involve reformatting, renumbering, and rewording of the CTS, along with the incorporation of PVNGS current operating practices and other changes, as discussed, in order to be consistent with NUREG-1432. The proposed changes are administrative in nature and will not involve any technical changes. The proposed changes will not reduce a margin of safety because they have no impact on any safety analysis assumptions. Also, because these changes are administrative in nature, no question of safety is involved. Therefore, these changes do not involve a significant reduction in a margin of safety.

TECHNICAL CHANGES - MORE RESTRICTIVE
(ITS 3.8.7 Discussion of Changes Labeled M.1 and M.2)

Arizona Public Service Company, Palo Verde Nuclear Generating Station (PVNGS), Units 1, 2, and 3 is converting to the ITS as outlined in NUREG-1432. This particular NSHC is for the changes labeled "Technical Changes - More Restrictive" described in the specific Discussion of Changes listed above. The proposed changes incorporate more restrictive changes into the CTS by either making current requirements more stringent or adding new requirements which currently do not exist.

The Commission has provided standards for determining whether a significant hazards consideration exists as stated in 10 CFR 50.92. A proposed amendment to an operating license for a facility involves a no significant hazards consideration if operation of the facility, in accordance with a proposed amendment, would not 1) involve a significant increase in the probability or consequences of an accident previously evaluated; 2) create the possibility of a new or different kind of accident from any accident previously evaluated; or 3) involve a significant reduction in a margin of safety. A discussion of these standards as they relate to this amendment request follows:

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

> The proposed changes provide more stringent requirements than previously existed in the CTS. The more stringent requirements will not result in operation that will increase the probability of initiating an analyzed event. If anything, the new requirements may decrease the probability or consequences of an analyzed event by incorporating the more restrictive changes discussed in the specific Discussion of Changes listed above. These changes will not alter assumptions relative to mitigation of an accident or transient event. The more restrictive requirements will not alter the operation and will continue to ensure process variables, structures, systems, or components are maintained consistent with safety analyses and licensing basis. These changes have been reviewed to ensure that no previously evaluated accident has been adversely affected. Therefore, these changes will not involve a significant increase in the probability or consequences of an accident evaluated.

TECHNICAL CHANGES - MORE RESTRICTIVE
(ITS 3.8.7 Discussion of Changes Labeled M.1 and M.2) (continued)

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

Making existing requirements more restrictive and adding more restrictive requirements to the CTS will not alter the plant configuration (no new or different type of equipment will be installed) or change the methods governing normal plant operation. These changes do impose different requirements. However, they are consistent with the assumptions made in the safety analyses, licensing basis, and NUREG-1432. Therefore, these changes will not create the possibility of a new or different kind of accident from any accident previously evaluated.

Standard 3.-- Does the proposed change involve a significant reduction in a margin of safety?

The proposed changes provide more stringent requirements than previously existed in the CTS. An evaluation of these changes concluded that adding these more restrictive requirements either increases or has no impact on the margin of safety. The changes provide additional restrictions which may enhance plant safety. These changes maintain requirements of the safety analysis, licensing basis, and NUREG-1432. As such, no question of safety is involved. Therefore, these changes will not involve a significant reduction in a margin of safety.

TECHNICAL CHANGES - RELOCATIONS
(ITS 3.8.7 Discussion of Changes Labeled LA.1)

Arizona Public Service Company, Palo Verde Nuclear Generating Station (PVNGS), Units 1, 2, and 3 is converting to the ITS as outlined in NUREG-1432. The proposed changes, since detail is being removed from the CTS to a Licensee Controlled Document, are less restrictive. The descriptions of these changes are in the Discussion of Changes listed above.

The Commission has provided standards for determining whether a significant hazards consideration exists as stated in 10 CFR 50.92. A proposed amendment to an operating license for a facility involves a no significant hazards consideration if operation of the facility, in accordance with a proposed amendment, would not 1) involve a significant increase in the probability or consequences of an accident previously evaluated; 2) create the possibility of a new or different kind of accident from any accident previously evaluated; or 3) involve a significant reduction in a margin of safety. A discussion of these standards as they relate to this amendment request follows:

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

> The proposed changes relocate requirements from the CTS to a Licensee Controlled Document. These changes do not result in any hardware changes or changes to plant operating practices. The details being relocated are not assumed to be an initiator of any analyzed event. The Licensee Controlled Document containing the relocated requirements will be maintained using the provisions of 10 CFR 50.59 or other specified control processes and is subject to the change control process in the Administrative Controls Section of the ITS. Since any changes to a Licensee Controlled Document will be evaluated, no increase in the probability or consequences of an accident previously evaluated will be allowed. Therefore, these changes will not involve a significant increase in the probability or consequences of an accident previously evaluated.

TECHNICAL CHANGES - RELOCATIONS
(ITS 3.8.7 Discussion of Changes Labeled LA.1) (continued)

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

The proposed changes relocate requirements from the CTS to a Licensee Controlled Document. These changes will not alter the plant configuration (no new or different type of equipment will be installed) or change the methods governing normal plant operation. These changes will not impose different requirements and adequate control of information will still be maintained. These changes will not alter assumptions made in the safety analysis or licensing basis. Therefore, these changes will not create the possibility of a new or different kind of accident from any accident previously evaluated.

Standard 3.-- Does the proposed change involve a significant reduction in a margin of safety?

The proposed changes relocate requirements from the CTS to a Licensee Controlled Document. These changes will not reduce a margin of safety since they have no impact on any safety analysis assumptions. In addition, the requirements to be transposed from the CTS to the Licensee Controlled Document are the same as the CTS. Since any future changes to this Licensee Controlled Document will be evaluated per the requirements of 10 CFR 50.59, or other specified control processes, no reduction (significant or insignificant) in a margin of safety will be allowed. Therefore, these changes will not involve a significant reduction in a margin of safety.

The NRC review provides a certain margin of safety, and although this review will no longer be performed prior to submittal, the NRC still inspects the 10 CFR 50.59 process. The proposed changes are consistent with NUREG-1432, which was approved by the NRC Staff. The change controls for proposed relocated details and requirements provide an acceptable level of regulatory authority. Revising the CTS to reflect the approved level of detail per NUREG-1432 reinforces the conclusion that there is not a significant reduction in the margin of safety. Therefore, revising the CTS to reflect the NRC accepted level of detail and requirements ensures no reduction in a margin of safety.

CE STS
NUREG-1432 REV. 1
SPECIFICATION 3.8.8
MARK UP

<DOC>
<CTS>

3.8 ELECTRICAL POWER SYSTEMS

3.8.8 Inverters—Shutdown

(1) Required

<LCO 3.8.3.2> LCO 3.8.8 ~~Inverter(s)~~ Required Inverter(s) shall be OPERABLE to support the onsite Class 1E AC vital instrument bus electrical power distribution subsystem(s) required by LCO 3.8.10, "Distribution Systems—Shutdown." (5)

<DOC M.3> APPLICABILITY: MODES 5 and 6,
During movement of irradiated fuel assemblies. With the core off loaded. (2)

<DOC M.2> ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
<3.8.3.2 ACT> <DOC M.1> A. One or more ~~[required]~~ inverters inoperable.	A.1 Declare affected required feature(s) inoperable. OR A.2.1 Suspend CORE ALTERATIONS. AND A.2.2 Suspend movement of irradiated fuel assemblies. AND A.2.3 Initiate action to suspend operations involving positive reactivity additions. AND	Immediately Immediately Immediately Immediately (continued)

ACTIONS

	CONDITION	REQUIRED ACTION	COMPLETION TIME
<3.8.3.2 ACT>	A. (continued)	A.2.4 Initiate action to restore required inverters to OPERABLE status.	Immediately

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE		FREQUENCY	
<4.8.3.2>	SR 3.8.8.1	Verify correct inverter voltage ~~[frequency,]~~ and alignments to required AC vital instrument buses.	7 days	4 5

CE STS
NUREG-1432 REV. 1
SPECIFICATION 3.8.8
BASES MARK UP

B 3.8 ELECTRICAL POWER SYSTEMS

B 3.8.8 Inverters—Shutdown

BASES

BACKGROUND

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

APPLICABLE SAFETY ANALYSES

The initial conditions of (u) Design Basis Accident (DBA) and transient analyses in the FSAR, Chapter ~~[~~6~~]~~ (Ref. 1) and Chapter ~~[~~15~~]~~ (Ref. 2), assume Engineered Safety Feature systems are OPERABLE. The DC to AC inverters are designed to provide the required capacity, capability, redundancy, and reliability to ensure the availability of necessary power to the Reactor Protective System and Engineered Safety Features Actuation System instrumentation and controls so that the fuel, Reactor Coolant System, and containment design limits are not exceeded. 5

The OPERABILITY of the inverters is consistent with the initial assumptions of the accident analyses and the requirements for the supported systems' OPERABILITY. 5

The OPERABILITY of the minimum inverters to each AC vital instrument bus during MODES 5 and 6, and during movement of irradiated fuel assemblies with the core offloaded ensures that:

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

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

c. Adequate power is available to mitigate events postulated during shutdown, such as a fuel handling accident.

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

(continued)

BASES (continued)

LCO

required ①

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

⑤ instrument ⑤ AC

APPLICABILITY

The inverters required to be OPERABLE in MODES 5 and 6, and during movement of irradiated fuel assemblies with the core off loaded, provide assurance that: ②

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

b. Systems needed to mitigate a fuel handling accident are available;

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

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

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

ACTIONS

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

If two trains of AC vital instrument buses are required by LCO 3.8.10, "Distribution Systems—Shutdown," the remaining OPERABLE inverters may be capable of supporting sufficient required features to allow ⑤

(continued)

BASES

ACTIONS

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

continuation of CORE ALTERATIONS, fuel movement, operations with a potential for draining the reactor vessel, and operations with a potential for positive reactivity additions. The Required Action to suspend positive reactivity additions does not preclude actions to maintain or increase reactor vessel inventory, provided the required SDM is maintained. By the allowance of the option to declare required features inoperable with the associated inverter(s) inoperable, appropriate restrictions will be implemented in accordance with the affected required features LCOs' Required Actions. In many instances, this option may involve undesired administrative efforts. Therefore, the allowance for sufficiently conservative actions is made (i.e., to suspend CORE ALTERATIONS, movement of irradiated fuel assemblies, and operations involving positive reactivity additions).

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

The Completion Time of immediately is consistent with the required times for actions requiring prompt attention. The restoration of the required inverters should be completed as quickly as possible in order to minimize the time the unit safety systems may be without power or powered from a constant voltage source ~~transformer~~ regulator. 5

SURVEILLANCE REQUIREMENTS

SR 3.8.8.1

This Surveillance verifies that the inverters are functioning properly with all required circuit breakers closed and AC vital instrument buses energized from the inverter. The verification of proper voltage ~~and frequency~~ output ensures that the required power is readily available for the

5 4

(continued)

BASES

SURVEILLANCE REQUIREMENTS	SR 3.8.8.1 (continued) instrumentation connected to the AC vital instrument 5 buses. The 7 day Frequency takes into account the redundant capability of the inverters and other indications available in the control room that alert the operator to inverter malfunctions.
REFERENCES	1. UFSAR, Chapter ~~[~~6~~]~~. 5 2. UFSAR, Chapter ~~[~~15~~]~~.

NUREG-1432 EXCEPTIONS
SPECIFICATION 3.8.8

1. Grammar and/or editorial changes have been made to enhance clarity. No technical or intent changes to the Specification are made by this change.

2. The Applicability of ITS LCO 3.8.8 has been modified to state, "During movement of irradiated fuel assemblies with the core off loaded." NUREG-1432, LCO 3.8.8 Applicability, does not contain the phrase "with the core off loaded" in its Applicability. This is acceptable because LCO 3.8.8, Required Actions A.2.1 and A.2.3, do not specify credible actions if moving irradiated fuel assemblies while in Mode 1, 2, 3, and 4. If moving irradiated fuel assemblies in Modes 1, 2, 3, or 4, the fuel movement is independent of reactor operations, therefore, suspending CORE ALTERATIONS or eliminating operations involving positive reactivity additions (LCO 3.8.8 Required Actions A.2.1 and A.2.3) on a reactor at power is not realistic or credible. This change is also in keeping with NUREG-1432 format in that Actions that address movement of irradiated fuels assemblies while shutdown are addressed in an LCO that is obviously written for shutdown conditions. This change is consistent with NUREG-1432.

3. ITS 3.8.8 adds information that states the required inverter(s) must be powered from its associated 125 VDC station battery. ITS 3.8.8 Bases is revised to ensure consistency with ITS 3.8.7 Bases, Inverters - Operating. This change is consistent with NUREG-1432.

4. ITS SR 3.8.8.1 removes any reference to "frequency" in the Surveillance and the Bases section. The inverters have an "insynch" alarm switch that continuously monitors inverter frequency. If inverter frequency should deviate beyond the alarm setpoint the control room is notified via the "inverter trouble" alarm. Therefore, there is no need to monitor inverter frequency with a Surveillance since it is continuously monitored by the inverter with the "insynch" alarm switch. This change is consistent with PVNGS licensing basis.

5. The plant specific titles, nomenclature, number, parameter/value, reference, system description, system design, operating practices or analysis description was used (additions, deletions, and/or changes are included). Plant specific parameters/values are directly transferred from the CTS to the ITS.

PVNGS CTS
SPECIFICATION 3.8.8
MARK UP

Specification 3.8.8
(3.8.8/3.8.10)

A.1

3.8 ELECTRICAL POWER SYSTEMS

3.8.8 ~~ONSITE POWER DISTRIBUTION SYSTEMS~~ Inverters - Shutdown

~~SHUTDOWN~~

~~LIMITING CONDITION FOR OPERATION~~

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

LCO 3.8.8 ~~3.8.3.2 As a minimum, the following electrical busses shall be energized in the specified manner:~~ L.1

ITS 3.8.8

ITS 3.8.10 a. One train of A.C. emergency busses consisting of one 4160-volt A.C. ESF bus, and three 480-volt A.C. load centers and their associated four class 1E-MCCs.

ITS 3.8.8 ~~b.~~ ~~Two 120-volt A.C. channel vital busses energized from their associated inverters connected to their respective D.C. channels.~~ LA.1

ITS 3.8.10 c. One 125-volt D.C. train with both required channels energized from their associated battery banks.

ITS 3.8.8

APPLICABILITY: MODES 5 and 6. During movement of irradiated fuel assemblies with the core off loaded

ACTION: M.1

ACT A With any of the above required electrical busses not energized ~~in the required manner~~ immediately suspend all operations involving CORE ALTERATIONS, positive reactivity changes, or movement of irradiated fuel, initiate corrective action to energize the required electrical busses ~~in the specified manner~~ ~~as soon as possible~~.

OR

Declare affected required feature(s) inoperable. L.2

SURVEILLANCE REQUIREMENTS

SR 3.8.8.1 ~~4.8.3.2~~ The specified AC vital busses shall be determined energized ~~in the required manner~~ at least once per 7 days by verifying correct ~~breaker~~ inverter alignment and indicated voltage ~~on the busses~~. LA.1 M2

DISCUSSION OF CHANGES
SPECIFICATION 3.8.8

ADMINISTRATIVE CHANGES

A.1 All reformatting and renumbering is in accordance with Combustion Engineering Plant (CEOG) Standard Technical Specifications NUREG-1432, Rev. 1 (NUREG-1432). As a result, the Palo Verde Nuclear Generating Station (PVNGS) Improved Technical Specifications (ITS) should be more readable, and therefore understandable, by plant operators as well as other users. During the reformatting and renumbering of the ITS, no technical changes (either actual or interpretational) to the Current Technical Specifications (CTS) were made unless they were identified and justified.

Editorial rewording (either adding or deleting) is made consistent with NUREG-1432. During NUREG-1432 development, certain wording preferences or English language conventions were adopted which resulted in no technical changes (either actual or interpretational) the CTS.

Additional information has also been added to more fully describe each subsection. This wording is consistent with NUREG-1432. Since the design is already approved by the NRC, adding more detail does not result in a technical change.

TECHNICAL CHANGES - MORE RESTRICTIVE

M.1 ITS 3.8.8 contains an additional Applicability statement that states, "During movement of irradiated fuel assemblies with the core off loaded." CTS 3.8.3.2 does not contain this additional Applicability. The addition of this Applicability statement constitutes a more restrictive change to PVNGS plant operation. This is acceptable because it ensures systems needed to mitigate a fuel handling accident are available. This change is consistent with NUREG-1432.

M.2 ITS SR 3.8.8.1 requires verification of proper inverter voltage output. CTS 4.8.3.2 only requires that voltage be present at the inverter output. The addition of this requirement to the Surveillance constitutes a more restrictive change to PVNGS operating practices. This is acceptable because this ensures proper AC output voltage from the inverter for use in the AC vital buses. This change is consistent with NUREG-1432.

TECHNICAL CHANGES - RELOCATIONS

LA.1 CTS LCO 3.8.3.2 contains detailed information that describes, what buses and components constitute an Operable inverter. ITS 3.8.8 does not contain this information in the LCO. This information, because of the level of detail, is located in the associated Bases Section and in LCO 3.8.8 Bases. The Bases section refers to LCO 3.8.7 for a description of the inverters. The LCO along with the associated description in the Bases is appropriate to ensure the required train A, B, C, or D inverters are Operable. In addition, this requirement does not meet the criterion of 10 CFR 50.36 (c) (2) (ii) for inclusion into ITS.

Any changes to the Bases will be in accordance with Chapter 5.0 Bases Control Program. Any technical changes to plant procedures will be in accordance with the PVNGS procedure control process. This provides an equivalent level of control and is an administrative change with no impact on the margin of safety. This requirement is not required to be in ITS to provide adequate protection of public health and safety. Therefore, relocation of this requirement to a Licensee Controlled Document is acceptable and is consistent with NUREG-1432.

TECHNICAL CHANGES - LESS RESTRICTIVE

L.1 CTS LCO 3.8.3.2 states that the buses shall be energized in a specified manner. ITS LCO 3.8.8 states only that required inverter(s) shall be Operable to support the onsite Class 1E AC vital bus electrical power distribution subsystem(s) required by LCO 3.8.10. Not specifying exactly which inverters by train must be Operable is a relaxation of requirements. This allows various combinations of subsystems, equipment, and components to be used that are not necessarily train related. This is acceptable because various combinations, not necessarily train related, of subsystems, equipment, and components are required Operable by other LCOs depending on the specific unit conditions. Implicit in those requirements is the required Operability of necessary support required features (inverters). This LCO explicitly requires inverter Operability to support Operability of onsite Class 1E AC vital bus electrical power distribution subsystem(s) required by LCO 3.8.10 - all implicitly required via the definition of Operability. This change is consistent with NUREG-1432.

L.2 ITS 3.8.8 has an additional Required Action (A.1) that states "Declare affected required feature(s) inoperable." CTS 3.8.3.2 does not contain this Required Action. The addition of this Required Action constitutes a less restrictive change to PVNGS operating practices because it offers an option to suspending CORE ALTERATIONS, suspending movement of irradiated fuel, and initiating action to suspend operations involving positive reactivity additions.. This is acceptable because it allows the option to declare affected required feature(s), associated with an inoperable inverter(s), inoperable. This ensures appropriate restrictions are implemented in accordance with the affected required feature(s) LCOs' Required Actions due to inverter(s) inoperability. This change is consistent with NUREG-1432.

TECHNICAL CHANGES - CTS CHANGES

None

NO SIGNIFICANT HAZARDS CONSIDERATION
SPECIFICATION 3.8.8

ADMINISTRATIVE CHANGES
(ITS 3.8.8 Discussion of Changes Labeled A.1)

Arizona Public Service Company, Palo Verde Nuclear Generating Station (PVNGS), Units 1, 2, and 3, is converting to the ITS as outlined in NUREG-1432, "Standard Technical Specifications, Combustion Engineering Plants." The proposed changes involve the reformatting, renumbering, rewording of the Technical Specifications (TS) and Bases with no change in intent, and the incorporation of current operating practices consistent with NUREG-1432. These changes, since they do not involve technical changes to the Current TS (CTS), are administrative. Below are the No Significant Hazards Consideration (NSHC) for the conversion of this Section/Chapter to NUREG-1432.

The Commission has provided standards for determining whether a significant hazards consideration exists as stated in 10 CFR 50.92. A proposed amendment to an operating license for a facility involves a no significant hazards consideration if operation of the facility, in accordance with a proposed amendment, would not 1) involve a significant increase in the probability or consequences of an accident previously evaluated; 2) create the possibility of a new or different kind of accident from any accident previously evaluated; or 3) involve a significant reduction in a margin of safety. A discussion of these standards as they relate to this amendment request follows:

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

> The proposed changes involve reformatting, renumbering, and rewording of the CTS and Bases along with incorporation of PVNGS current operating practices and other changes to the CTS as discussed in the specific Discussion of Changes listed above in order to be consistent with NUREG-1432. The reformatting, renumbering, and rewording along with the other changes listed above, involves no technical changes to the CTS. Specifically, there will be no change in the requirements imposed on PVNGS due to these changes. During development of NUREG-1432, certain wording preferences or English language conventions were adopted. The proposed changes to this Section/Chapter are administrative in nature and do not impact initiators of any analyzed events. They also do not impact the assumed mitigation of accidents or transient events. Therefore, these changes do not involve a significant increase in the probability or consequences of an accident previously evaluated.

ADMINISTRATIVE CHANGES
(ITS 3.8.8 Discussion of Changes Labeled (A.1) (continued)

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

> The proposed changes involve reformatting, renumbering, and rewording of the CTS, along with the incorporation of PVNGS current operating practices and other changes, as discussed, in order to be consistent with NUREG-1432. The proposed changes do not involve a physical alteration of the plant (no new or different type of equipment will be installed) or change the methods governing normal plant operation. The proposed changes will not impose any new or different requirements or eliminate any existing requirements. Therefore, these changes do not create the possibility of a new or different kind of accident from any accident previously evaluated.

Standard 3.-- Does the proposed change involve a significant reduction in a margin of safety?

> The proposed changes involve reformatting, renumbering, and rewording of the CTS, along with the incorporation of PVNGS current operating practices and other changes, as discussed, in order to be consistent with NUREG-1432. The proposed changes are administrative in nature and will not involve any technical changes. The proposed changes will not reduce a margin of safety because they have no impact on any safety analysis assumptions. Also, because these changes are administrative in nature, no question of safety is involved. Therefore, these changes do not involve a significant reduction in a margin of safety.

TECHNICAL CHANGES - MORE RESTRICTIVE
(ITS 3.8.8 Discussion of Changes Labeled M.1 and M.2)

Arizona Public Service Company, Palo Verde Nuclear Generating Station (PVNGS), Units 1, 2, and 3 is converting to the ITS as outlined in NUREG-1432. This particular NSHC is for the changes labeled "Technical Changes - More Restrictive" described in the specific Discussion of Changes listed above. The proposed changes incorporate more restrictive changes into the CTS by either making current requirements more stringent or adding new requirements which currently do not exist.

The Commission has provided standards for determining whether a significant hazards consideration exists as stated in 10 CFR 50.92. A proposed amendment to an operating license for a facility involves a no significant hazards consideration if operation of the facility, in accordance with a proposed amendment, would not 1) involve a significant increase in the probability or consequences of an accident previously evaluated; 2) create the possibility of a new or different kind of accident from any accident previously evaluated; or 3) involve a significant reduction in a margin of safety. A discussion of these standards as they relate to this amendment request follows:

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

The proposed changes provide more stringent requirements than previously existed in the CTS. The more stringent requirements will not result in operation that will increase the probability of initiating an analyzed event. If anything, the new requirements may decrease the probability or consequences of an analyzed event by incorporating the more restrictive changes discussed in the specific Discussion of Changes listed above. These changes will not alter assumptions relative to mitigation of an accident or transient event. The more restrictive requirements will not alter the operation and will continue to ensure process variables, structures, systems, or components are maintained consistent with safety analyses and licensing basis. These changes have been reviewed to ensure that no previously evaluated accident has been adversely affected. Therefore, these changes will not involve a significant increase in the probability or consequences of an accident evaluated.

TECHNICAL CHANGES - MORE RESTRICTIVE
(ITS 3.8.8 Discussion of Changes Labeled M.1 and M.2) (continued)

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

Making existing requirements more restrictive and adding more restrictive requirements to the CTS will not alter the plant configuration (no new or different type of equipment will be installed) or change the methods governing normal plant operation. These changes do impose different requirements. However, they are consistent with the assumptions made in the safety analyses, licensing basis, and NUREG-1432. Therefore, these changes will not create the possibility of a new or different kind of accident from any accident previously evaluated.

Standard 3.-- Does the proposed change involve a significant reduction in a margin of safety?

The proposed changes provide more stringent requirements than previously existed in the CTS. An evaluation of these changes concluded that adding these more restrictive requirements either increases or has no impact on the margin of safety. The changes provide additional restrictions which may enhance plant safety. These changes maintain requirements of the safety analysis, licensing basis, and NUREG-1432. As such, no question of safety is involved. Therefore, these changes will not involve a significant reduction in a margin of safety.

TECHNICAL CHANGES - RELOCATIONS
(ITS 3.8.8 Discussion of Changes Labeled LA.1)

Arizona Public Service Company, Palo Verde Nuclear Generating Station (PVNGS), Units 1, 2, and 3 is converting to the ITS as outlined in NUREG-1432. The proposed changes, since detail is being removed from the CTS to a Licensee Controlled Document, are less restrictive. The descriptions of these changes are in the Discussion of Changes listed above.

The Commission has provided standards for determining whether a significant hazards consideration exists as stated in 10 CFR 50.92. A proposed amendment to an operating license for a facility involves a no significant hazards consideration if operation of the facility, in accordance with a proposed amendment, would not 1) involve a significant increase in the probability or consequences of an accident previously evaluated; 2) create the possibility of a new or different kind of accident from any accident previously evaluated; or 3) involve a significant reduction in a margin of safety. A discussion of these standards as they relate to this amendment request follows:

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

> The proposed changes relocate requirements from the CTS to a Licensee Controlled Document. These changes do not result in any hardware changes or changes to plant operating practices. The details being relocated are not assumed to be an initiator of any analyzed event. The Licensee Controlled Document containing the relocated requirements will be maintained using the provisions of 10 CFR 50.59 or other specified control processes and is subject to the change control process in the Administrative Controls Section of the ITS. Since any changes to a Licensee Controlled Document will be evaluated, no increase in the probability or consequences of an accident previously evaluated will be allowed. Therefore, these changes will not involve a significant increase in the probability or consequences of an accident previously evaluated.

TECHNICAL CHANGES - RELOCATIONS
(ITS 3.8.8 Discussion of Changes Labeled LA.1) (continued)

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

The proposed changes relocate requirements from the CTS to a Licensee Controlled Document. These changes will not alter the plant configuration (no new or different type of equipment will be installed) or change the methods governing normal plant operation. These changes will not impose different requirements and adequate control of information will still be maintained. These changes will not alter assumptions made in the safety analysis or licensing basis. Therefore, these changes will not create the possibility of a new or different kind of accident from any accident previously evaluated.

Standard 3.-- Does the proposed change involve a significant reduction in a margin of safety?

The proposed changes relocate requirements from the CTS to a Licensee Controlled Document. These changes will not reduce a margin of safety since they have no impact on any safety analysis assumptions. In addition, the requirements to be transposed from the CTS to the Licensee Controlled Document are the same as the CTS. Since any future changes to this Licensee Controlled Document will be evaluated per the requirements of 10 CFR 50.59, or other specified control processes, no reduction (significant or insignificant) in a margin of safety will be allowed. Therefore, these changes will not involve a significant reduction in a margin of safety.

The NRC review provides a certain margin of safety, and although this review will no longer be performed prior to submittal, the NRC still inspects the 10 CFR 50.59 process. The proposed changes are consistent with NUREG-1432, which was approved by the NRC Staff. The change controls for proposed relocated details and requirements provide an acceptable level of regulatory authority. Revising the CTS to reflect the approved level of detail per NUREG-1432 reinforces the conclusion that there is not a significant reduction in the margin of safety. Therefore, revising the CTS to reflect the NRC accepted level of detail and requirements ensures no reduction in a margin of safety.

TECHNICAL CHANGES - LESS RESTRICTIVE
(ITS 3.8.8 Discussion of Changes Labeled L.1)

Arizona Public Service Company, Palo Verde Nuclear Generating Station (PVNGS), Units 1, 2, and 3 is converting to the ITS as outlined in NUREG-1432. The proposed change involves making the CTS less restrictive. Below is the description of this less restrictive change and the NSHC for the conversion to NUREG 1432.

L.1 CTS LCO 3.8.3.2 states that the buses shall be energized in a specified manner. ITS LCO 3.8.8 states only that required inverter(s) shall be Operable to support the onsite Class 1E AC vital bus electrical power distribution subsystem(s) required by LCO 3.8.10. Not specifying exactly which inverters by train must be Operable is a relaxation of requirements. This allows various combinations of subsystems, equipment, and components to be used that are not necessarily train related. This is acceptable because various combinations, not necessarily train related, of subsystems, equipment, and components are required Operable by other LCOs depending on the specific unit conditions. Implicit in those requirements is the required Operability of necessary support required features (inverters). This LCO explicitly requires inverter Operability to support Operability of onsite Class 1E AC vital bus electrical power distribution subsystem(s) required by LCO 3.8.10 - all implicitly required via the definition of Operability. This change is consistent with NUREG-1432.

The Commission has provided standards for determining whether a significant hazards consideration exists as stated in 10 CFR 50.92. A proposed amendment to an operating license for a facility involves a no significant hazards consideration if operation of the facility, in accordance with a proposed amendment, would not 1) involve a significant increase in the probability or consequences of an accident previously evaluated; 2) create the possibility of a new or different kind of accident from any accident previously evaluated; or 3) involve a significant reduction in a margin of safety. A discussion of these standards as they relate to this amendment request follows:

TECHNICAL CHANGES - LESS RESTRICTIVE
(ITS 3.8.8 Discussion of Changes Labeled L.1) (continued)

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

The proposed change requires Operable only those inverter(s) necessary to support onsite Class IE AC vital bus electrical power distribution subsystem(s) identified by ITS LCO 3.8.10. Although necessary systems, subsystems, support equipment and components are derived from design basis accidents, it is ITS LCO 3.8.10 that will stipulate which train(s) of equipment is required. ITS LCO 3.8.8 will require those inverter(s) necessary to support the train(s) identified by LCO 3.8.10. This change will not affect the probability of an accident.

Requiring Operable only those inverter(s) necessary to support onsite Class IE AC vital bus electrical power distribution subsystem(s) identified by ITS LCO 3.8.10 is not an initiator of any analyzed event. The consequences of an accident are not significantly affected by this change. Also this is acceptable because various combinations of subsystems, equipment, and components are required Operable by other LCOs, depending on the specific unit conditions. Implicit in those requirements is the required Operability of necessary support required functions (inverters). The change does not alter assumptions relative to the mitigation of an analyzed event. Therefore, the change will not involve a significant increase in the probability or consequence of an accident previously evaluated.

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

The proposed change requires Operable only those inverter(s) necessary to support onsite Class IE AC vital bus electrical power distribution subsystem(s) identified by ITS LCO 3.8.10. While loss of a required support function (inverters), during shutdown conditions is an unanalyzed condition, the unit will declare the required support feature(s) inoperable, or secure various evolutions (Core Alterations, movement of irradiated fuel, operations involving positive reactivity changes) while restoring required inverter(s) to Operable status. As a result, this change will not allow continued operation following a loss of required inverter(s) unless appropriate compensatory Actions are taken. This change will not physically alter the plant (no new or different type of equipment will be installed). The change does not require any new or unusual operator actions. Therefore, this change does not create the possibility of a new or different kind of accident from any accident previously evaluated.

TECHNICAL CHANGES - LESS RESTRICTIVE
(ITS 3.8.8 Discussion of Changes Labeled L.1) (continued)

Standard 3.-- Does the proposed change involve a significant reduction in a margin of safety?

The proposed change requires Operable only those inverter(s) necessary to support onsite Class IE AC vital bus electrical power distribution subsystem(s) identified by ITS LCO 3.8.10. The margin of safety is not affected by this change. Whether stipulating which buses shall be energized in one LCO or in a combination of LCOs, appropriate compensatory Actions are taken. LCO 3.8.8 explicitly requires inverter Operability to support Operability of onsite Class IE AC vital bus electrical power distribution subsystem(s) required by LCO 3.8.10 - all implicitly required via the definition of Operability. Therefore, the change does not involve a significant reduction in a margin of safety.

TECHNICAL CHANGES - LESS RESTRICTIVE
(ITS 3.8.8 Discussion of Changes Labeled L.2)

Arizona Public Service Company, Palo Verde Nuclear Generating Station (PVNGS), Units 1, 2, and 3 is converting to the ITS as outlined in NUREG-1432. The proposed change involves making the CTS less restrictive. Below is the description of this less restrictive change and the NSHC for conversion to NUREG-1432.

L.2 ITS 3.8.8 has an additional Required Action (A.1) that states "Declare affected required feature(s) inoperable." CTS 3.8.3.2 does not contain this Required Action. The addition of this Required Action constitutes a less restrictive change to PVNGS operating practices because it offers an option to suspending CORE ALTERATIONS, suspending movement of irradiated fuel, and initiating action to suspend operations involving positive reactivity additions.. This is acceptable because it allows the option to declare affected required feature(s), associated with an inoperable inverter(s), inoperable. This ensures appropriate restrictions are implemented in accordance with the affected required feature(s) LCOs' Required Actions due to inverter(s) inoperability. This change is consistent with NUREG-1432.

The Commission has provided standards for determining whether a significant hazards consideration exists as stated in 10 CFR 50.92. A proposed amendment to an operating license for a facility involves a no significant hazards consideration if operation of the facility, in accordance with a proposed amendment, would not 1) involve a significant increase in the probability or consequences of an accident previously evaluated; 2) create the possibility of a new or different kind of accident from any accident previously evaluated; or 3) involve a significant reduction in a margin of safety. A discussion of these standards as they relate to this amendment request follows:

TECHNICAL CHANGES - LESS RESTRICTIVE
(ITS 3.8.8 Discussion of Changes Labeled L.2) (continued)

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

The proposed change affords the option to declare affected required feature(s) inoperable rather than suspend CORE ALTERATIONS, suspend movement of irradiated fuel assemblies, and initiate action to suspend operations involving positive reactivity additions. Though suspending CORE ALTERATIONS, movement of irradiated fuel assemblies, and initiating action to suspend operations involving positive reactivity additions are derived from design basis accidents, the option to declare affected required feature(s) inoperable will ensure appropriate LCOs are entered and appropriate compensatory actions are performed. The Action to declare affected required feature(s) inoperable or to suspend CORE ALTERATIONS, suspend movement of irradiated fuel assemblies, and initiate action to suspend operations involving positive reactivity additions minimizes the probability of the occurrence of postulated events. This change will not affect the probability of an accident. The Action to declare affected required feature(s) inoperable is not an initiator of any analyzed event. The consequences of an accident are not significantly affected by this change. Also, this Action ensures appropriate restrictions are implemented in accordance with the affected required features LCOs' Required Actions due to inverter(s) inoperability. The change does not alter assumptions relative to the mitigation of an analyzed event. Therefore, the change will not involve a significant increase in the probability or consequence of an accident previously evaluated.

TECHNICAL CHANGES - LESS RESTRICTIVE
(ITS 3.8.8 Discussion of Changes Labeled L.2) (continued)

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

The proposed change affords the option to declare affected required feature(s) inoperable rather than suspend CORE ALTERATIONS, suspend movement of irradiated fuel assemblies, and initiate action to suspend operations involving positive reactivity additions. While loss of a required support function (inverters), during shutdown conditions is an unanalyzed condition, the unit will declare the required support feature(s) inoperable, or secure various evolutions (Core Alterations, movement of irradiated fuel, operations involving positive reactivity changes). As a result, this change will not allow continued CORE ALTERATIONS, movement of irradiated fuel assemblies, or positive reactivity additions unless appropriate compensatory Actions (declaring affected required feature(s) inoperable)are taken. This change will not physically alter the plant (no new or different type of equipment will be installed). The change does not require any new or unusual operator actions. Therefore, this change does not create the possibility of a new or different kind of accident from any accident previously evaluated.

Standard 3.-- Does the proposed change involve a significant reduction in a margin of safety?

The proposed change affords the option to declare affected required feature(s) inoperable rather than suspend CORE ALTERATIONS, suspend movement of irradiated fuel assemblies, and initiate action to suspend operations involving positive reactivity additions. The margin of safety is not affected by this change. Whether declaring affected required feature(s) inoperable or suspending CORE ALTERATIONS, movement of irradiated fuel assemblies, and initiating action to suspend operations involving positive reactivity additions, appropriate LCOs are entered and appropriate compensatory Actions are performed. Therefore, the change does not involve a significant reduction in a margin of safety.

CE STS
NUREG-1432 REV. 1
SPECIFICATION 3.8.9
MARK UP

<DOC>
<CTS>

3.8 ELECTRICAL POWER SYSTEMS

3.8.9 Distribution Systems—Operating

2

<LCO 3.8.3.1> LCO 3.8.9 Train A and Train B AC, DC, and AC vital instrument bus electrical power distribution subsystems shall be OPERABLE.

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

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
<3.8.3.1 ACT A> A. One or more 1 AC electrical power distribution subsystem(s) inoperable.	A.1 Restore AC electrical power distribution subsystem to OPERABLE status.	8 hours AND 16 hours from discovery of failure to meet LCO
<3.8.3.1 ACT B> B. 1 One or more AC vital instrument bus electrical power distribution subsystems inoperable.	B.1 Restore AC vital instrument bus ~~subsystem~~ electrical power distribution subsystems to OPERABLE status.	2 hours AND 16 hours from discovery of failure to meet LCO 2
<3.8.3.1 ACT C> C. One or more 1 DC electrical power distribution subsystem(s) inoperable.	C.1 Restore DC electrical power distribution subsystem to OPERABLE status.	2 hours AND 16 hours from discovery of failure to meet LCO

(continued)

ACTIONS (continued)

	CONDITION	REQUIRED ACTION		COMPLETION TIME
<3.8.3.1 ACT A 3.8.3.1 ACT B 3.8.3.1 ACT C>	D. Required Action and associated Completion Time not met.	D.1	Be in MODE 3.	6 hours
		AND		
		D.2	Be in MODE 5.	36 hours
<DOC M.2>	E. Two or more inoperable distribution subsystems that result in a loss of safety function.	E.1	Enter LCO 3.0.3.	Immediately

1

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE		FREQUENCY
<4.8.3.1>	SR 3.8.9.1	Verify correct breaker alignments and voltage to ~~required~~ AC, DC, and AC vital instrument bus electrical power distribution subsystems.	7 days

2

CE STS
NUREG-1432 REV. 1
SPECIFICATION 3.8.9
BASES MARK UP

B 3.8 ELECTRICAL POWER SYSTEMS

B 3.8.9 Distribution Systems—Operating

BASES

BACKGROUND

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

The AC primary electrical power distribution system consists of two 4.16 kV Engineered Safety Feature (ESF) buses~~, each having at least [one separate and independent offsite source of power] as well as a dedicated onsite diesel generator (DG) source~~. Each ~~4.16 kV ESF bus~~ is normally connected to a preferred offsite source. ~~After a loss of the preferred offsite power source to a 4.16 kV ESF bus, a transfer to the alternate offsite source is accomplished by utilizing a time delayed bus undervoltage relay. If all offsite sources are unavailable, the onsite emergency DG supplies power to the 4.16 kV ESF bus.~~ If the offsite source is de-energized or disconnected, the onsite emergency DG supplies power to the 4.16kV ESF bus. Control power for the 4.16 kV breakers is supplied from the Class 1E batteries. Additional description of this system may be found in the Bases for LCO 3.8.1, "AC Sources—Operating," and the Bases for LCO 3.8.4, "DC Sources—Operating."

The secondary AC electrical power distribution system for each train includes the safety related load centers, and motor control centers ~~and distribution panels~~ shown in Table B 3.8.9-1.

The 120 VAC vital instrument buses are arranged in two ~~load groups~~ channels per ~~train~~ subsystem and are normally powered from the inverters. There are four channels designated as A, B, C, and D for each unit. The alternate power supply for the vital instrument buses are Class 1E constant voltage source ~~transformers~~ regulators powered from ~~the same train as the associated inverter~~ Train-related Class 1E motor control centers, ~~and its use is governed by LCO 3.8.7, "Inverters—Operating." Each constant voltage source transformer is powered from a Class 1E AC bus.~~

There are two independent 125~~/250~~VDC electrical power distribution subsystems ~~(one for each train)~~ (train A & train B). Each subsystem contains two DC power channels. There are four channels designated as A, B, C, and D for each unit.

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

Insert 1

(continued)

INSERT FOR ITS BASES 3.8.9
BASES SECTION
(Units 1, 2, and 3)
INSERT 1

BASES

BACKGROUND	The six electrical power distribution subsystems consist of those components identified in Table B 3.8.9-1. Load breakers not identified by this table do not impact this LCO but may impact supported system LCOs. Load breakers that are required to maintain energized those buses identified by Table B 3.8.9-1 (e.g., PG to PH) do impact this LCO.

BASES (continued)

APPLICABLE SAFETY ANALYSES

u

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

instrument

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

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

b. A worst case single failure.

The distribution systems satisfy Criterion 3 of ~~the NRC Policy Statement~~ 10 CFR 50.36(c)(2)(ii).

LCO

six (1)

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

(2) instrument

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

(continued)

BASES

LCO (continued)

OPERABLE AC electrical power distribution subsystems require the associated buses, load centers, motor control centers, and distribution panels to be energized to their proper voltages. OPERABLE DC electrical power distribution subsystems require the associated buses to be energized to their proper voltage from either the associated battery or charger. OPERABLE vital bus electrical power distribution subsystems require the associated buses to be energized to their proper voltage from the associated inverter via inverted DC voltage, ~~inverter using internal AC source,~~ or Class 1E constant voltage ~~transformer~~. regulator

1 and 2 AC 2 instrument 2

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

APPLICABILITY

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

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

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

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

(continued)

BASES (continued)

ACTIONS

A.1

(see table B3.8.9-1) 1

ESF

With one or more required AC buses, load centers, motor control centers, or distribution panels, except AC vital buses, in one train inoperable, the remaining AC electrical power distribution subsystem in the other train is capable of supporting the minimum safety functions necessary to shut down the reactor and maintain it in a safe shutdown condition, assuming no single failure. The overall reliability is reduced, however, because a single failure in the remaining power distribution subsystems could result in the minimum required ESF functions not being supported. Therefore, the required AC buses, load centers, motor control centers, and distribution panels must be restored to OPERABLE status within 8 hours.

2 instrument

1 subsystem

2

1 and

(PBA or PBB)

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

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

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

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

(continued)

BASES

ACTIONS

A.1 (continued)

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.

2 electrical power distribution subsystem is

B.1 1 instrument (es) (trains A, B, C, or D), in one train

With ~~one~~ AC vital bus inoperable, the remaining OPERABLE AC vital ~~buses are~~ capable of supporting the minimum safety functions necessary to shut down the unit and maintain it in the safe shutdown condition. Overall reliability is reduced, however, since an additional single failure could result in the minimum required ESF functions not being supported. Therefore, the ~~required~~ AC vital bus es must be restored to OPERABLE status within 2 hours ~~by powering the bus from the associated inverter via inverted DC, inverter using internal AC source, or Class 1E constant voltage transformer~~. 1

2 instrument

2 train

2 adequate AC vital instrument bus

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

1 Operability

2 electrical power distribution subsystem

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

2 instrument

(continued)

Palo Verde Units 1, 2, 3

A

BASES

ACTIONS

B.1 (continued)

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

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

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

instrument ②

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

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

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

(continued)

BASES

ACTIONS (continued)

C.1

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

Condition C represents one train 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.

2 DC buses

operability

DC electrical power distribution subsystem

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

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

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

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

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

(continued)

BASES

ACTIONS

C.1 (continued)

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

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

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

E.1

Condition E corresponds to a level of degradation in the electrical distribution system that causes a required safety function to be lost. When more than one Condition is entered, and this results in the loss of a required function, the plant is in a condition outside the accident analysis. Therefore, no additional time is justified for

(this can be both trains of a single Condition) 1

(continued)

Palo Verde Units 1,2,3

EAB

BASES

ACTIONS

E.1 (continued)

continued operation. LCO 3.0.3 must be entered immediately to commence a controlled shutdown.

1

SURVEILLANCE REQUIREMENTS

SR 3.8.9.1 required circuit breakers closed and the buses energized,

2 instrument

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

REFERENCES

2

1. U FSAR, Chapter ~~[~~6~~]~~.
2. U FSAR, Chapter ~~[~~15~~]~~.
3. Regulatory Guide 1.93, December 1974.

(Revision 0)

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

TYPE	VOLTAGE	TRAIN A*	TRAIN B*
AC safety buses	[4160 V]	[ESF Bus] [NB01]	[ESF Bus] [NB02]
	[480 V]	Load Centers [NG01, NG03]	Load Centers [NG02, NG04]
	[480 V]	Motor Control Centers [NG01A, NG01I, NG01B, NG03C, NG03I, NG03D]	Motor Control Centers [NG02A, NG02I, NG02B, NG04C, NG04I, NG04D]
	[120 V]	Distribution Panels [NP01, NP03]	Distribution Panels [NP02, NP04]
DC buses	[125 V]	Bus [NK01]	Bus [NK02]
		Bus [NK03]	Bus [NK04]
		Distribution Panels [NK41, NK43, NK51]	Distribution Panels [NK42, NK44, NK52]
AC vital buses	[120 V]	Bus [NN01]	Bus [NN02]
		Bus [NN03]	Bus [NN04]

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

1

2

Insert 1

INSERT FOR ITS BASES 3.8.9
TABLE B 3.8.9-1
(Units 1, 2, and 3)
INSERT 1

<table>
<tr><th>TYPE</th><th>VOLTAGE</th><th colspan="2">TRAIN A</th><th colspan="2">TRAIN B</th></tr>
<tr><td rowspan="3">AC safety buses</td><td>4160 V</td><td colspan="2">ESF Bus PBA-S03</td><td colspan="2">ESF Bus PBB-S04</td></tr>
<tr><td>480 V</td><td colspan="2">Load Centers
PGA-L31, PGA-L33,
PGA-L35</td><td colspan="2">Load Centers
PGB-L32, PGB-L34,
PGB-L36</td></tr>
<tr><td>480 V</td><td colspan="2">Motor Control Centers
PHA-M31, PHA-M33,
PHA-M35, PHA-M37</td><td colspan="2">Motor Control Centers
PHB-M32, PHB-M34,
PHB-M36, PHB-M38</td></tr>
<tr><td rowspan="2">DC buses</td><td rowspan="2">125 V</td><td>CHANNEL A</td><td>CHANNEL C</td><td>CHANNEL B</td><td>CHANNEL D</td></tr>
<tr><td>Bus
PKA-M41

Distribution
Panel
PKA-D21</td><td>Bus
PKC-M43

Distribution
Panel
PKC-D23</td><td>Bus
PKB-M42

Distribution
Panel
PKB-D22</td><td>Bus
PKD-M44

Distribution
Panel
PKD-D24</td></tr>
<tr><td rowspan="2">AC vital instrument buses</td><td rowspan="2">120 V</td><td>CHANNEL A</td><td>CHANNEL C</td><td>CHANNEL B</td><td>CHANNEL D</td></tr>
<tr><td>Bus
PNA-D25</td><td>Bus
PNC-D27</td><td>Bus
PNB-D26</td><td>Bus
PND-D28</td></tr>
</table>

NOTE: Each train of the electrical power distribution system is comprised of the independent AC , DC and AC vital instrument bus subsystems.

NUREG-1432 EXCEPTIONS
SPECIFICATION 3.8.9

1. Grammar and/or editorial changes have been made to enhance clarity. No technical or intent changes to the Specification are made by this change.

2. The plant specific titles, nomenclature, number, parameter/value, reference, system description, system design, operating practices or analysis description was used (additions, deletions, and/or changes are included). Plant specific parameters/values are directly transferred from the CTS to the ITS.

PVNGS CTS
SPECIFICATION 3.8.9
MARK UP

Specification 3.8.9
(3.8.7/3.8.9) A.1

3.8

3.8.9

ELECTRICAL POWER SYSTEMS

~~3/4.8.3 ONSITE POWER~~ DISTRIBUTION SYSTEMS - Operating

~~OPERATING~~

~~LIMITING CONDITION FOR OPERATION~~

~~3.8.3.1 The following electrical busses shall be energized in the specified manner with tie breakers open between redundant busses within the unit.~~

a. Train "A" A.C. emergency busses consisting of:
   1. 4160-volt ESF Bus #E-PBA-S03
   2. 480-volt ESF Load Center #E-PGA-L31
      a. MCC E-PHA-M31
   3. 480-volt ESF Load Center #EPGA-L33
      a. MCC E-PHA-M33
      b. MCC E-PHA-M37
   4. 480-volt ESF Load Center #E-PGA-L35
      a. MCC E-PHA-M35

b. Train "B" A.C. emergency busses consisting of:
   1. 4160-volt ESF Bus #E-PBB-S04
   2. 480-volt ESF Load Center #E-PGB-L32
      a. MCC E-PHB-M32
      b. MCC E-PHB-M38
   3. 480-volt ESF Load Center #E-PGB-L34
      a. MCC E-PHB-M34
   4. 480-volt ESF Load Center #E-PGB-L36
      a. MCC E-PHB-M36

c. 120-volt Channel A Vital A.C. Bus #E-PNA-D25 energized from its associated inverter connected to D.C. Channel A*.

d. 120-volt Channel B Vital A.C. Bus #E-PNB-D26 energized from its associated inverter connected to D.C. Channel B*.

e. 120-volt Channel C Vital A.C. Bus #E-PNC-D27 energized from its associated inverter connected to D.C. Channel C*.

f. 120-volt Channel D Vital A.C. Bus #E-PND-D28 energized from its associated inverter connected to D.C. Channel D*.

LA.1

L.1 or associated constant voltage regulator

g. 125-volt D.C. Channel A energized from Battery Bank E-PKA-F11.

h. 125-volt D.C. Channel B energized from Battery Bank E-PKB-F12.

i. 125-volt D.C. Channel C energized from Battery Bank E-PKC-F13.

j. 125-volt D.C. Channel D energized from Battery Bank E-PKD-F14.

L.1 or associated battery charger

LCO 3.8.9 Train A and train B AC, DC and AC vital bus electrical power distribution subsystems shall be OPERABLE

ITS 3.8.9

ITS 3.8.7 *Two inverters may be disconnected from their D.C. bus for up to 24 hours, as necessary, for the purpose of performing an equalizing charge on their associated battery bank provided (1) their vital busses are energized, and (2) the vital busses associated with the other battery bank are energized from their associated inverters and connected to their associated D.C. bus.

Specification 3.8.9
(3.8.7/3.8.9)

A.1

3.8 ELECTRICAL POWER SYSTEMS

3.8.9 Distribution Systems - Operating

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

ACTION: or more L.2 LA.1

ACT A ACT D ~~With~~ one ~~of the required divisions of~~ A.C. ESF buss~~es~~ not fully energized, reenergize the division within 8 hours, or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours. AND within 16 hours from discovery of failure to meet LCO M.1

ITS 3.8.7 ACT B ~~With~~ one A.C. vital bus ~~either~~ not energized from its associated inverter ~~inverter~~, or with the inverter not connected to its associated D.C. bus ~~bus~~: (1) reenergize the A.C. vital bus within 2 hours, or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN ITS 3.8.7

ITS 3.8.9 ACT D within the following 30 hours and (2) reenergize the A.C. vital bus from its associated inverter connected to its associated D.C. bus

ITS 3.8.7 within 24 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

ITS 3.8.9 L.2 or more ACT C ACT D ~~With~~ one D.C. bus not energized from its associated battery bank, reenergize the D.C. bus ~~from its associated battery bank~~ within 2 hours, or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours LA.2

AND within 16 hours from discovery of failure to meet LCO M.1

SURVEILLANCE REQUIREMENTS

SR 3.8.9.1 ~~4.8.3.1~~ The specified busses shall be determined energized ~~in the required manner~~ at least once per 7 days by verifying correct breaker alignment and indicated voltage ~~on the busses~~. LA.1

Actions

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

M.2

DISCUSSION OF CHANGES
SPECIFICATION 3.8.9

ADMINISTRATIVE CHANGES

A.1 All reformatting and renumbering is in accordance with Combustion Engineering Plant (CEOG) Standard Technical Specifications NUREG-1432, Rev. 1 (NUREG-1432). As a result, the Palo Verde Nuclear Generating Station (PVNGS) Improved Technical Specifications (ITS) should be more readable, and therefore understandable, by plant operators as well as other users. During the reformatting and renumbering of the ITS, no technical changes (either actual or interpretational) to the Current Technical Specifications (CTS) were made unless they were identified and justified.

Editorial rewording (either adding or deleting) is made consistent with NUREG-1432. During NUREG-1432 development, certain wording preferences or English language conventions were adopted which resulted in no technical changes (either actual or interpretational) the CTS.

Additional information has also been added to more fully describe each subsection. This wording is consistent with NUREG-1432. Since the design is already approved by the NRC, adding more detail does not result in a technical change.

TECHNICAL CHANGES - MORE RESTRICTIVE

M.1 ITS 3.8.9 has an additional Completion Time for each Condition that requires Operability restoration within 16 hours of failure to meet the LCO. CTS 3.8.3.1 has no such requirement to limit distribution subsystem inoperability during any single continuous occurrence of failing to meet the LCO. The addition of this Completion Time constitutes a more restrictive change to PVNGS operating practices. This is acceptable because the additional Completion Time establishes a limit on the maximum allowed, for any combination of required distribution subsystems, to be inoperable during any continuous occurrence of failing to meet the LCO. This Completion Time allows for an exception to the normal "time zero" for the 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 the individual Condition was entered. The 16 hour Completion Time is an acceptable limitation on this potential to fail to meet the LCO indefinitely. This change is consistent with NUREG-1432.

M.2 ITS 3.8.9 has an additional Action to address a loss of safety function Condition due to electrical sub systems inoperability (3.0.3 entry). CTS 3.8.3.1 has no explicit Action that addresses this Condition. The addition of this Action constitutes a more restrictive change to PVNGS operating practices. This is acceptable because when more than one electrical distribution subsystem is inoperable and results in a loss of a required safety function, the plant is in a condition outside the accident analysis. Hence, no additional time is justified for continued operation and LCO 3.0.3 must be entered. ITS 3.8.9 now contains an explicit Action to address this Condition. This change is consistent with NUREG-1432.

TECHNICAL CHANGES - RELOCATIONS

LA.1 CTS LCO 3.8.3.1 contains detailed information that describes, what buses, and combination of buses and components constitute an Operable electrical distribution subsystem. ITS 3.8.9 does not contain this information in the LCO. This information, because of the level of detail, is located in the associated Bases Section. The LCO along with the associated description in the Bases is appropriate to ensure the required AC, DC, and AC vital instrument bus electrical power distribution subsystems are Operable. In addition, this requirement does not meet the criterion of 10 CFR 50.36 (c) (2) (ii) for inclusion into ITS.

Any changes to the Bases will be in accordance with Chapter 5.0 Bases Control Program. Any technical changes to plant procedures will be in accordance with the PVNGS procedure control process. This provides an equivalent level of control and is an administrative change with no impact on the margin of safety. This requirement is not required to be in ITS to provide adequate protection of public health and safety. Therefore, relocation of this requirement to a Licensee Controlled Document is acceptable and is consistent with NUREG-1432.

LA.2 CTS LCO 3.8.3.1 contains information about power restoration to the DC bus that states the DC bus must be reenergized from its associated battery bank. ITS 3.8.9 does not contain this information in the LCO. This information, because of the level of detail, is located in the associated Bases Section. The LCO along with the associated description in the Bases is appropriate to ensure the required DC bus electrical power distribution subsystems is Operable. In addition, this requirement does not meet the criterion of 10 CFR 50.36 (c) (2) (ii) for inclusion into ITS.

Any changes to the Bases will be in accordance with Chapter 5.0 Bases Control Program. Any technical changes to plant procedures will be in accordance with the PVNGS procedure control process. This provides an equivalent level of control and is an administrative change with no impact on the margin of safety. This requirement is not required to be in ITS to provide adequate protection of public health and safety. Therefore, relocation of this requirement to a Licensee Controlled Document is acceptable and is consistent with NUREG-1432.

TECHNICAL CHANGES - LESS RESTRICTIVE

L.1 CTS 3.8.3.1 requires that the AC vital bus be energized from its associated inverter and the DC bus be energized from its associated battery to be considered Operable. ITS 3.8.9 only requires that the AC vital bus be energized from its associated inverter or constant voltage regulator, and the DC bus be energized from its associated battery or battery charger to be considered Operable. Relaxing the choice of power supply for AC vital bus and DC bus power is a less restrictive change. This is acceptable because subsystem (bus) Operability is concerned with power being supplied regardless of type (normal or emergency). This is consistent with the definition of Operability in section 1.0. If a component requires a specific type (normal or emergency) of power supply this will be addressed in the individual component LCO. Hence, LCOs 3.8.4, DC Sources - Operating, and 3.8.7, Inverters - Operating, address the choice of power supply (normal or emergency) for DC electrical power subsystem and the AC vital electrical power subsystem, respectively. LCOs 3.8.4, DC Sources - Operating, and 3.8.7, Inverters - Operating, are the component level LCOs. This change is consistent with NUREG-1432.

L.2 ITS 3.8.9 (Actions A, B, and C) all state in part, "One or more ..." CTS 3.8.3.1 (Actions A , B, and C), in the same context, state in part, "One ..."Relaxing Actions to allow one or more AC, one or more AC vital instrument bus, or one or more DC electrical power distribution subsystems to be inoperable constitutes a less restrictive change to PVNGS operating practices. This is acceptable because the Safety Function Determination Program (SFDP) is referenced under these Conditions to ensure no safety function is lost. CTS does not perform this action (using the SFDP to ensure a safety function is not lost), therefore, CTS actions are train specific in order to ensure all safety functions remain intact. ITS 3.8.9 Actions are not train specific. Any combination of electrical power distribution subsystems can be inoperable as long as a safety function is not lost. Use of the SFDP in ITS ensure a safety function is not lost. If a safety function is lost, Action E is entered which requires a 3.0.3 entry. This change is consistent with NUREG-1432.

TECHNICAL CHANGES - CTS CHANGES

None

NO SIGNIFICANT HAZARDS CONSIDERATION
SPECIFICATION 3.8.9

ADMINISTRATIVE CHANGES
(ITS 3.8.9 Discussion of Changes Labeled A.1)

Arizona Public Service Company, Palo Verde Nuclear Generating Station (PVNGS), Units 1, 2, and 3, is converting to the ITS as outlined in NUREG-1432, "Standard Technical Specifications, Combustion Engineering Plants." The proposed changes involve the reformatting, renumbering, rewording of the Technical Specifications (TS) and Bases with no change in intent, and the incorporation of current operating practices consistent with NUREG-1432. These changes, since they do not involve technical changes to the Current TS (CTS), are administrative. Below are the No Significant Hazards Consideration (NSHC) for the conversion of this Section/Chapter to NUREG-1432.

The Commission has provided standards for determining whether a significant hazards consideration exists as stated in 10 CFR 50.92. A proposed amendment to an operating license for a facility involves a no significant hazards consideration if operation of the facility, in accordance with a proposed amendment, would not 1) involve a significant increase in the probability or consequences of an accident previously evaluated; 2) create the possibility of a new or different kind of accident from any accident previously evaluated; or 3) involve a significant reduction in a margin of safety. A discussion of these standards as they relate to this amendment request follows:

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

> The proposed changes involve reformatting, renumbering, and rewording of the CTS and Bases along with incorporation of PVNGS current operating practices and other changes to the CTS as discussed in the specific Discussion of Changes listed above in order to be consistent with NUREG-1432. The reformatting, renumbering, and rewording along with the other changes listed above, involves no technical changes to the CTS. Specifically, there will be no change in the requirements imposed on PVNGS due to these changes. During development of NUREG-1432, certain wording preferences or English language conventions were adopted. The proposed changes to this Section/Chapter are administrative in nature and do not impact initiators of any analyzed events. They also do not impact the assumed mitigation of accidents or transient events. Therefore, these changes do not involve a significant increase in the probability or consequences of an accident previously evaluated.

ADMINISTRATIVE CHANGES
(ITS 3.8.9 Discussion of Changes Labeled (A.1) (continued)

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

> The proposed changes involve reformatting, renumbering, and rewording of the CTS, along with the incorporation of PVNGS current operating practices and other changes, as discussed, in order to be consistent with NUREG-1432. The proposed changes do not involve a physical alteration of the plant (no new or different type of equipment will be installed) or change the methods governing normal plant operation. The proposed changes will not impose any new or different requirements or eliminate any existing requirements. Therefore, these changes do not create the possibility of a new or different kind of accident from any accident previously evaluated.

Standard 3.-- Does the proposed change involve a significant reduction in a margin of safety?

> The proposed changes involve reformatting, renumbering, and rewording of the CTS, along with the incorporation of PVNGS current operating practices and other changes, as discussed, in order to be consistent with NUREG-1432. The proposed changes are administrative in nature and will not involve any technical changes. The proposed changes will not reduce a margin of safety because they have no impact on any safety analysis assumptions. Also, because these changes are administrative in nature, no question of safety is involved. Therefore, these changes do not involve a significant reduction in a margin of safety.

TECHNICAL CHANGES - MORE RESTRICTIVE
(ITS 3.8.9 Discussion of Changes Labeled M.1 and M.2)

Arizona Public Service Company, Palo Verde Nuclear Generating Station (PVNGS), Units 1, 2, and 3 is converting to the ITS as outlined in NUREG-1432. This particular NSHC is for the changes labeled "Technical Changes - More Restrictive" described in the specific Discussion of Changes listed above. The proposed changes incorporate more restrictive changes into the CTS by either making current requirements more stringent or adding new requirements which currently do not exist.

The Commission has provided standards for determining whether a significant hazards consideration exists as stated in 10 CFR 50.92. A proposed amendment to an operating license for a facility involves a no significant hazards consideration if operation of the facility, in accordance with a proposed amendment, would not 1) involve a significant increase in the probability or consequences of an accident previously evaluated; 2) create the possibility of a new or different kind of accident from any accident previously evaluated; or 3) involve a significant reduction in a margin of safety. A discussion of these standards as they relate to this amendment request follows:

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

The proposed changes provide more stringent requirements than previously existed in the CTS. The more stringent requirements will not result in operation that will increase the probability of initiating an analyzed event. If anything, the new requirements may decrease the probability or consequences of an analyzed event by incorporating the more restrictive changes discussed in the specific Discussion of Changes listed above. These changes will not alter assumptions relative to mitigation of an accident or transient event. The more restrictive requirements will not alter the operation and will continue to ensure process variables, structures, systems, or components are maintained consistent with safety analyses and licensing basis. These changes have been reviewed to ensure that no previously evaluated accident has been adversely affected. Therefore, these changes will not involve a significant increase in the probability or consequences of an accident evaluated.

TECHNICAL CHANGES - MORE RESTRICTIVE
(ITS 3.8.9 Discussion of Changes Labeled M.1 and M.2) (continued)

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

Making existing requirements more restrictive and adding more restrictive requirements to the CTS will not alter the plant configuration (no new or different type of equipment will be installed) or change the methods governing normal plant operation. These changes do impose different requirements. However, they are consistent with the assumptions made in the safety analyses, licensing basis, and NUREG-1432. Therefore, these changes will not create the possibility of a new or different kind of accident from any accident previously evaluated.

Standard 3.-- Does the proposed change involve a significant reduction in a margin of safety?

The proposed changes provide more stringent requirements than previously existed in the CTS. An evaluation of these changes concluded that adding these more restrictive requirements either increases or has no impact on the margin of safety. The changes provide additional restrictions which may enhance plant safety. These changes maintain requirements of the safety analysis, licensing basis, and NUREG-1432. As such, no question of safety is involved. Therefore, these changes will not involve a significant reduction in a margin of safety.

TECHNICAL CHANGES - RELOCATIONS
(ITS 3.8.9 Discussion of Changes Labeled LA.1 and LA.2)

Arizona Public Service Company, Palo Verde Nuclear Generating Station (PVNGS), Units 1, 2, and 3 is converting to the ITS as outlined in NUREG-1432. The proposed changes, since detail is being removed from the CTS to a Licensee Controlled Document, are less restrictive. The descriptions of these changes are in the Discussion of Changes listed above.

The Commission has provided standards for determining whether a significant hazards consideration exists as stated in 10 CFR 50.92. A proposed amendment to an operating license for a facility involves a no significant hazards consideration if operation of the facility, in accordance with a proposed amendment, would not 1) involve a significant increase in the probability or consequences of an accident previously evaluated; 2) create the possibility of a new or different kind of accident from any accident previously evaluated; or 3) involve a significant reduction in a margin of safety. A discussion of these standards as they relate to this amendment request follows:

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

> The proposed changes relocate requirements from the CTS to a Licensee Controlled Document. These changes do not result in any hardware changes or changes to plant operating practices. The details being relocated are not assumed to be an initiator of any analyzed event. The Licensee Controlled Document containing the relocated requirements will be maintained using the provisions of 10 CFR 50.59 or other specified control processes and is subject to the change control process in the Administrative Controls Section of the ITS. Since any changes to a Licensee Controlled Document will be evaluated, no increase in the probability or consequences of an accident previously evaluated will be allowed. Therefore, these changes will not involve a significant increase in the probability or consequences of an accident previously evaluated.

TECHNICAL CHANGES - RELOCATIONS
(ITS 3.8.9 Discussion of Changes Labeled LA.1 and LA.2) (continued)

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

The proposed changes relocate requirements from the CTS to a Licensee Controlled Document. These changes will not alter the plant configuration (no new or different type of equipment will be installed) or change the methods governing normal plant operation. These changes will not impose different requirements and adequate control of information will still be maintained. These changes will not alter assumptions made in the safety analysis or licensing basis. Therefore, these changes will not create the possibility of a new or different kind of accident from any accident previously evaluated.

Standard 3.-- Does the proposed change involve a significant reduction in a margin of safety?

The proposed changes relocate requirements from the CTS to a Licensee Controlled Document. These changes will not reduce a margin of safety since they have no impact on any safety analysis assumptions. In addition, the requirements to be transposed from the CTS to the Licensee Controlled Document are the same as the CTS. Since any future changes to this Licensee Controlled Document will be evaluated per the requirements of 10 CFR 50.59, or other specified control processes, no reduction (significant or insignificant) in a margin of safety will be allowed. Therefore, these changes will not involve a significant reduction in a margin of safety.

The NRC review provides a certain margin of safety, and although this review will no longer be performed prior to submittal, the NRC still inspects the 10 CFR 50.59 process. The proposed changes are consistent with NUREG-1432, which was approved by the NRC Staff. The change controls for proposed relocated details and requirements provide an acceptable level of regulatory authority. Revising the CTS to reflect the approved level of detail per NUREG-1432 reinforces the conclusion that there is not a significant reduction in the margin of safety. Therefore, revising the CTS to reflect the NRC accepted level of detail and requirements ensures no reduction in a margin of safety.

TECHNICAL CHANGES - LESS RESTRICTIVE
(ITS 3.8.9 Discussion of Changes Labeled L.1)

Arizona Public Service Company, Palo Verde Nuclear Generating Station (PVNGS), Units 1, 2, and 3 is converting to the ITS as outlined in NUREG-1432. The proposed change involves making the CTS less restrictive. Below is the description of this less restrictive change and the NSHC for the conversion to NUREG 1432.

L.1 CTS 3.8.3.1 requires that the AC vital bus be energized from its associated inverter and the DC bus be energized from its associated battery to be considered Operable. ITS 3.8.9 only requires that the AC vital bus be energized from its associated inverter or constant voltage regulator, and the DC bus be energized from its associated battery or battery charger to be considered Operable. Relaxing the choice of power supply for AC vital bus and DC bus power is a less restrictive change. This is acceptable because subsystem (bus) Operability is concerned with power being supplied regardless of type (normal or emergency). This is consistent with the definition of Operability in section 1.0. If a component requires a specific type (normal or emergency) of power supply this will be addressed in the individual component LCO. Hence, LCOs 3.8.4, DC Sources - Operating, and 3.8.7, Inverters - Operating, address the choice of power supply (normal or emergency) for DC electrical power subsystem and the AC vital electrical power subsystem, respectively. LCOs 3.8.4, DC Sources - Operating, and 3.8.7, Inverters - Operating, are the component level LCOs. This change is consistent with NUREG-1432.

The Commission has provided standards for determining whether a significant hazards consideration exists as stated in 10 CFR 50.92. A proposed amendment to an operating license for a facility involves a no significant hazards consideration if operation of the facility, in accordance with a proposed amendment, would not 1) involve a significant increase in the probability or consequences of an accident previously evaluated; 2) create the possibility of a new or different kind of accident from any accident previously evaluated; or 3) involve a significant reduction in a margin of safety. A discussion of these standards as they relate to this amendment request follows:

TECHNICAL CHANGES - LESS RESTRICTIVE
(ITS 3.8.9 Discussion of Changes Labeled L.1) (continued)

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

The proposed change requires that the AC vital bus be energized from its associated inverter or constant voltage regulator, and that the DC bus be energized from its associated battery or battery charger to be considered Operable. CTS requires that the AC vital bus be energized from its associated inverter and the DC bus be energized from its associated battery to be considered Operable. Power supply type (normal or emergency) is not derived from design basis accidents. Power supplies are prescribed to ensure systems, subsystems, components, and equipment are energized from a reliable source to perform their function(s). This change will not affect the probability of an accident. The type of power in use is not an initiator of any analyzed event. The consequences of an accident is not significantly affected by this change. Also, subsystem (bus) Operability is concerned with power being supplied regardless of type (normal or emergency). If a component requires a specific type (normal or emergency)) of power supply this is addressed in individual component LCOs. The change does not alter assumptions relative to the mitigation of an analyzed event. Therefore, the change will not involve a significant increase in the probability or consequence of an accident previously evaluated.

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

The proposed change requires that the AC vital bus be energized from its associated inverter or constant voltage regulator, and that the DC bus be energized from its associated battery or battery charger to be considered Operable. While use of the most reliable power source is not required by LCO 3.8.9, it maintains consistency with the definition of bus Operability. LCO 3.8.9 addresses bus Operability. It is the individual component LCOs that address preferred power supply types (normal or emergency). As a result, this change will not allow continued operation if a component is not powered from its preferred source. This change will not physically alter the plant (no new or different type of equipment will be installed). The change does not require any new or unusual operator actions. Therefore, this change does not create the possibility of a new or different kind of accident from any accident previously evaluated.

TECHNICAL CHANGES - LESS RESTRICTIVE
(ITS 3.8.9 Discussion of Changes Labeled L.1) (continued)

Standard 3.-- Does the proposed change involve a significant reduction in a margin of safety?

The proposed change requires that the AC vital bus be energized from its associated inverter or constant voltage regulator, and that the DC bus be energized from its associated battery or battery charger to be considered Operable. The margin of safety is not affected by this change. While operation is allowed by LCO 3.8.9, continued operation without the preferred power source aligned is minimized by component LCOs (LCOs 3.8.4 and 3.8.7). Therefore, the change does not involve a significant reduction in a margin of safety.

TECHNICAL CHANGES - LESS RESTRICTIVE
(ITS 3.8.9 Discussion of Changes Labeled L.2)

Arizona Public Service Company, Palo Verde Nuclear Generating Station (PVNGS), Units 1, 2, and 3 is converting to the ITS as outlined in NUREG-1432. The proposed change involves making the CTS less restrictive. Below is the description of this less restrictive change and the NSHC for conversion to NUREG-1432.

L.2 ITS 3.8.9 (Actions A, B, and C) all state in part, "One or more ..." CTS 3.8.3.1 (Actions A , B, and C), in the same context, state in part, "One ..."Relaxing Actions to allow one or more AC, one or more AC vital instrument bus, or one or more DC electrical power distribution subsystems to be inoperable constitutes a less restrictive change to PVNGS operating practices. This is acceptable because the Safety Function Determination Program (SFDP) is referenced under these Conditions to ensure no safety function is lost. CTS does not perform this action (using the SFDP to ensure a safety function is not lost), therefore, CTS actions are train specific in order to ensure all safety functions remain intact. ITS 3.8.9 Actions are not train specific. Any combination of electrical power distribution subsystems can be inoperable as long as a safety function is not lost. Use of the SFDP in ITS ensure a safety function is not lost. If a safety function is lost, Action E is entered which requires a 3.0.3 entry. This change is consistent with NUREG-1432.

The Commission has provided standards for determining whether a significant hazards consideration exists as stated in 10 CFR 50.92. A proposed amendment to an operating license for a facility involves a no significant hazards consideration if operation of the facility, in accordance with a proposed amendment, would not 1) involve a significant increase in the probability or consequences of an accident previously evaluated; 2) create the possibility of a new or different kind of accident from any accident previously evaluated; or 3) involve a significant reduction in a margin of safety. A discussion of these standards as they relate to this amendment request follows:

TECHNICAL CHANGES - LESS RESTRICTIVE
(ITS 3.8.9 Discussion of Changes Labeled L.2) (continued)

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

The proposed change allows any combination of electrical power distribution subsystems to be inoperable as long as all safety functions remain intact. CTS actions are train specific in order to ensure all safety functions remain intact. Electrical power distribution subsystems are not derived from design basis accidents. Electrical power distribution subsystems are prescribed to ensure systems, subsystems, components, and equipment are energized from a reliable source to perform their function(s). This change will not affect the probability of an accident. Electrical power distribution subsystems are not an initiator of any analyzed event. The consequences of an accident is not significantly affected by this change. Also, when one or more electrical power distribution subsystems are inoperable the Safety Function Determination Program (SFDP) is referenced to ensure all safety functions remain intact. The change does not alter assumptions relative to the mitigation of an analyzed event. Therefore, the change will not involve a significant increase in the probability or consequence of an accident previously evaluated.

TECHNICAL CHANGES - LESS RESTRICTIVE
(ITS 3.8.9 Discussion of Changes Labeled L.2) (continued)

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

The proposed change allows any combination of electrical power distribution subsystems to be inoperable as long as all safety functions remain intact. CTS actions are train specific in order to ensure all safety functions remain intact. While loss of one or more electrical power distribution subsystems can lead to loss of ESF functions, the SFDP will ensure that the remaining ESF functions remain intact ensuring all safety functions remain intact. As a result, this change will not allow continued operation if a safety function is lost. This change will not physically alter the plant (no new or different type of equipment will be installed). The change does not require any new or unusual operator actions. Therefore, this change does not create the possibility of a new or different kind of accident from any accident previously evaluated.

Standard 3.-- Does the proposed change involve a significant reduction in a margin of safety?

The proposed change allows any combination of electrical power distribution subsystems to be inoperable as long as all safety functions remain intact. CTS actions are train specific in order to ensure all safety functions remain intact. The margin of safety is not affected by this change. While operation is allowed by LCO 3.8.9 if one or more electrical power distribution subsystems are inoperable, continued operation under this condition with loss of a safety function is not allowed. Therefore, the change does not involve a significant reduction in a margin of safety.

CE STS
NUREG-1432 REV. 1
SPECIFICATION 3.8.10
MARK UP

<DOC>
<CTS>

3.8 ELECTRICAL POWER SYSTEMS

3.8.10 Distribution Systems—Shutdown

<LCO 3.8.3.2> LCO 3.8.10 The necessary portion of AC, DC, and AC vital instrument (3) bus electrical power distribution subsystems shall be OPERABLE to support equipment required to be OPERABLE.

<DOC M.4> APPLICABILITY: MODES 5 and 6,
During movement of irradiated fuel assemblies with the core off loaded. (2)

<DOC M.3> ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
<3.8.3.2 ACT> <DOC M.2> A. One or more required AC, DC, or AC vital instrument (3) bus electrical power distribution subsystems inoperable.	A.1 Declare associated supported required feature(s) inoperable.	Immediately
	OR	
	A.2.1 Suspend CORE ALTERATIONS.	Immediately
	AND	
	A.2.2 Suspend movement of irradiated fuel assemblies.	Immediately
	AND	
	A.2.3 Initiate action to suspend operations involving positive reactivity additions.	Immediately
	AND	
		(continued)

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
<3.8.3.2 ACT> A. (continued)	A.2.4 Initiate actions to restore required AC, DC, and AC vital instrument bus electrical power distribution subsystems to OPERABLE status. 3	Immediately
	<u>AND</u>	
<DOC M.1>	A.2.5 Declare associated required shutdown cooling subsystem(s) inoperable and not in operation.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
<4.8.3.2> SR 3.8.10.1 Verify correct breaker alignments and voltage to required AC, DC, and AC vital instrument bus electrical power distribution subsystems. 3	7 days

CE STS
NUREG-1432 REV. 1
SPECIFICATION 3.8.10
BASES MARK UP

B 3.8 ELECTRICAL POWER SYSTEMS

B 3.8.10 Distribution Systems—Shutdown

BASES

BACKGROUND

A description of the AC, DC, and AC vital ~~bus~~ instrument electrical power distribution systems is provided in the Bases for LCO 3.8.9, "Distribution Systems—Operating." 3

APPLICABLE SAFETY ANALYSES

The initial conditions of ~~Design~~ u Basis Accident and transient analyses in the FSAR, Chapter ~~6~~ (Ref. 1) and Chapter ~~15~~ (Ref. 2), assume Engineered Safety Feature (ESF) systems are OPERABLE. The AC, DC, and AC vital ~~bus~~ instrument electrical power distribution systems are designed to provide sufficient capacity, capability, redundancy, and reliability to ensure the availability of necessary power to ESF systems so that the fuel, Reactor Coolant System, and containment design limits are not exceeded. 3

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

The OPERABILITY of the minimum AC, DC, and AC vital ~~bus~~ electrical power distribution subsystems during MODES 5 and 6, and during movement of irradiated fuel assemblies with the core off loaded ensures that: 2

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

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

c. Adequate power is provided to mitigate events postulated during shutdown, such as a fuel handling accident.

The AC and DC electrical power distribution systems satisfy Criterion 3 of ~~the NRC Policy Statement.~~ 10 CFR 50.36(c)(2)(ii) 1

(continued)

BASES (continued)

LCO

Various combinations of subsystems, equipment, and components are required OPERABLE by other LCOs, depending on the specific unit condition. Implicit in those requirements is the required OPERABILITY of necessary support required features. This LCO explicitly requires energization of the portions of the electrical distribution system necessary to support OPERABILITY of required systems, equipment and components—all specifically addressed in each LCO and implicitly required via the definition of OPERABILITY.

Maintaining these portions of the distribution system energized ensures the availability of sufficient power to operate the unit in a safe manner to mitigate the consequences of postulated events during shutdown (e.g., fuel handling accidents).

1

APPLICABILITY

and AC vital instrument bus 3

The AC, and DC electrical power distribution subsystems required to be OPERABLE in MODES 5 and 6, and during movement of irradiated fuel assemblies, provide assurance that:

with the core off loaded 2

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

b. Systems needed to mitigate a fuel handling accident are available;

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

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

instrument 3

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

(continued)

BASES (continued)

ACTIONS

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

Although redundant required features may require redundant trains of electrical power distribution subsystems to be OPERABLE, one OPERABLE distribution subsystem train may be capable of supporting sufficient required features to allow continuation of CORE ALTERATIONS and fuel movement. By allowing the option to declare required features associated with an inoperable distribution subsystem inoperable, appropriate restrictions are implemented in accordance with the affected ~~distribution subsystems~~ required features LCO's Required Actions. In many instances, this option may involve undesired administrative efforts. Therefore, the allowance for sufficiently conservative actions is made (i.e., to suspend CORE ALTERATIONS, movement of irradiated fuel assemblies, and operations involving positive reactivity additions).

1

Suspension of these activities shall not preclude completion of actions to establish a safe conservative condition. These actions minimize the probability of the occurrence of postulated events. It is further required to immediately initiate action to restore the required AC, ~~and~~ DC and AC vital instrument bus, 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 shutdown cooling (SDC) subsystem may be inoperable. In this case, Required Actions A.2.1 through A.2.4 do not adequately address the concerns relating to coolant circulation and heat removal. Pursuant to LCO 3.0.6, the SDC ACTIONS would not be entered. Therefore, Required Action A.2.5 is provided to direct declaring SDC inoperable, which results in taking the appropriate SDC actions.

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

(continued)

BASES (continued)

SURVEILLANCE REQUIREMENTS

SR 3.8.10.1

required 1 instrument 3

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

REFERENCES

1. (U)FSAR, Chapter ~~[~~6~~]~~.
2. (U)FSAR, Chapter ~~[~~15~~]~~.

3

NUREG-1432 EXCEPTIONS
SPECIFICATION 3.8.10

1. Grammar and/or editorial changes have been made to enhance clarity. No technical or intent changes to the Specification are made by this change.

2. The Applicability of ITS LCO 3.8.10 has been modified to state, "During movement of irradiated fuel assemblies with the core off loaded." NUREG-1432, LCO 3.8.10 Applicability, does not contain the phrase "with the core off loaded" in its Applicability. This is acceptable because LCO 3.8.10, Required Actions A.2.1 and A.2.3, do not specify credible actions if moving irradiated fuel assemblies while in Mode 1, 2, 3, and 4. If moving irradiated fuel assemblies in Modes 1, 2, 3, or 4, the fuel movement is independent of reactor operations, therefore, suspending CORE ALTERATIONS or eliminating operations involving positive reactivity additions (LCO 3.8.10 Required Actions A.2.1 and A.2.3) on a reactor at power is not realistic or credible. This change is also in keeping with NUREG-1432 format in that Actions that address movement of irradiated fuels assemblies while shutdown are addressed in an LCO that is obviously written for shutdown conditions. This change is consistent with NUREG-1432.

3. The plant specific titles, nomenclature, number, parameter/value, reference, system description, system design, operating practices or analysis description was used (additions, deletions, and/or changes are included). Plant specific parameters/values are directly transferred from the CTS to the ITS.

PVNGS CTS
SPECIFICATION 3.8.10
MARK UP

Specification 3.8.10

A.1

3.8

ELECTRICAL POWER SYSTEMS

3.8.10

~~ONSITE POWER DISTRIBUTION SYSTEMS~~ Distribution Systems - Shutdown

~~SHUTDOWN~~

~~LIMITING CONDITION FOR OPERATION~~

The necessary portion of AC, DC, and AC vital bus electrical power distribution subsystems shall be OPERABLE to support equipment required to be OPERABLE. L.2

LCO 3.8.10 ~~3.8.3.2 As a minimum, the following electrical busses shall be energized in the specified manner:~~

a. ~~One train of A.C. emergency busses consisting of one 4160-volt A.C. ESF bus, and three 480-volt A.C. load centers and their associated four class 1E-MCCs.~~ LA.1

b. ~~Two 120-volt A.C. channel vital busses energized from their associated inverters connected to their respective D.C. channels.~~ or associated constant voltage regulator

c. ~~One 125-volt D.C. train with both required channels energized from their associated battery banks~~ or associated battery charger L.1

M.2

APPLICABILITY: MODES 5 and 6. During movement of irradiated fuel assemblies with the core off loaded

ACTION:

ACT A With any of the above required electrical busses not energized ~~in the required manner~~, immediately suspend all operations involving CORE ALTERATIONS, positive reactivity changes, or movement of irradiated fuel, initiate corrective action to energize the required electrical busses ~~in the specified manner~~ ~~as soon as possible~~, and declare associated required shutdown cooling subsystem(s) inoperable and not in operation LA.1 M.1

OR

Declare associated supported required feature(s) inoperable. L.3

SURVEILLANCE REQUIREMENTS

SR 3.8.10.1 ~~4.8.3.2~~ The specified busses shall be determined energized ~~in the required manner~~ at least once per 7 days by verifying correct breaker alignment and indicated voltage ~~on the busses~~. LA.1

DISCUSSION OF CHANGES
SPECIFICATION 3.8.10

ADMINISTRATIVE CHANGES

A.1 All reformatting and renumbering is in accordance with Combustion Engineering Plant (CEOG) Standard Technical Specifications NUREG-1432, Rev. 1 (NUREG-1432). As a result, the Palo Verde Nuclear Generating Station (PVNGS) Improved Technical Specifications (ITS) should be more readable, and therefore understandable, by plant operators as well as other users. During the reformatting and renumbering of the ITS, no technical changes (either actual or interpretational) to the Current Technical Specifications (CTS) were made unless they were identified and justified.

Editorial rewording (either adding or deleting) is made consistent with NUREG-1432. During NUREG-1432 development, certain wording preferences or English language conventions were adopted which resulted in no technical changes (either actual or interpretational) the CTS.

Additional information has also been added to more fully describe each subsection. This wording is consistent with NUREG-1432. Since the design is already approved by the NRC, adding more detail does not result in a technical change.

TECHNICAL CHANGES - MORE RESTRICTIVE

M.1 ITS 3.8.10 has an additional Required Action (A.2.5) that states, "Declare associated required shutdown cooling subsystem(s) inoperable and not in operation." CTS 3.8.3.2 does not contain this Required Action. The addition of this Required Action constitutes a more restrictive change to PVNGS operating practice. This is acceptable because a required shutdown cooling loop may be inoperable. In this case, the other Required Actions do not adequately address concerns relating to coolant circulation and heat removal. Pursuant to LCO 3.0.6, the SDC Actions would not be entered. Therefore, a Required Action (A.2.5) is provided to direct declaring SDC inoperable, which results in taking appropriate SDC Actions. This change is consistent with NUREG-1432.

M.2 ITS 3.8.10 contains an additional Applicability statement that states, "During movement of irradiated fuel assemblies with the core off loaded." CTS 3.8.3.2 does not contain this additional Applicability. The addition of this Applicability statement constitutes a more restrictive change to PVNGS plant operation. This is acceptable because it ensures systems needed to mitigate a fuel handling accident are available. This change is consistent with NUREG-1432.

TECHNICAL CHANGES - RELOCATIONS

LA.1 CTS LCO 3.8.3.2 contains detailed information that describes, what buses, and combination of buses and components constitute an Operable electrical distribution subsystem. ITS 3.8.10 does not contain this information in the LCO. This information, because of the level of detail, is located in the associated Bases Section. The Bases section refers to LCO 3.8.9 for a description of the AC, DC, and AC vital bus electrical power distribution systems. The LCO along with the associated description in the Bases is appropriate to ensure the required AC, DC, and AC vital bus electrical power distribution subsystems are Operable. In addition, this requirement does not meet the criterion of 10 CFR 50.36 (c) (2) (ii) for inclusion into ITS.

Any changes to the Bases will be in accordance with Chapter 5.0 Bases Control Program. Any technical changes to plant procedures will be in accordance with the PVNGS procedure control process. This provides an equivalent level of control and is an administrative change with no impact on the margin of safety. This requirement is not required to be in ITS to provide adequate protection of public health and safety. Therefore, relocation of this requirement to a Licensee Controlled Document is acceptable and is consistent with NUREG-1432.

TECHNICAL CHANGES - LESS RESTRICTIVE

L.1 CTS 3.8.3.2 requires that the AC vital bus be energized from its associated inverter and the DC bus be energized from its associated battery to be considered Operable. ITS 3.8.10 only requires that the AC vital bus be energized from its associated inverter or constant voltage regulator, and the DC bus be energized from its associated battery or battery charger to be considered Operable. Relaxing the choice of power supply for AC vital bus and DC bus power is a less restrictive change. This is acceptable because subsystem (bus) Operability is concerned with power being supplied regardless of type (normal or emergency). This is consistent with the definition of Operability in section 1.0. If a component requires a specific type (normal or emergency) of power supply this will be addressed in the individual component LCO. Hence, LCOs 3.8.5, DC Sources - Shutdown, and 3.8.8, Inverters - Shutdown, address the choice of power supply (normal or emergency) for DC electrical power subsystem and the AC vital electrical power subsystem, respectively. LCOs 3.8.5, DC Sources - Shutdown, and 3.8.8, Inverters - Shutdown, are the component level LCOs. This change is consistent with NUREG-1432.

L.2 CTS LCO 3.8.3.2 states that the buses shall be energized in a specified manner. ITS LCO 3.8.10 states that only the necessary portions of AC, DC, and AC vital bus electrical power distribution subsystems shall be Operable to support equipment required to be Operable. Not specifying exactly which AC, DC, and AC vital bus electrical power distribution subsystems must be energized is a relaxation of requirements. This is acceptable because various combinations of subsystems, equipment, and components are required Operable by other LCOs, depending on the specific unit conditions. Implicit in those requirements is the required Operability of necessary support required features. This LCO explicitly requires energization of the portions of the electrical distribution system necessary to support Operability of required systems, equipment, and components - all explicitly addressed in each LCO and implicitly required via the definition of Operability. This change is consistent with NUREG-1432.

L.3 ITS 3.8.10 has an additional Required Action (A.1) that states "Declare affected required feature(s) inoperable." CTS 3.8.3.2 does not contain this Required Action. The addition of this Required Action constitutes a less restrictive change to PVNGS operating practices because it offers an option to suspending CORE ALTERATIONS, suspending movement of irradiated fuel, and initiating action to suspend operations involving positive reactivity additions.. This is acceptable because it allows the option to declare affected required feature(s), associated with an inoperable inverter(s), inoperable. This ensures appropriate restrictions are implemented in accordance with the affected required feature(s) LCOs' Required Actions due to inverter(s) inoperability. This change is consistent with NUREG-1432.

TECHNICAL CHANGES - CTS CHANGES

None

NO SIGNIFICANT HAZARDS CONSIDERATION
SPECIFICATION 3.8.10

ADMINISTRATIVE CHANGES
(ITS 3.8.10 Discussion of Changes Labeled A.1)

Arizona Public Service Company, Palo Verde Nuclear Generating Station (PVNGS), Units 1, 2, and 3, is converting to the ITS as outlined in NUREG-1432, "Standard Technical Specifications, Combustion Engineering Plants." The proposed changes involve the reformatting, renumbering, rewording of the Technical Specifications (TS) and Bases with no change in intent, and the incorporation of current operating practices consistent with NUREG-1432. These changes, since they do not involve technical changes to the Current TS (CTS), are administrative. Below are the No Significant Hazards Consideration (NSHC) for the conversion of this Section/Chapter to NUREG-1432.

The Commission has provided standards for determining whether a significant hazards consideration exists as stated in 10 CFR 50.92. A proposed amendment to an operating license for a facility involves a no significant hazards consideration if operation of the facility, in accordance with a proposed amendment, would not 1) involve a significant increase in the probability or consequences of an accident previously evaluated; 2) create the possibility of a new or different kind of accident from any accident previously evaluated; or 3) involve a significant reduction in a margin of safety. A discussion of these standards as they relate to this amendment request follows:

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

> The proposed changes involve reformatting, renumbering, and rewording of the CTS and Bases along with incorporation of PVNGS current operating practices and other changes to the CTS as discussed in the specific Discussion of Changes listed above in order to be consistent with NUREG-1432. The reformatting, renumbering, and rewording along with the other changes listed above, involves no technical changes to the CTS. Specifically, there will be no change in the requirements imposed on PVNGS due to these changes. During development of NUREG-1432, certain wording preferences or English language conventions were adopted. The proposed changes to this Section/Chapter are administrative in nature and do not impact initiators of any analyzed events. They also do not impact the assumed mitigation of accidents or transient events. Therefore, these changes do not involve a significant increase in the probability or consequences of an accident previously evaluated.

ADMINISTRATIVE CHANGES
(ITS 3.8.10 Discussion of Changes Labeled (A.1) (continued)

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

The proposed changes involve reformatting, renumbering, and rewording of the CTS, along with the incorporation of PVNGS current operating practices and other changes, as discussed, in order to be consistent with NUREG-1432. The proposed changes do not involve a physical alteration of the plant (no new or different type of equipment will be installed) or change the methods governing normal plant operation. The proposed changes will not impose any new or different requirements or eliminate any existing requirements. Therefore, these changes do not create the possibility of a new or different kind of accident from any accident previously evaluated.

Standard 3.-- Does the proposed change involve a significant reduction in a margin of safety?

The proposed changes involve reformatting, renumbering, and rewording of the CTS, along with the incorporation of PVNGS current operating practices and other changes, as discussed, in order to be consistent with NUREG-1432. The proposed changes are administrative in nature and will not involve any technical changes. The proposed changes will not reduce a margin of safety because they have no impact on any safety analysis assumptions. Also, because these changes are administrative in nature, no question of safety is involved. Therefore, these changes do not involve a significant reduction in a margin of safety.

TECHNICAL CHANGES - MORE RESTRICTIVE
(ITS 3.8.10 Discussion of Changes Labeled M.1 and M.2)

Arizona Public Service Company, Palo Verde Nuclear Generating Station (PVNGS), Units 1, 2, and 3 is converting to the ITS as outlined in NUREG-1432. This particular NSHC is for the changes labeled "Technical Changes - More Restrictive" described in the specific Discussion of Changes listed above. The proposed changes incorporate more restrictive changes into the CTS by either making current requirements more stringent or adding new requirements which currently do not exist.

The Commission has provided standards for determining whether a significant hazards consideration exists as stated in 10 CFR 50.92. A proposed amendment to an operating license for a facility involves a no significant hazards consideration if operation of the facility, in accordance with a proposed amendment, would not 1) involve a significant increase in the probability or consequences of an accident previously evaluated; 2) create the possibility of a new or different kind of accident from any accident previously evaluated; or 3) involve a significant reduction in a margin of safety. A discussion of these standards as they relate to this amendment request follows:

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

> The proposed changes provide more stringent requirements than previously existed in the CTS. The more stringent requirements will not result in operation that will increase the probability of initiating an analyzed event. If anything, the new requirements may decrease the probability or consequences of an analyzed event by incorporating the more restrictive changes discussed in the specific Discussion of Changes listed above. These changes will not alter assumptions relative to mitigation of an accident or transient event. The more restrictive requirements will not alter the operation and will continue to ensure process variables, structures, systems, or components are maintained consistent with safety analyses and licensing basis. These changes have been reviewed to ensure that no previously evaluated accident has been adversely affected. Therefore, these changes will not involve a significant increase in the probability or consequences of an accident evaluated.

TECHNICAL CHANGES - MORE RESTRICTIVE
(ITS 3.8.10 Discussion of Changes Labeled M.1 and M.2) (continued)

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

Making existing requirements more restrictive and adding more restrictive requirements to the CTS will not alter the plant configuration (no new or different type of equipment will be installed) or change the methods governing normal plant operation. These changes do impose different requirements. However, they are consistent with the assumptions made in the safety analyses, licensing basis, and NUREG-1432. Therefore, these changes will not create the possibility of a new or different kind of accident from any accident previously evaluated.

Standard 3.-- Does the proposed change involve a significant reduction in a margin of safety?

The proposed changes provide more stringent requirements than previously existed in the CTS. An evaluation of these changes concluded that adding these more restrictive requirements either increases or has no impact on the margin of safety. The changes provide additional restrictions which may enhance plant safety. These changes maintain requirements of the safety analysis, licensing basis, and NUREG-1432. As such, no question of safety is involved. Therefore, these changes will not involve a significant reduction in a margin of safety.

TECHNICAL CHANGES - RELOCATIONS
(ITS 3.8.10 Discussion of Changes Labeled LA.1)

Arizona Public Service Company, Palo Verde Nuclear Generating Station (PVNGS), Units 1, 2, and 3 is converting to the ITS as outlined in NUREG-1432. The proposed changes, since detail is being removed from the CTS to a Licensee Controlled Document, are less restrictive. The descriptions of these changes are in the Discussion of Changes listed above.

The Commission has provided standards for determining whether a significant hazards consideration exists as stated in 10 CFR 50.92. A proposed amendment to an operating license for a facility involves a no significant hazards consideration if operation of the facility, in accordance with a proposed amendment, would not 1) involve a significant increase in the probability or consequences of an accident previously evaluated; 2) create the possibility of a new or different kind of accident from any accident previously evaluated; or 3) involve a significant reduction in a margin of safety. A discussion of these standards as they relate to this amendment request follows:

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

> The proposed changes relocate requirements from the CTS to a Licensee Controlled Document. These changes do not result in any hardware changes or changes to plant operating practices. The details being relocated are not assumed to be an initiator of any analyzed event. The Licensee Controlled Document containing the relocated requirements will be maintained using the provisions of 10 CFR 50.59 or other specified control processes and is subject to the change control process in the Administrative Controls Section of the ITS. Since any changes to a Licensee Controlled Document will be evaluated, no increase in the probability or consequences of an accident previously evaluated will be allowed. Therefore, these changes will not involve a significant increase in the probability or consequences of an accident previously evaluated.

TECHNICAL CHANGES - RELOCATIONS
(ITS 3.8.10 Discussion of Changes Labeled LA.1) (continued)

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

The proposed changes relocate requirements from the CTS to a Licensee Controlled Document. These changes will not alter the plant configuration (no new or different type of equipment will be installed) or change the methods governing normal plant operation. These changes will not impose different requirements and adequate control of information will still be maintained. These changes will not alter assumptions made in the safety analysis or licensing basis. Therefore, these changes will not create the possibility of a new or different kind of accident from any accident previously evaluated.

Standard 3.-- Does the proposed change involve a significant reduction in a margin of safety?

The proposed changes relocate requirements from the CTS to a Licensee Controlled Document. These changes will not reduce a margin of safety since they have no impact on any safety analysis assumptions. In addition, the requirements to be transposed from the CTS to the Licensee Controlled Document are the same as the CTS. Since any future changes to this Licensee Controlled Document will be evaluated per the requirements of 10 CFR 50.59, or other specified control processes, no reduction (significant or insignificant) in a margin of safety will be allowed. Therefore, these changes will not involve a significant reduction in a margin of safety.

The NRC review provides a certain margin of safety, and although this review will no longer be performed prior to submittal, the NRC still inspects the 10 CFR 50.59 process. The proposed changes are consistent with NUREG-1432, which was approved by the NRC Staff. The change controls for proposed relocated details and requirements provide an acceptable level of regulatory authority. Revising the CTS to reflect the approved level of detail per NUREG-1432 reinforces the conclusion that there is not a significant reduction in the margin of safety. Therefore, revising the CTS to reflect the NRC accepted level of detail and requirements ensures no reduction in a margin of safety.

TECHNICAL CHANGES - LESS RESTRICTIVE
(ITS 3.8.10 Discussion of Changes Labeled L.1)

Arizona Public Service Company, Palo Verde Nuclear Generating Station (PVNGS), Units 1, 2, and 3 is converting to the ITS as outlined in NUREG-1432. The proposed change involves making the CTS less restrictive. Below is the description of this less restrictive change and the NSHC for the conversion to NUREG 1432.

L.1 CTS 3.8.3.2 requires that the AC vital bus be energized from its associated inverter and the DC bus be energized from its associated battery to be considered Operable. ITS 3.8.10 only requires that the AC vital bus be energized from its associated inverter or constant voltage regulator, and the DC bus be energized from its associated battery or battery charger to be considered Operable. Relaxing the choice of power supply for AC vital bus and DC bus power is a less restrictive change. This is acceptable because subsystem (bus) Operability is concerned with power being supplied regardless of type (normal or emergency). This is consistent with the definition of Operability in section 1.0. If a component requires a specific type (normal or emergency) of power supply this will be addressed in the individual component LCO. Hence, LCOs 3.8.5, DC Sources - Shutdown, and 3.8.8, Inverters - Shutdown, address the choice of power supply (normal or emergency) for DC electrical power subsystem and the AC vital electrical power subsystem, respectively. LCOs 3.8.5, DC Sources - Shutdown, and 3.8.8, Inverters - Shutdown, are the component level LCOs. This change is consistent with NUREG-1432.

The Commission has provided standards for determining whether a significant hazards consideration exists as stated in 10 CFR 50.92. A proposed amendment to an operating license for a facility involves a no significant hazards consideration if operation of the facility, in accordance with a proposed amendment, would not 1) involve a significant increase in the probability or consequences of an accident previously evaluated; 2) create the possibility of a new or different kind of accident from any accident previously evaluated; or 3) involve a significant reduction in a margin of safety. A discussion of these standards as they relate to this amendment request follows:

TECHNICAL CHANGES - LESS RESTRICTIVE
(ITS 3.8.10 Discussion of Changes Labeled L.1) (continued)

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

The proposed change requires that the AC vital bus be energized from its associated inverter or constant voltage regulator, and that the DC bus be energized from its associated battery or battery charger to be considered Operable. CTS requires that the AC vital bus be energized from its associated inverter and the DC bus be energized from its associated battery to be considered Operable. Power supply type (normal or emergency) is not derived from design basis accidents. Power supplies are prescribed to ensure systems, subsystems, components, and equipment are energized from a reliable source to perform their function(s). This change will not affect the probability of an accident. The type of power in use is not an initiator of any analyzed event. The consequences of an accident is not significantly affected by this change. Also, subsystem (bus) Operability is concerned with power being supplied regardless of type (normal or emergency). If a component requires a specific type (normal or emergency)) of power supply this is addressed in individual component LCOs. The change does not alter assumptions relative to the mitigation of an analyzed event. Therefore, the change will not involve a significant increase in the probability or consequence of an accident previously evaluated.

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

The proposed change requires that the AC vital bus be energized from its associated inverter or constant voltage regulator, and that the DC bus be energized from its associated battery or battery charger to be considered Operable. While use of the most reliable power source is not required by LCO 3.8.9, it maintains consistency with the definition of bus Operability. LCO 3.8.9 addresses bus Operability. It is the individual component LCOs that address preferred power supply types (normal or emergency). As a result, this change will not allow continued operation if a component is not powered from its preferred source. This change will not physically alter the plant (no new or different type of equipment will be installed). The change does not require any new or unusual operator actions. Therefore, this change does not create the possibility of a new or different kind of accident from any accident previously evaluated.

TECHNICAL CHANGES - LESS RESTRICTIVE
(ITS 3.8.10 Discussion of Changes Labeled L.1) (continued)

Standard 3.-- Does the proposed change involve a significant reduction in a margin of safety?

The proposed change requires that the AC vital bus be energized from its associated inverter or constant voltage regulator, and that the DC bus be energized from its associated battery or battery charger to be considered Operable. The margin of safety is not affected by this change. While operation is allowed by LCO 3.8.9, continued operation without the preferred power source aligned is minimized by component LCOs (LCOs 3.8.5 and 3.8.8). Therefore, the change does not involve a significant reduction in a margin of safety.

TECHNICAL CHANGES - LESS RESTRICTIVE
(ITS 3.8.10 Discussion of Changes Labeled L.2)

Arizona Public Service Company, Palo Verde Nuclear Generating Station (PVNGS), Units 1, 2, and 3 is converting to the ITS as outlined in NUREG-1432. The proposed change involves making the CTS less restrictive. Below is the description of this less restrictive change and the NSHC for conversion to NUREG-1432.

L.2 CTS LCO 3.8.3.2 states that the buses shall be energized in a specified manner. ITS LCO 3.8.10 states that only the necessary portions of AC, DC, and AC vital bus electrical power distribution subsystems shall be Operable to support equipment required to be Operable. Not specifying exactly which AC, DC, and AC vital bus electrical power distribution subsystems must be energized is a relaxation of requirements. This is acceptable because various combinations of subsystems, equipment, and components are required Operable by other LCOs, depending on the specific unit conditions. Implicit in those requirements is the required Operability of necessary support required features. This LCO explicitly requires energization of the portions of the electrical distribution system necessary to support Operability of required systems, equipment, and components - all explicitly addressed in each LCO and implicitly required via the definition of Operability. This change is consistent with NUREG-1432.

The Commission has provided standards for determining whether a significant hazards consideration exists as stated in 10 CFR 50.92. A proposed amendment to an operating license for a facility involves a no significant hazards consideration if operation of the facility, in accordance with a proposed amendment, would not 1) involve a significant increase in the probability or consequences of an accident previously evaluated; 2) create the possibility of a new or different kind of accident from any accident previously evaluated; or 3) involve a significant reduction in a margin of safety. A discussion of these standards as they relate to this amendment request follows:

TECHNICAL CHANGES - LESS RESTRICTIVE
(ITS 3.8.10 Discussion of Changes Labeled L.2) (continued)

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

The proposed change requires Operable only necessary portion(s) of AC, DC, and AC vital bus electrical power distribution subsystems to support equipment required to be Operable. Although necessary systems, subsystems, support equipment and components are derived from design basis accidents, it is the system/component LCOs (e.g. shutdown cooling and ECCS) that will stipulate which train(s) of equipment is required. ITS LCO 3.8.10 will require those portion(s) of AC, DC, and AC vital bus electrical power distribution subsystems to support the train(s) identified by system/component level LCOs. This change will not affect the probability of an accident. Requiring Operable only those portion(s) of AC, DC, and AC vital bus electrical power distribution subsystems necessary to support required systems/components is not an initiator of any analyzed event. The consequences of an accident are not significantly affected by this change. Also this is acceptable because various combinations of subsystems, equipment, and components are required Operable by other system/component LCOs, depending on the specific unit conditions. Implicit in those requirements is the required Operability of necessary required support functions. The change does not alter assumptions relative to the mitigation of an analyzed event. Therefore, the change will not involve a significant increase in the probability or consequence of an accident previously evaluated.

[illegible]

TECHNICAL CHANGES - LESS RESTRICTIVE
(ITS 3.8.10 Discussion of Changes Labeled L.2) (continued)

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

The proposed change requires Operable only necessary portion(s) of AC, DC, and AC vital bus electrical power distribution subsystems to support equipment required to be Operable. While loss of a required support function (AC, DC, or AC vital bus electrical power distribution subsystems), during shutdown conditions is an unanalyzed condition, the unit will declare the required support feature(s) inoperable, or declare the associated required SDC loop inoperable and secure various evolutions (Core Alterations, movement of irradiated fuel, operations involving positive reactivity changes) while restoring required AC, DC, or AC vital bus electrical power distribution subsystems to Operable status. As a result, this change will not allow continued operation following a loss of required AC, DC, and AC vital bus electrical power distribution subsystems unless appropriate compensatory Actions are taken. This change will not physically alter the plant (no new or different type of equipment will be installed). The change does not require any new or unusual operator actions. Therefore, this change does not create the possibility of a new or different kind of accident from any accident previously evaluated.

Standard 3.-- Does the proposed change involve a significant reduction in a margin of safety?

The proposed change requires Operable only necessary portion(s) of AC, DC, and AC vital bus electrical power distribution subsystems to support equipment required to be Operable. The margin of safety is not affected by this change. Whether stipulating which buses shall be energized in one LCO or in a combination of LCOs, appropriate compensatory Actions are taken. LCO 3.8.10 explicitly requires AC, DC, and AC vital bus electrical power distribution subsystems Operability to support Operability of required systems, equipment, or components - all explicitly addressed in each system/component LCO and implicitly required via the definition of Operability. Therefore, the change does not involve a significant reduction in a margin of safety.

TECHNICAL CHANGES - LESS RESTRICTIVE
(ITS 3.8.10 Discussion of Changes Labeled L.3)

Arizona Public Service Company, Palo Verde Nuclear Generating Station (PVNGS), Units 1, 2, and 3 is converting to the ITS as outlined in NUREG-1432. The proposed change involves making the CTS less restrictive. Below is the description of this less restrictive change and the NSHC for conversion to NUREG-1432.

L.3 ITS 3.8.10 has an additional Required Action (A.1) that states "Declare affected required feature(s) inoperable." CTS 3.8.3.2 does not contain this Required Action. The addition of this Required Action constitutes a less restrictive change to PVNGS operating practices because it offers an option to suspending CORE ALTERATIONS, suspending movement of irradiated fuel, and initiating action to suspend operations involving positive reactivity additions.. This is acceptable because it allows the option to declare affected required feature(s), associated with an inoperable inverter(s), inoperable. This ensures appropriate restrictions are implemented in accordance with the affected required feature(s) LCOs' Required Actions due to inverter(s) inoperability. This change is consistent with NUREG-1432.

The Commission has provided standards for determining whether a significant hazards consideration exists as stated in 10 CFR 50.92. A proposed amendment to an operating license for a facility involves a no significant hazards consideration if operation of the facility, in accordance with a proposed amendment, would not 1) involve a significant increase in the probability or consequences of an accident previously evaluated; 2) create the possibility of a new or different kind of accident from any accident previously evaluated; or 3) involve a significant reduction in a margin of safety. A discussion of these standards as they relate to this amendment request follows:

TECHNICAL CHANGES - LESS RESTRICTIVE
(ITS 3.8.10 Discussion of Changes Labeled L.3) (continued)

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

The proposed change affords the option to declare affected required feature(s) inoperable rather than suspend CORE ALTERATIONS, suspend movement of irradiated fuel assemblies, and initiate action to suspend operations involving positive reactivity additions. Though suspending CORE ALTERATIONS, movement of irradiated fuel assemblies, and initiating action to suspend operations involving positive reactivity additions are derived from design basis accidents, the option to declare affected required feature(s) inoperable will ensure appropriate LCOs are entered and appropriate compensatory actions are performed. The Action to declare affected required feature(s) inoperable or to suspend CORE ALTERATIONS, suspend movement of irradiated fuel assemblies, and initiate action to suspend operations involving positive reactivity additions minimizes the probability of the occurrence of postulated events. This change will not affect the probability of an accident. The Action to declare affected required feature(s) inoperable is not an initiator of any analyzed event. The consequences of an accident are not significantly affected by this change. Also, this Action ensures appropriate restrictions are implemented in accordance with the affected required features LCOs' Required Actions due to inverter(s) inoperability. The change does not alter assumptions relative to the mitigation of an analyzed event. Therefore, the change will not involve a significant increase in the probability or consequence of an accident previously evaluated.

TECHNICAL CHANGES - LESS RESTRICTIVE
(ITS 3.8.10 Discussion of Changes Labeled L.3) (continued)

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

The proposed change affords the option to declare affected required feature(s) inoperable rather than suspend CORE ALTERATIONS, suspend movement of irradiated fuel assemblies, and initiate action to suspend operations involving positive reactivity additions. While loss of a required support function (inverters), during shutdown conditions is an unanalyzed condition, the unit will declare the required support feature(s) inoperable, or secure various evolutions (Core Alterations, movement of irradiated fuel, operations involving positive reactivity changes). As a result, this change will not allow continued CORE ALTERATIONS, movement of irradiated fuel assemblies, or positive reactivity additions unless appropriate compensatory Actions (declaring affected required feature(s) inoperable)are taken. This change will not physically alter the plant (no new or different type of equipment will be installed). The change does not require any new or unusual operator actions. Therefore, this change does not create the possibility of a new or different kind of accident from any accident previously evaluated.

Standard 3.-- Does the proposed change involve a significant reduction in a margin of safety?

The proposed change affords the option to declare affected required feature(s) inoperable rather than suspend CORE ALTERATIONS, suspend movement of irradiated fuel assemblies, and initiate action to suspend operations involving positive reactivity additions. The margin of safety is not affected by this change. Whether declaring affected required feature(s) inoperable or suspending CORE ALTERATIONS, movement of irradiated fuel assemblies, and initiating action to suspend operations involving positive reactivity additions, appropriate LCOs are entered and appropriate compensatory Actions are performed. Therefore, the change does not involve a significant reduction in a margin of safety.

[illegible]

[illegible]

ENVIRONMENTAL ASSESSMENT

These proposed TS changes have been evaluated against the criteria for and identification of licensing and regulatory actions requiring environmental assessment in accordance with 10 CFR 51.21. It has been determined that the proposed changes meet the criteria for categorical exclusion as provided for under 10 CFR 51.22(c)(9). The following is a discussion of how the proposed TS changes meet the criteria for categorical exclusion.

10 CFR 51.22(c)(9): Although the proposed changes involve changes to requirements with respect to inspection or Surveillance Requirements with:

(i) the proposed changes involve No Significant Hazards Consideration (refer to the No Significant Hazards Consideration Section of this Technical Specification Change Request),

(ii) there is no significant change in the types or significant increase in the amounts of any effluent that may be released offsite since the proposed changes do not affect generation of any radioactive effluent not do they affect any of the permitted release paths, and

(iii) there is no significant increase in individual or cumulative occupational radiation exposure.

Accordingly, the proposed changes meet the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Based on the aforementioned and pursuant to 10 CFR 51.22(b), no environmental assessment or environmental impact statement need be prepared in connection with issuance of an amendment to the Technical Specifications incorporating the proposed changes of this request.

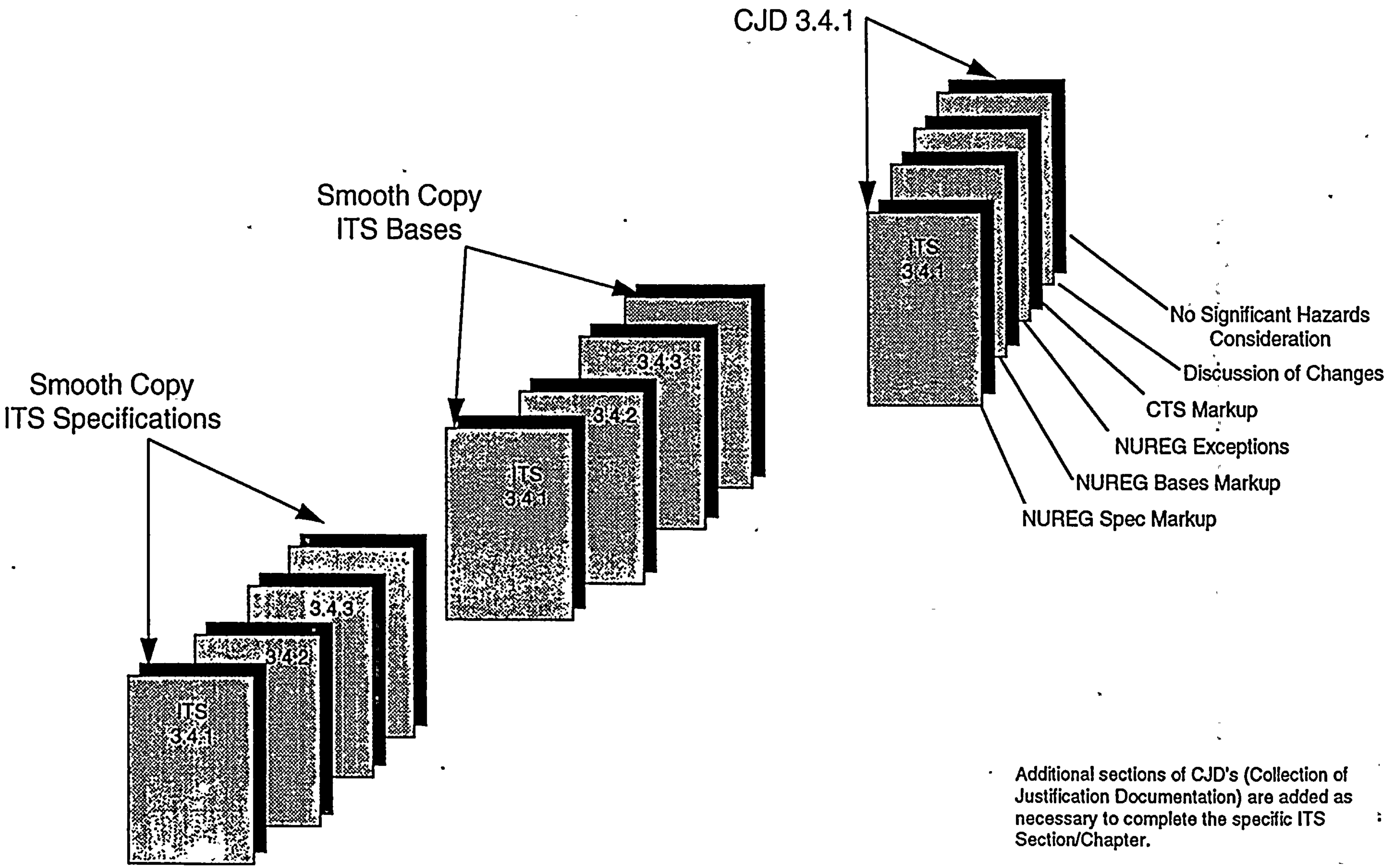
PVNGS

Palo Verde Nuclear Generating Station
Units 1, 2, and 3

Improved Technical Specifications

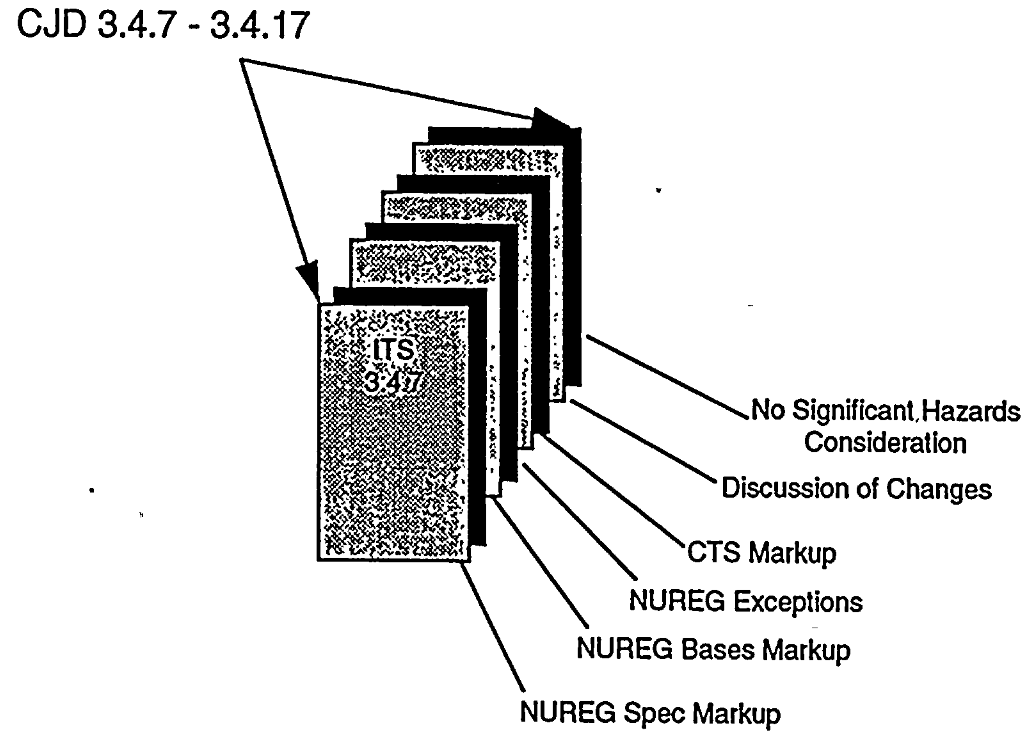
PALO VERDE

ITS REVIEW PACKAGE CONTENTS
(Volume 9)



- **Additional sections of CJD's (Collection of Justification Documentation) are added as necessary to complete the specific ITS Section/Chapter.**

ITS REVIEW PACKAGE CONTENTS
(Volume 10, continued from Volume 9)



Additional sections of CJD's (Collection of Justification Documentation) are added as necessary to complete the specific ITS Section/Chapter.

PVNGS ITS
SECTION 3.4 - REACTOR COOLANT SYSTEM (RCS)

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ITS SECTION 3.4

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.1 RCS Pressure, Temperature, and Flow Departure from Nucleate Boiling (DNB) Limits

LCO 3.4.1 RCS DNB parameters for pressurizer pressure, cold leg temperature, and RCS total flow rate shall be within the limits specified below:

a. Pressurizer pressure ≥ 2130 psia and ≤ 2295 psia; and

b. RCS cold leg temperature (T_c) shall be within the area of acceptable operation shown in Figure 3.4.1-1; and

c. RCS total flow rate ≥ 155.8 E6 lb/hour.

APPLICABILITY: MODE 1 for RCS total flow rate,

MODES 1 and 2 for pressurizer pressure,

MODES 1 and 2 with K_{eff} ≥ 1 for RCS cold leg temperature (Tc).

-----------------------------NOTE-----------------------------
Pressurizer pressure limit does not apply during:

a. THERMAL POWER ramp > 5% RTP per minute; or

b. THERMAL POWER step > 10% RTP.

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. RCS flow rate not within limit.	A.1	Restore RCS flow rate to within limit.	2 hours
B. Required Action and associated Completion Time of Condition A not met.	B.1	Be in MODE 2.	6 hours

(continued)

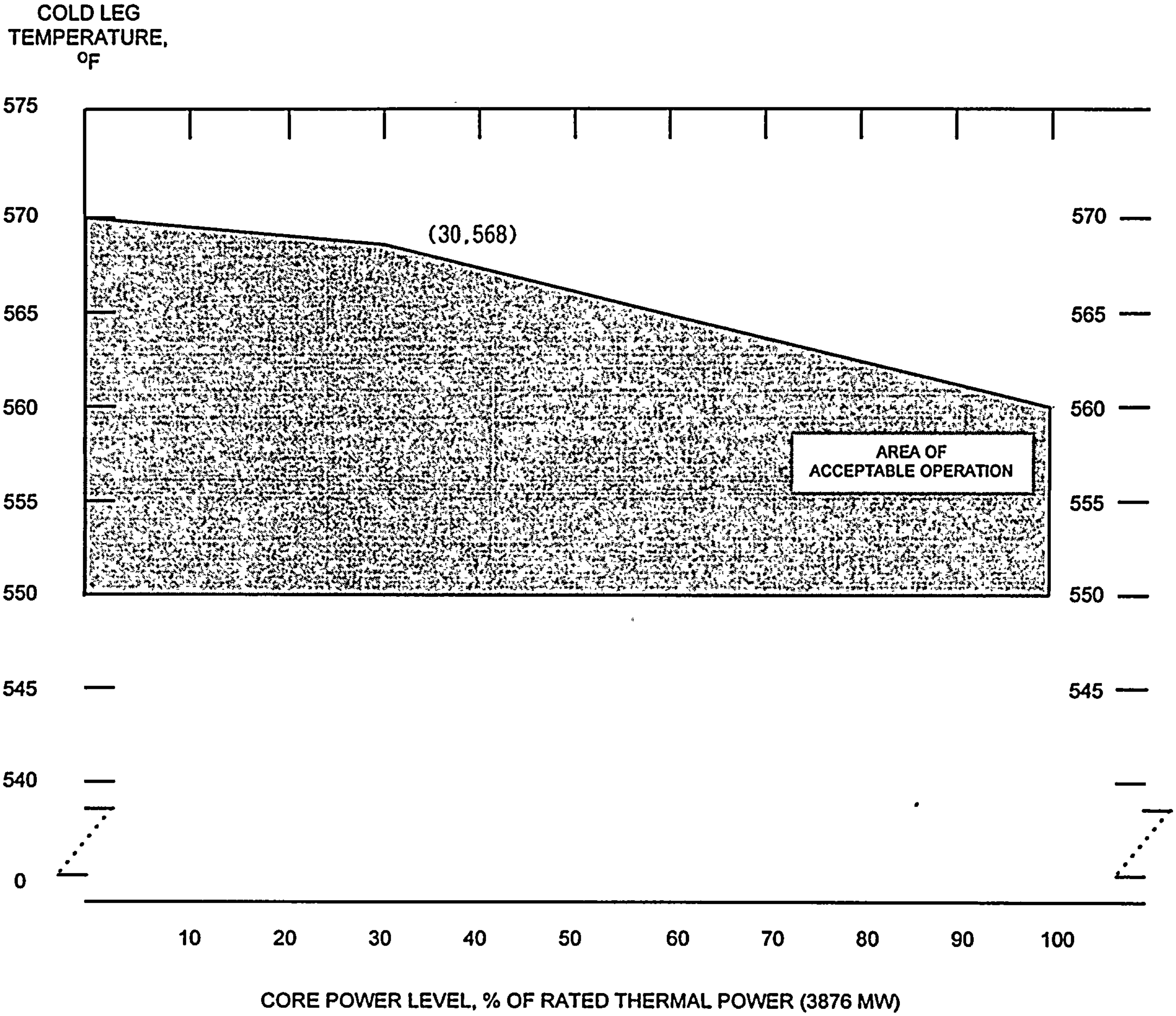
ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. Pressurizer pressure or RCS cold leg temperature not within limits.	C.1 Restore paramater(s) to within limits.	2 hours
D. Required Action and associated Completion Time of Condition C not met.	D.1 Be in MODE 3.	6 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.4.1.1	Verify pressurizer pressure ≥ 2130 psia and ≤ 2295 psia.	12 hours
SR 3.4.1.2	Verify RCS cold leg temperature within limits as shown in Figure 3.4.1-1.	12 hours
SR 3.4.1.3	------------------NOTE------------------ Required to be met in MODE 1 with all RCPS running. -------------------------------------- Verify RCS total flow rate ≥ 155.8 E6 lb/hour.	12 hours

Figure 3.4.1-1
Reactor Coolant Cold Leg Temperature vs. Core Power Level



3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.2 RCS Minimum Temperature for Criticality

LCO 3.4.2 Each RCS loop temperature (T_{cold}) shall be ≥ 545°F.

APPLICABILITY: MODE 1,
MODE 2 with K_{eff} ≥ 1.0.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. T_{cold} in one or more RCS loops not within limit.	A.1 Be in MODE 3.	30 minutes

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
SR 3.4.2.1 Verify RCS T_{cold} in each loop ≥ 545°F.	------NOTE----- Only required if any RCS loop T_{cold} < 550°F. --------------- 30 minutes AND Once within 30 minutes prior to reaching criticality

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.3 RCS Pressure and Temperature (P/T) Limits

LCO 3.4.3 RCS pressure, RCS temperature, and RCS heatup and cooldown rates shall be limited in accordance with the limits shown in Figures 3.4.3-1 or 3.4.3-2 during heatup, cooldown criticality, and inservice leak and hydrostatic testing with:

a. Maximum heatup and cooldown specified in Table 3.4.3-1.

b. A maximum temperature change of 10°F in any 1-hour period during inservice hydrostatic testing operations.

APPLICABILITY: At all times; except when reactor vessel head is fully detensioned such that the RCS cannot be pressurized.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. ---------NOTE--------- Required Action A.2 shall be completed whenever this Condition is entered. --------------------- Requirements of LCO not met in MODE 1, 2, 3, or 4.	A.1 Restore parameter(s) to within limits. AND A.2 Determine RCS is acceptable for continued operation.	30 minutes 72 hours
B. Required Action and associated Completion Time of Condition A not met.	B.1 Be in MODE 3. AND B.2 Be in MODE 5 with RCS pressure < 500 psia.	6 hours 36 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. ---------NOTE--------- Required Action C.2 shall be completed whenever this Condition is entered. --------------------- Requirements of LCO not met any time in other than MODE 1, 2, 3, or 4.	C.1 Initiate action to restore parameter(s) to within limits. AND C.2 Determine RCS is acceptable for continued operation.	Immediately Prior to entering MODE 4

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.4.3.1	-----------------NOTE-------------------- Only required to be performed during RCS heatup and cooldown operations and RCS inservice leak and hydrostatic testing. -- Verify RCS pressure, RCS temperature, and RCS heatup and cooldown rates within limits specified in Table 3.4.3-1, and Figures 3.4.3-1 and 3.4.3-2.	30 minutes

TABLE 3.4.3-1
Maximum Allowable Heatup and Cooldown Rates

≤8 Effective Full Power Years

Heatup

T_c^x (°F)	Rate (°F/HR)
< 128°F	20°F/HR
128°F - 180°F	30°F/HR
181° - 230°F	50°F/HR
> 230°F	75°F/HR

Cooldown

T_c^x (°F)	Rate (°F/HR)
≤ 93°F	See Figure 3.4.3-3
94°F - 114°F	10°F/HR
115°F - 148°F	20°F/HR
> 148°F	100°F/HR

8-32 Effective Full Power Years

Heatup

T_c^x (°F)	Rate (°F/HR)
< 116°F	10°F/HR
117°F - 150°F	20°F/HR
151° - 199°F	30°F/HR
200°F - 246°F	50°F/HR
> 246°F	75°F

Cooldown

T_c^x (°F)	Rate (°F/HR)
≤ 108°F	See Figure 3.4.3-4
109° - 126°F	10°F/HR
127°F - 147°F	20°F/HR
148°F - 162°F	40°F/HR
>162°F	100°F/HR

x Indicated Cold Leg Temperature

Figure 3.4.3-1
Reactor Coolant System Pressure/Temperature
Limitations for Less Than 8 Effective
Full Power Years of Operation

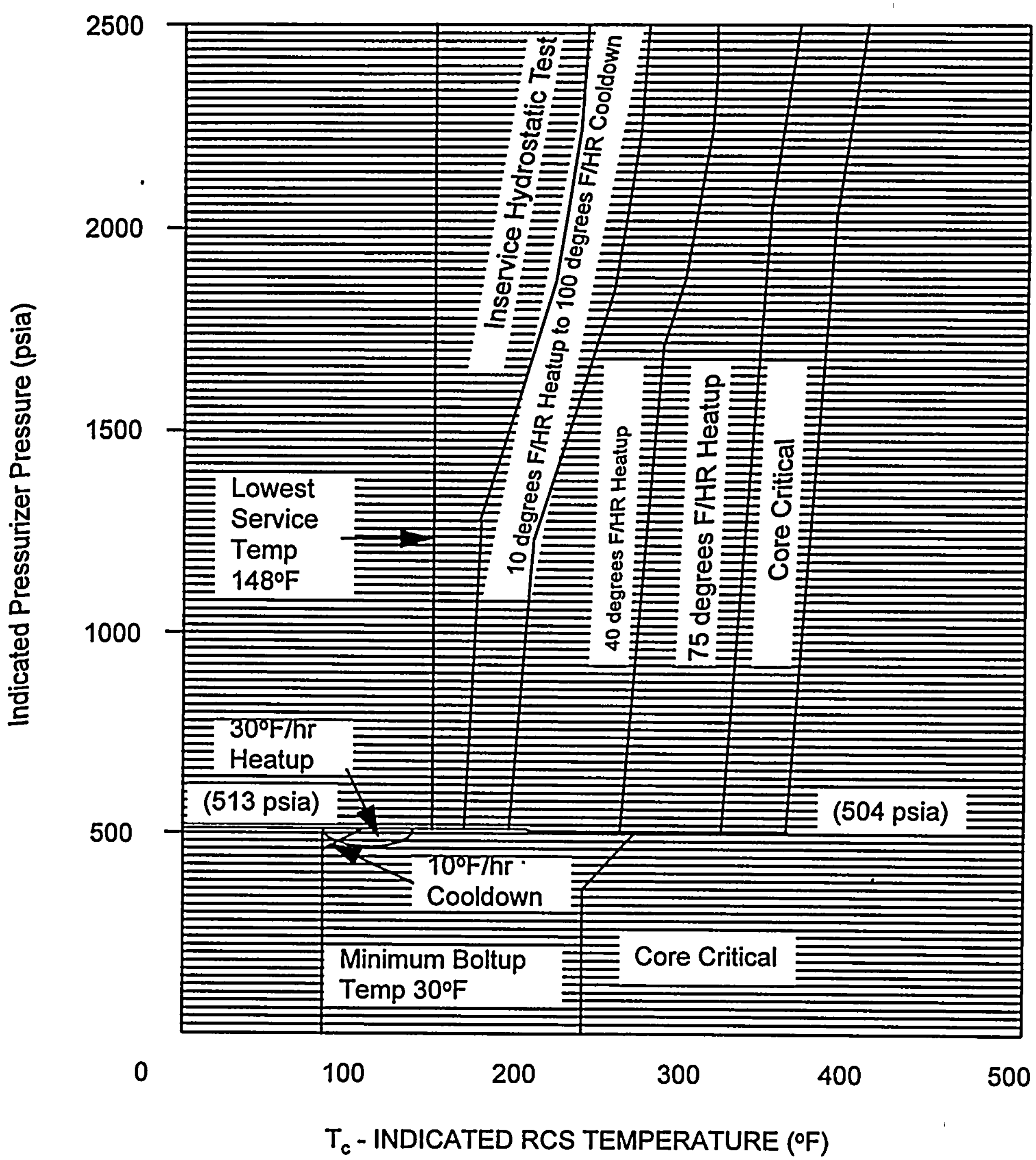


Figure 3.4.3-2
Reactor Coolant System Pressure/Temperature
Limitations for 8 to 32 Effective Full
Power Years of Operation

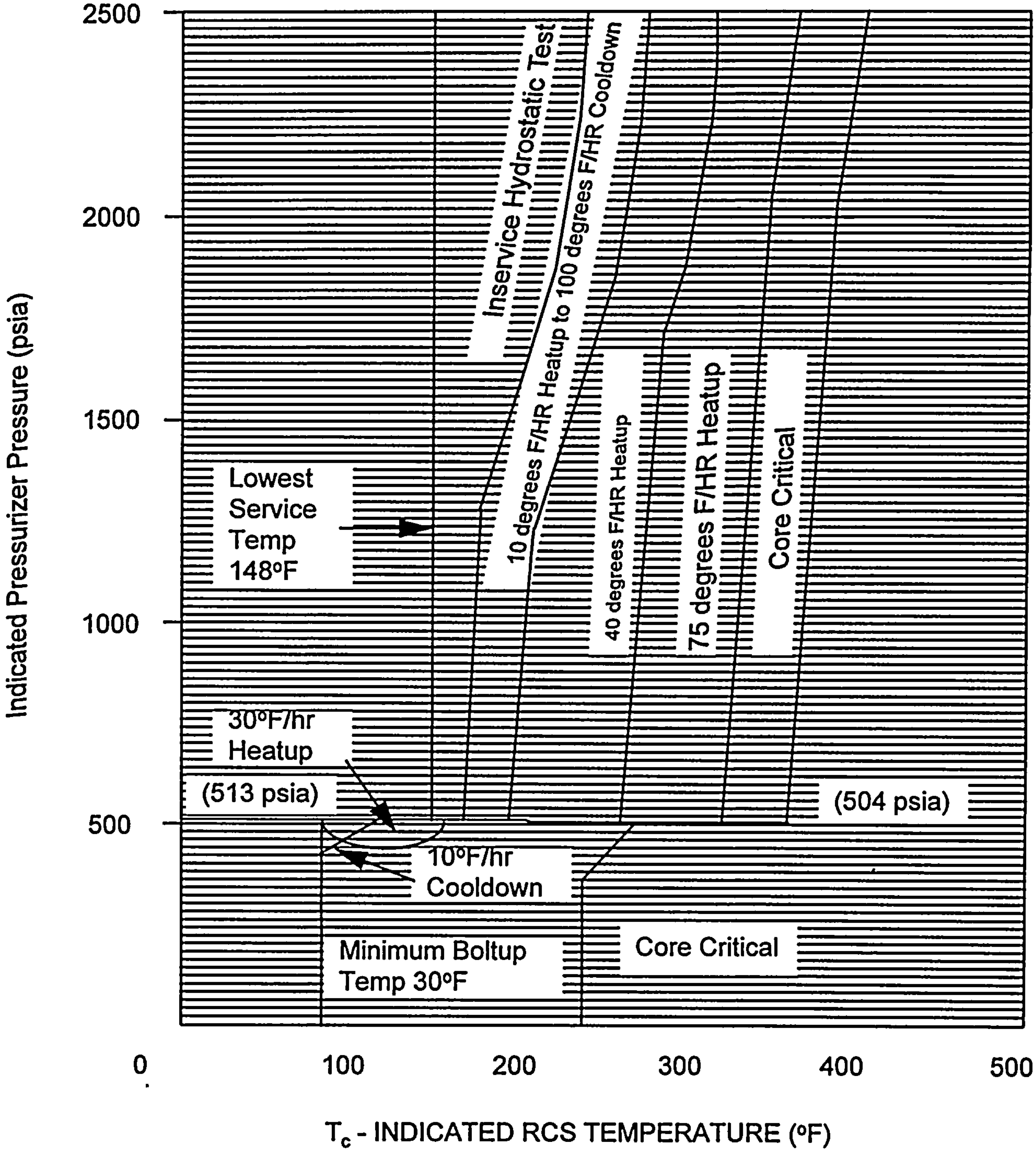


Figure 3.4.3-3
Maximum Allowable Cooldown Rates
< 8 EFPY

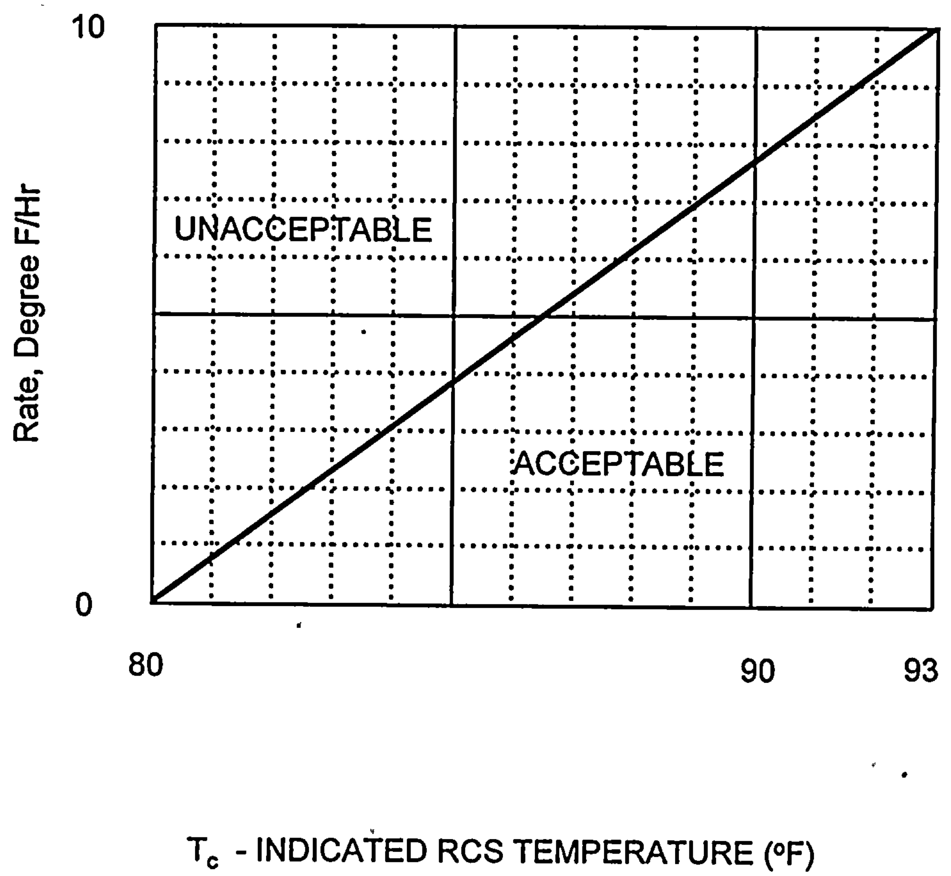
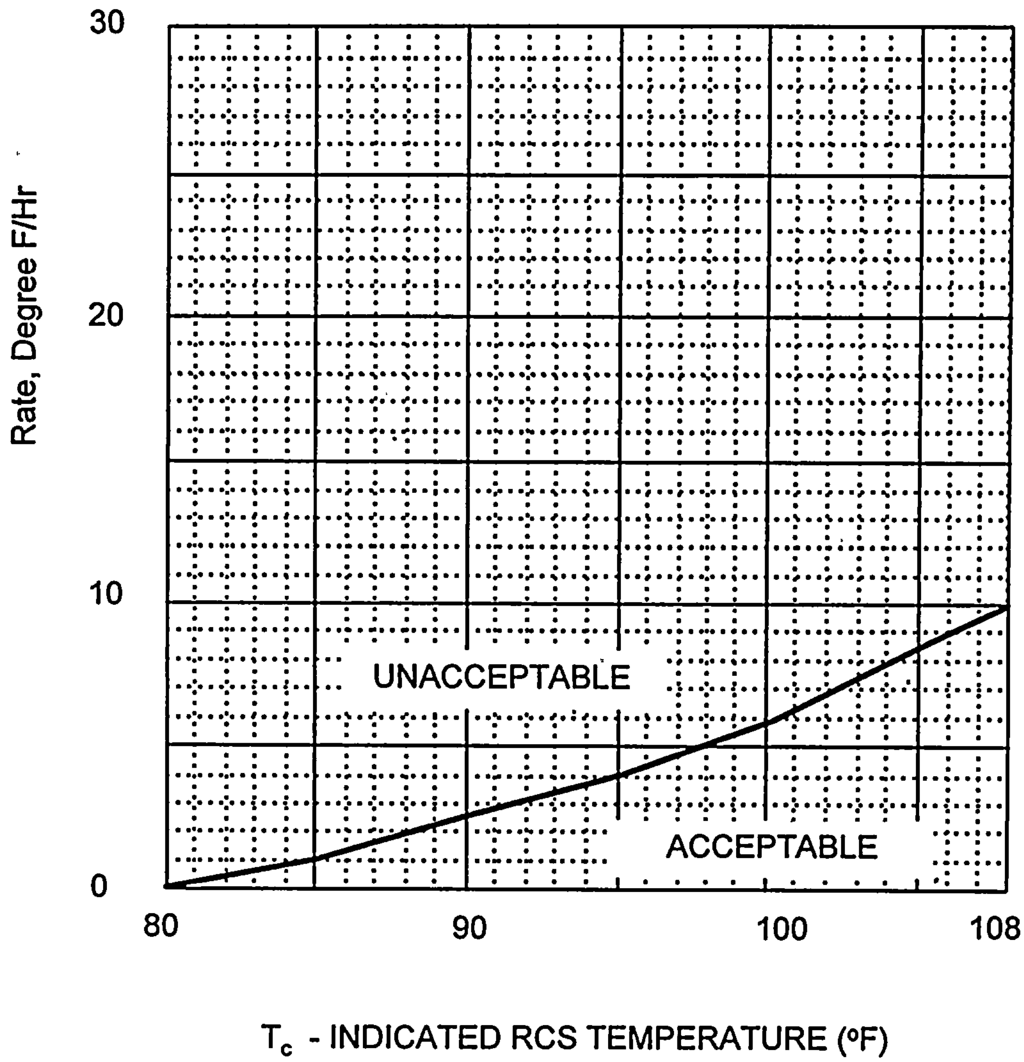


Figure 3.4.3-4
Maximum Allowable Cooldown Rates
8-32 EFPY



3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.4 RCS Loops – MODES 1 and 2

LCO 3.4.4 Two RCS loops shall be OPERABLE and in operation.

APPLICABILITY: MODES 1 and 2.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Requirements of LCO not met.	A.1 Be in MODE 3.	6 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
SR 3.4.4.1 Verify each RCS loop is in operation.	12 hours

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.5 RCS Loops – MODE 3

LCO 3.4.5 Two RCS loops shall be OPERABLE and one RCS loop shall be in operation.

---------------------------NOTE---------------------------
All reactor coolant pumps may be de-energized for ≤ 1 hour per 8 hour period, provided:

a. No operations are permitted that would cause reduction of the RCS boron concentration; and

b. Core outlet temperature is maintained at least 10°F below saturation temperature.

APPLICABILITY: MODE 3.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One required RCS loop inoperable.	A.1 Restore required RCS loop to OPERABLE status.	72 hours
B. Required Action and associated Completion Time of Condition A not met.	B.1 Be in MODE 4.	12 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. No RCS loop OPERABLE. OR No RCS loop in operation.	C.1 Suspend all operations involving a reduction of RCS boron concentration. AND C.2 Initiate action to restore one RCS loop to OPERABLE status and operation.	Immediately Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.4.5.1	Verify required RCS loop is in operation.	12 hours
SR 3.4.5.2	Verify secondary side water level in each steam generator ≥ 25%.	12 hours
SR 3.4.5.3	Verify correct breaker alignment and indicated power available to the required pump that is not in operation.	7 days

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.6 RCS Loops – MODE 4

LCO 3.4.6 Two loops or trains consisting of any combination of RCS loops and shutdown cooling (SDC) trains shall be OPERABLE and at least one loop or train shall be in operation.

---------------------------NOTES---------------------------

1. All reactor coolant pumps (RCPs) and SDC pumps may be de-energized for ≤ 1 hour per 8 hour period, provided:

    a. No operations are permitted that would cause reduction of the RCS boron concentration; and

    b. Core outlet temperature is maintained at least 10°F below saturation temperature.

2. No RCP shall be started with any RCS cold leg temperature ≤ 214°F during cooldown, or ≤ 291°F during heatup, unless the secondary side water temperature in each Steam Generator (SG) is < 100°F above each of the RCS cold leg temperatures.

APPLICABILITY: MODE 4.

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. One required RCS loop inoperable. AND Two SDC trains inoperable.	A.1	Initiate action to restore a second loop or train to OPERABLE status.	Immediately

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. One required SDC train inoperable. AND Two required RCS loops inoperable.	B.1 Be in MODE 5.	24 hours
C. No RCS loop or SDC train OPERABLE. OR No RCS loop or SDC train in operation.	C.1 Suspend all operations involving reduction of RCS boron concentration. AND C.2 Initiate action to restore one loop or train to OPERABLE status and operation.	Immediately Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.4.6.1	Verify one RCS loop or SDC train is in operation.	12 hours
SR 3.4.6.2	Verify secondary side water level in required SG(s) is ≥ 25%.	12 hours

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.4.6.3	Verify correct breaker alignment and indicated power available to the required pump that is not in operation.	7 days

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.7 RCS Loops — MODE 5, Loops Filled

LCO 3.4.7 One Shutdown Cooling (SDC) train shall be OPERABLE and in operation, and either:

a. One additional SDC train shall be OPERABLE; or

b. The secondary side water level of each Steam Generator (SG) shall be ≥ 25%.

---------------------------NOTES---------------------------

1. The SDC pump of the train in operation may be de-energized for ≤ 1 hour per 8 hour period provided:

   a. No operations are permitted that would cause reduction of the RCS boron concentration; and

   b. Core outlet temperature is maintained at least 10°F below saturation temperature.

2. One required SDC train may be inoperable for up to 2 hours for surveillance testing provided that the other SDC train is OPERABLE and in operation.

3. No Reactor Coolant Pump (RCP) shall be started with one or more of the RCS cold leg temperatures ≤ 214°F during cooldown, or ≤ 291°F during heatup unless the secondary side water temperature in each SG is < 100°F above each of the RCS cold leg temperatures.

4. All SDC trains may be removed from operation during planned heatup to MODE 4 when at least one RCS loop is in operation.

APPLICABILITY: MODE 5 with RCS loops filled.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One SDC train inoperable. AND Any SG with secondary side water level not within limit.	A.1 Initiate action to restore a second SDC train to OPERABLE status. OR A.2 Initiate action to restore SG secondary side water levels to within limits.	Immediately Immediately
B. Required SDC train inoperable. OR No SDC train in operation.	B.1 Suspend all operations involving reduction in RCS boron concentration. AND B.2 Initiate action to restore one SDC train to OPERABLE status and operation.	Immediately Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.4.7.1	Verify one SDC train is in operation.	12 hours
SR 3.4.7.2	Verify required SG secondary side water level is ≥ 25%.	12 hours
SR 3.4.7.3	Verify correct breaker alignment and indicated power available to the required SDC pump that is not in operation.	7 days

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.8 RCS Loops – MODE 5, Loops Not Filled

LCO 3.4.8 Two Shutdown Cooling (SDC) trains shall be OPERABLE and one SDC train shall be in operation.

---------------------------NOTES---------------------------

1. All SDC pumps may be de-energized for ≤ 1 hour per 8 hour period:
   a. The core outlet temperature is maintained > 10°F below saturation temperature;
   b. No operations are permitted that would cause a reduction of the RCS boron concentration; and
   c. No draining operations to further reduce the RCS water volume are permitted.
2. One SDC train may be inoperable for ≤ 2 hours for surveillance testing provided the other SDC train is OPERABLE and in operation.

APPLICABILITY: MODE 5 with RCS loops not filled.

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. One SDC train inoperable.	A.1	Initiate action to restore SDC train to OPERABLE status.	Immediately

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. Required SDC train inoperable. OR No SDC train in operation.	B.1 Suspend all operations involving reduction of RCS boron concentration. AND B.2 Initiate action to restore one SDC train to OPERABLE status and operation.	Immediately Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.4.8.1	Verify one SDC train is in operation.	12 hours
SR 3.4.8.2	Verify correct breaker alignment and indicated power available to the required SDC pump that is not in operation.	7 days

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.9 Pressurizer

LCO 3.4.9 The pressurizer shall be OPERABLE with:

a. Pressurizer water level ≥ 27% and ≤ 56%; and

b. Two groups of pressurizer heaters OPERABLE with the capacity of each group ≥ 125 kW and capable of being powered from an emergency power supply.

APPLICABILITY: MODES 1, 2, and 3.

-----------------------------NOTE-----------------------------
The pressurizer level limit does not apply during:

a. THERMAL POWER ramp > 5% RTP per minute; or
b. THERMAL POWER step > 10% RTP.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Pressurizer water level not within limit.	A.1 Be in MODE 3 with reactor trip breakers open. AND A.2 Be in MODE 4.	6 hours 12 hours
B. One required group of pressurizer heaters inoperable.	B.1 Restore required group of pressurizer heaters to OPERABLE status.	72 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. Required Action and associated Completion Time of Condition B not met.	C.1 Be in MODE 3. AND C.2 Be in MODE 4.	6 hours 12 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.4.9.1	Verify pressurizer water level is ≥ 27% and ≤ 56%.	12 hours
SR 3.4.9.2	Verify capacity of each required group of pressurizer heaters ≥ 125 kW.	92 days

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.10 Pressurizer Safety Valves - Modes 1, 2 and 3

LCO 3.4.10 Four pressurizer safety valves shall be OPERABLE with lift settings ≥ 2450.25 psia and ≤ 2549.25 psia.

APPLICABILITY: MODES 1, 2, and 3.

---------------------------NOTE---------------------------
The lift settings are not required to be within LCO limits during MODES 3 and 4 for the purpose of setting the pressurizer safety valves under ambient (hot) conditions. This exception is allowed for 72 hours following entry into MODE 3 provided a preliminary cold setting was made prior to heatup.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One pressurizer safety valve inoperable.	A.1 Restore valve to OPERABLE status.	15 minutes
B. Required Action and associated Completion Time not met. OR Two or more pressurizer safety valves inoperable.	B.1 Be in MODE 3. AND B.2 Be in MODE 4	6 hours 12 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.4.10.1	Verify each pressurizer safety valve is OPERABLE in accordance with the Inservice Testing Program. Following testing, lift settings shall be within ± 1%.	In accordance with the Inservice Testing Program

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.11 Pressurizer Safety Valves-MODE 4

LCO 3.4.11 One pressurizer safety valve shall be OPERABLE with a lift setting ≥ 2450.25 psia and ≤ 2549.25 psia.

APPLICABILITY: MODE 4 with all RCS cold leg temperatures > 214°F during cooldown, or

MODE 4 with all RCS cold leg temperatures > 291°F during heatup.

---------------------------NOTE---------------------------
The lift settings are not required to be within LCO limits during MODES 3 and 4 for the purpose of setting the pressurizer safety valves under ambient (hot) conditions. This exception is allowed for 72 hours following entry into MODE 3 provided a preliminary cold setting was made prior to heatup.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. All pressurizer safety valves inoperable.	A.1 Be in MODE 4 with one Shutdown Cooling System suction line relief valve in service. <u>AND</u> A.2 Perform SR 3.4.11.2 and SR 3.4.11.3 for the required Shutdown Cooling System suction line relief valve to comply with Action A.1.	12 hours 12 hours
B. Required Action and associated Completion Time not met.	B.1 Be in MODE 4 with all RCS cold leg temperatures ≤ 214°F during cooldown or ≤ 291°F during heatup.	8 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.4.11.1	Verify the required pressurizer safety valve is OPERABLE in accordance with the Inservice Testing Program. Following testing, lift settings shall be within ± 1%.	In accordance with the Inservice Testing Program
SR 3.4.11.2	--------------------NOTE------------------- Only required to be performed when a Shutdown Cooling System suction line relief valve is being used for overpressure protection. --- Verify the required Shutdown Cooling System suction line relief valve aligned to provide overpressure protection for the RCS.	12 hours for unlocked, not sealed, or otherwise not secured open pathway vent valve(s) <u>AND</u> 31 days for locked, sealed, or otherwise secured open pathway vent valve(s)
SR 3.4.11.3	Verify the required Shutdown Cooling System suction line relief valve OPERABLE with the required setpoint.	In accordance with the Inservice Testing Program

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.12 Pressurizer Vents

LCO 3.4.12 Four pressurizer vent paths shall be OPERABLE.

APPLICABILITY: MODES 1, 2, 3, and MODE 4 with RCS pressure ≥ 385 psia.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Two or three required pressurizer vent paths inoperable.	A.1 Restore required pressurizer vent paths to OPERABLE status.	72 hours
B. All pressurizer vent paths inoperable.	B.1 Restore one pressurizer vent path to OPERABLE status.	6 hours
C. Required Action and associated Completion Time of Condition A, or B not met.	C.1 Be in MODE 3. AND C.2 Be in MODE 4 with RCS pressure < 385 psia.	6 hours 24 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.4.12.1	Perform a complete cycle of each Pressurizer Vent Valve.	18 months
SR 3.4.12.2	Verify flow through each pressurizer vent path.	18 months

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.13 Low Temperature Overpressure Protection (LTOP) System

LCO 3.4.13 An LTOP System shall be OPERABLE consisting of:

a. Two OPERABLE Shutdown Cooling System suction line relief valves with lift settings ≤ 467 psig aligned to provide overpressure protection for the RCS; or

b. The RCS depressurized and an RCS vent of ≥ 16 square inches.

APPLICABILITY: MODE 4 when any RCS cold leg temperature is ≤ 214°F during cooldown,
MODE 4 when any RCS cold leg temperature is ≤ 291°F during heatup,
MODE 5,
MODE 6 when the reactor vessel head is on.

---------------------------NOTE---------------------------
When one or more cold legs reach 214°F, this LCO remains applicable during periods of steady state temperature conditions until all RCS cold leg temperature reach 291°F. If a cooldown is teminated prior to reaching 214°F and a heatup is commenced, this LCO is applicable until all RCS cold leg temperatures reach 291°F.

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. One required Shutdown Cooling System suction line relief valve inoperable in MODE 4.	A.1	Restore required Shutdown Cooling System suction line relief valve to OPERABLE status.	7 days

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
B. One required Shutdown Cooling System suction line relief valve inoperable in MODE 5 or 6.	B.1	Restore required Shutdown Cooling System suction line relief valve to OPERABLE status.	24 hours
C. Two required Shutdown Cooling System suction line relief valves inoperable. OR Required Action and associated Completion Time of Condition A, or B not met.	C.1	Depressurize RCS and establish RCS vent of ≥ 16 square inches.	8 hours

SURVEILLANCE		FREQUENCY
SR 3.4.13.1	Verify RCS Vent ≥ 16 square inches is open.	12 hours for unlocked, not sealed, or otherwise not secured open vent pathway(s) <u>AND</u> 31 days for locked, sealed, or otherwise secured open vent pathway(s)
SR 3.4.13.2	Verify each Shutdown Cooling System suction line relief valve aligned to provide overpressure protection for the RCS.	12 hours for unlocked, not sealed, or otherwise not secured open pathway vent valve(s) <u>AND</u> 31 days for locked, sealed, or otherwise secured open pathway vent valve(s).
SR 3.4.13.3	Verify each Shutdown Cooling System suction line relief valve OPERABLE with the required setpoint.	In accordance with the Inservice Testing Program.

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.14 RCS Operational LEAKAGE

LCO 3.4.14 RCS operational LEAKAGE shall be limited to:

a. No pressure boundary LEAKAGE;

b. 1 gpm unidentified LEAKAGE;

c. 10 gpm identified LEAKAGE;

d. 1 gpm total primary to secondary LEAKAGE through all steam generators (SGs); and,

e. 720 gallons per day primary to secondary LEAKAGE through any one SG.

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

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. RCS LEAKAGE not within limits for reasons other than pressure boundary LEAKAGE.	A.1 Reduce LEAKAGE to within limits.	4 hours
B. Required Action and associated Completion Time of Condition A not met. OR Pressure boundary LEAKAGE exists.	B.1 Be in MODE 3. AND B.2 Be in MODE 5.	6 hours 36 hours
C. One or more SGs inoperable.	C.1 Enter 3.0.3.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.4.14.1	--------------------NOTE-------------------- Not required to be performed in MODE 3 or 4 until 12 hours of steady state operation. --- Perform RCS water inventory balance.	-----NOTE------ Only required to be performed during steady state operation --------------- 72 hours
SR 3.4.14.2	Verify SG tube integrity is in accordance with the Steam Generator Tube Surveillance Program.	In accordance with the Steam Generator Tube Surveillance Program

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.15 RCS Pressure Isolation Valve (PIV) Leakage

LCO 3.4.15 Leakage from each RCS PIV shall be within limits.

APPLICABILITY: MODES 1, 2, and 3,
MODE 4, except valves in the shutdown cooling (SDC) flow path when in, or during the transition to or from, the SDC mode of operation.

ACTIONS

------------------------------------NOTES------------------------------------

1. Separate Condition entry is allowed for each flow path.

2. Enter applicable Conditions and Required Actions for systems made inoperable by an inoperable PIV.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more flow paths with leakage from one or more RCS PIVs not within limit	------------NOTE------------ Each valve used to satisfy Required Action A.1 and required Action A.2 must have been verified to meet SR 3.4.15.1 and be on the RCS pressure boundary. ---------------------------	
	A.1 Isolate the high pressure portion of the affected system from the low pressure portion by use of one closed manual, deactivated automatic, or check valve.	4 hours
	<u>AND</u>	
	A.2 Restore RCS PIV to within limits	72 hours

(continued)

ACTIONS (Continued)

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

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.4.15.1	------------------NOTES------------------ 1. Not required to be performed in MODES 3 and 4. 2. Not required to be performed on the RCS PIVs located in the SDC flow path when in the shutdown cooling mode of operation. 3. RCS PIVs actuated during the performance of this Surveillance are not required to be tested more than once if a repetitive testing loop cannot be avoided. --- Verify leakage from each RCS PIV is equivalent to ≤ 0.5 gpm per nominal inch of valve size up to a maximum of 5 gpm at an RCS pressure ≥ 2230 psia and ≤ 2270 psia.	18 months AND Prior to entering MODE 2 whenever the unit has been in MODE 5 for 7 days or more, if leakage testing has not been performed in the previous 9 months, except for SDC PIVs AND

(continued)

SURVEILLANCE REQUIREMENTS (Continued)

SURVEILLANCE		FREQUENCY
SR 3.4.15.1 (continued)		Within 24 hours following valve actuation due to automatic or manual action or flow through the valve, except for SDC PIVs.
SR 3.4.15.2	Verify SDC System open permissive interlock prevents the valves from being opened with a simulated or actual RCS pressure signal ≥ 410 psia.	18 months

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.16 RCS Leakage Detection Instrumentation

LCO 3.4.16 Both of the following RCS leakage detection instrumentation shall be OPERABLE:

a. One containment sump monitor; and

b. One containment atmosphere radioactivity monitor (gaseous and particulate).

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

ACTIONS

------------------------------------NOTE------------------------------------
LCO 3.0.4 is not applicable.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Required containment sump monitor inoperable.	A.1 Perform SR 3.4.14.1. <u>AND</u> A.2 Restore containment sump monitor to OPERABLE status.	Once per 24 hours 30 days

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
B. Required containment atmosphere radioactivity monitor inoperable.	B.1.1	Analyze grab samples of the containment atmosphere.	Once per 24 hours
	<u>OR</u>		
	B.1.2	Perform SR 3.4.14.1.	Once per 24 hours
	<u>AND</u>		
	B.2	Restore required containment atmosphere radioactivity monitor to OPERABLE status.	30 days
C. Required Action and associated Completion Time not met.	C.1	Be in MODE 3.	6 hours
	<u>AND</u>		
	C.2	Be in MODE 5.	36 hours
D. All required monitors inoperable.	D.1	Enter LCO 3.0.3	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.4.16.1	Perform CHANNEL CHECK of the required containment atmosphere radioactivity monitor.	12 hours
SR 3.4.16.2	Perform CHANNEL FUNCTIONAL TEST of the required containment atmosphere radioactivity monitor.	92 days

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.4.16.3	Perform CHANNEL CALIBRATION of the required containment sump monitor.	18 months
SR 3.4.16.4	Perform CHANNEL CALIBRATION of the required containment atmosphere radioactivity monitor.	18 months

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.17 RCS Specific Activity

LCO 3.4.17 The specific activity of the reactor coolant shall be within limits.

APPLICABILITY: MODES 1 and 2,
MODE 3 with RCS cold leg temperature (T_{cold}) ≥ 500°F.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. DOSE EQUIVALENT I-131 > 1.0 μCi/gm.	----------NOTE---------- LCO 3.0.4 is not applicable. ----------------------------	
	A.1 Verify DOSE EQUIVALENT I-131 within the acceptable region of Figure 3.4.17-1.	Once per 4 hours
	AND	
	A.2 Restore DOSE EQUIVALENT I-131 to within limit.	48 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. Required Action and associated Completion Time of Condition A not met. OR DOSE EQUIVALENT I-131 in the unacceptable region of Figure 3.4.17-1.	B.1 Be in MODE 3 with T_{cold} < 500°F.	6 hours
C. Gross specific activity of the reactor coolant not within limit.	C.1 Perform SR 3.4.17.2. AND C.2 Be in MODE 3 with T_{cold} < 500°F.	4 hours 6 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.4.17.1	Verify reactor coolant gross specific activity ≤ 100/Ē μCi/gm.	7 days

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.4.17.2	Verify reactor coolant DOSE EQUIVALENT I-131 specific activity ≤ 1.0 μCi/gm.	-------NOTE------ Only required to be performed in MODE 1. ---------------- 14 days AND Between 2 and 6 hours after THERMAL POWER change of ≥ 15% RTP within a 1 hour period
SR 3.4.17.3	-----------------NOTE-------------- Not required to be performed until 31 days after a minimum of 2 EFPD and 20 days of MODE 1 operation have elapsed since the reactor was last subcritical for ≥ 48 hours. ---------------------------------- Determine $\bar{E}$ from a sample taken in MODE 1 after a minimum of 2 EFPD and 20 days of MODE 1 operation have elapsed since the reactor was last subcritical for ≥ 48 hours.	184 days

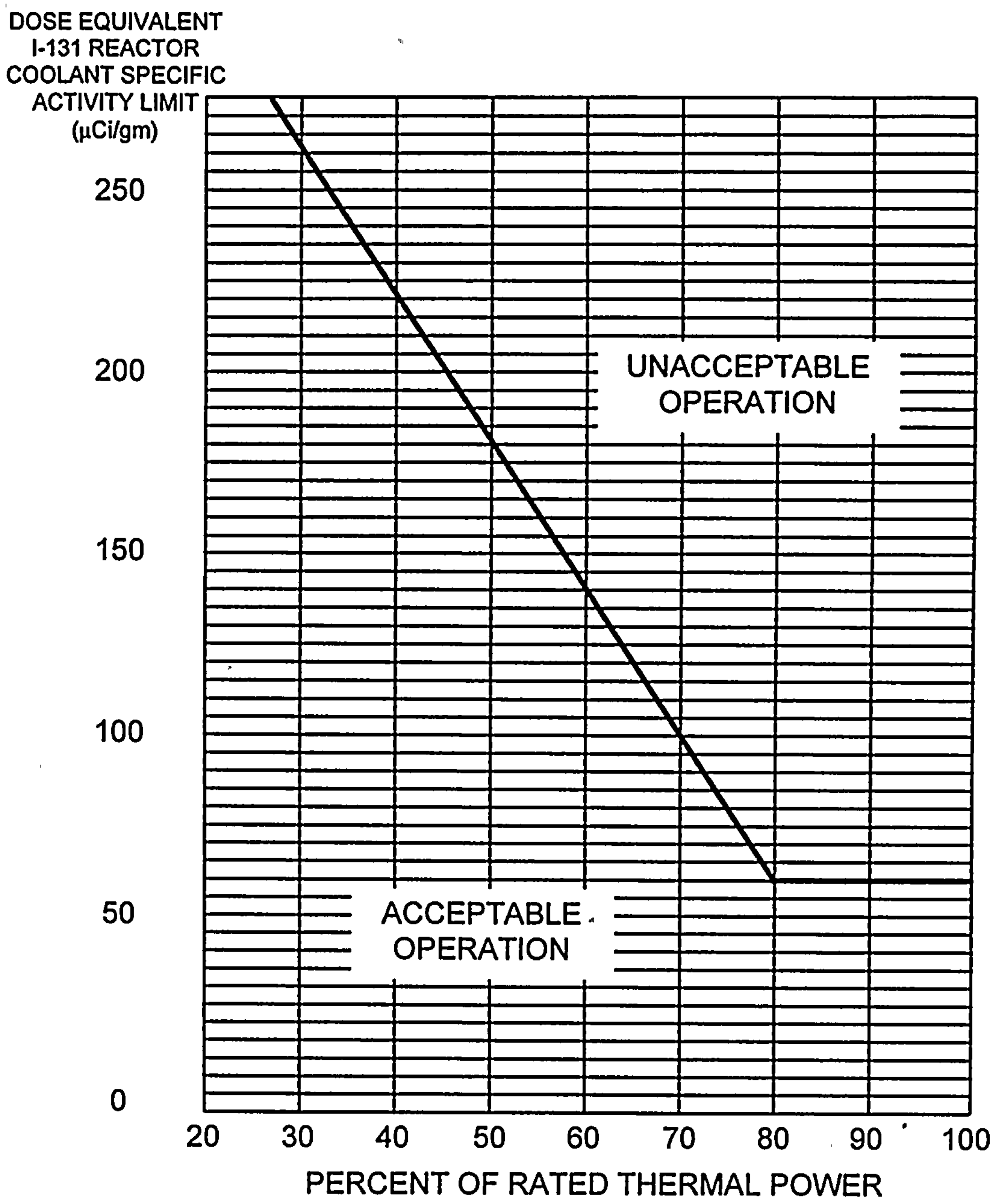


Figure 3.4.17-1 (page 1 of 1)
Reactor Coolant DOSE EQUIVALENT I-131 Specific Activity Limit Versus Percent of RATED THERMAL POWER With Reactor Coolant Specific Activity >1.0 μCi/gm DOSE EQUIVALENT I-131

SMOOTH COPY
ITS SECTION 3.4 - BASES

B 3.4 REACTOR COOLANT SYSTEM (RCS)

B 3.4.1 RCS Pressure, Temperature, and Flow Departure from Nucleate Boiling (DNB) Limits

BASES

BACKGROUND

These Bases address requirements for maintaining RCS pressure, temperature, and flow rate within limits assumed in the safety analyses. The safety analyses (Ref. 1) of normal operating conditions and anticipated operational occurrences assume initial conditions within the normal steady state envelope. The limits placed on DNB related parameters ensure that these parameters will not be less conservative than were assumed in the analyses and thereby provide assurance that the minimum Departure from Nucleate Boiling Ratio (DNBR) will meet the required criteria for each of the transients analyzed.

The LCO limits for minimum and maximum RCS pressures as measured at the pressurizer are consistent with operation within the nominal operating envelope and are bounded by those used as the initial pressures in the analyses.

The LCO limit for minimum and maximum RCS cold leg temperatures are in accordance with the area of acceptable operation shown in Figure 3.4.1-1, are consistent with operation at the indicated power level, and are bounded by those used as the initial temperatures in the analyses.

The LCO limit for minimum RCS flow rate is bounded by those used as the initial flow rates in the analyses. The RCS flow rate is not expected to vary during plant operation with all pumps running.

APPLICABLE SAFETY ANALYSES

The requirements of LCO 3.4.1 represent the initial conditions for DNB limited transients analyzed in the safety analyses (Ref. 1). The safety analyses have shown that transients initiated from the limits of this LCO will meet the DNBR criterion of ≥ 1.3. This is the acceptance limit for the RCS DNB parameters. Changes to the facility that could impact these parameters must be assessed for their impact on the DNBR criterion.

(continued)

BASES

APPLICABLE SAFETY ANALYSES (continued)

The transients analyzed for include loss of coolant flow events and dropped or stuck Control Element Assembly (CEA) events. A key assumption for the analysis of these events is that the core power distribution is within the limits of LCO 3.1.7, "Regulating CEA Insertion Limits"; LCO 3.1.8, "Part Length CEA Insertion Limits"; LCO 3.2.3, "AZIMUTHAL POWER TILT (T_q)"; and LCO 3.2.5, "AXIAL SHAPE INDEX (ASI). The safety analyses are performed over the following range of initial values: RCS pressure 2105-2320 psia, core inlet temperature 548-572°F, and reactor vessel inlet coolant flow rate > 95%.

The RCS DNB limits satisfy Criterion 2 of 10 CFR 50.56(c)(2)(ii).

LCO

This LCO specifies limits on the monitored process variables – RCS pressurizer pressure, RCS cold leg temperature, and RCS total flow rate – to ensure that the core operates within the limits assumed for the plant safety analyses. Operating within these limits will result in meeting the DNBR criterion in the event of a DNB limited transient.

The LCO numerical value for minimum flow rate is given for the measurement location but has not been adjusted for instrument error. Plant specific limits of instrument error are established by the plant staff to meet the operational requirements of minimum flow rate.

APPLICABILITY

In MODE 1 for RCS flow rate, MODES 1 and 2 for RCS pressurizer pressure, and MODES 1 and 2 with $K_{eff} \geq 1$ for RCS cold leg temperature, the limits must be maintained during steady state operation in order to ensure that DNBR criteria will be met in the event of an unplanned loss of forced coolant flow or other DNB limited transient. In all other MODES, the power level is low enough so that DNBR is not a concern.

(continued)

BASES

APPLICABILITY (continued)

A Note has been added to indicate the limit on pressurizer pressure may be exceeded during short term operational transients such as a THERMAL POWER ramp increase of > 5% RTP per minute or a THERMAL POWER step increase of > 10% RTP. These conditions represent short term perturbations where actions to control pressure variations might be counterproductive. Also, DNBR margin exists to offset the temporary pressure variations.

Another set of limits on DNB related parameters is provided in Safety Limit (SL) 2.1.1, "Reactor Core Safety Limits." Those limits are less restrictive than the limits of this LCO, but violation of SLs merits a stricter, more severe Required Action. Should a violation of this LCO occur, the operator should check whether or not an SL may have been exceeded.

ACTIONS

A.1

RCS flow rate is not a controllable parameter and is not expected to vary during steady state operation. If the flow rate is not within the LCO limit, then power must be reduced, as required by Required Action B.1, to restore DNB margin and eliminate the potential for violation of the accident analysis bounds.

The 2 hour Completion Time for restoration of RCS flow rate provides sufficient time to determine the cause of the off normal condition, and to restore the readings within limits. The Completion Time is based on plant operating experience.

B.1

If Required Action A.1 is not met within the associated Completion Time, the plant must be brought to a MODE in which the LCO does not apply. To achieve this status, the plant must be brought to at least MODE 2 within 6 hours. In MODE 2, the reduced power condition eliminates the potential for violation of the accident analysis bounds.

(continued)

BASES

ACTIONS

B.1 (continued)

Six hours is a reasonable time that permits the plant power to be reduced at an orderly rate in conjunction with even control of Steam Generator (SG) heat removal.

C.1

Pressurizer pressure and cold leg temperature are controllable and measurable parameter(s). If a parameter is not within the LCO limits, action must be taken to restore the parameter.

The 2 hour Completion Time is based on plant operating experience that shows that these parameter(s) can be restored in this time period.

D.1

If Required Action C.1 is not met within the associated Completion Time, place the plant in MODE 3. In MODE 3 the potential for violation of the DNB limits is greatly reduced.

The 6 hour Completion Time is a reasonable time that permits power reduction at an orderly rate in conjunction with even control of SG heat removal.

(continued)

BASES (continued)

SURVEILLANCE REQUIREMENTS

SR 3.4.1.1

Since Required Action C.1 allows a Completion Time of 2 hours to restore parameters that are not within limits, the 12 hour Surveillance Frequency for pressurizer pressure is sufficient to ensure that the pressure can be restored to a normal operation, steady state condition following load changes and other expected transient operations. The 12 hour interval has been shown by operating practice to be sufficient to regularly assess for potential degradation and verify operation is within safety analysis assumptions.

SR 3.4.1.2

Since Required Action C.1 allows a Completion Time of 2 hours to restore parameters that are not within limits, the 12 hour Surveillance Frequency for cold leg temperature is sufficient to ensure that the RCS coolant temperature can be restored to a normal operation, steady state condition following load changes and other expected transient operations. The 12 hour interval has been shown by operating practice to be sufficient to regularly assess for potential degradation and to verify operation is within safety analysis assumptions.

SR 3.4.1.3

The 12 hour Surveillance Frequency for RCS total flow rate is performed using the installed flow instrumentation. The 12 hour Frequency has been shown by operating experience to be sufficient to assess for potential degradation and to verify operation is within safety analysis assumptions.

This SR is modified by a Note that only requires performance of this SR in MODE 1. The Note is necessary to allow measurement of RCS flow rate at normal operating conditions at power with all RCPs running.

REFERENCES

1. UFSAR, Section 15.

B 3.4 REACTOR COOLANT SYSTEM (RCS)

B 3.4.2 RCS Minimum Temperature for Criticality

BASES

BACKGROUND

Establishing the value for the minimum temperature for reactor criticality is based upon considerations for:

a. Operation within the existing instrumentation ranges and accuracies;

b. Operation within the bounds of the existing accident analyses; and

c. Operation with the reactor vessel above its minimum nil ductility reference temperature when the reactor is critical.

The reactor coolant moderator temperature coefficient used in core operating and accident analysis is typically defined for the normal operating temperature range (550°F to 611°F). Nominal T_{cold} for making the reactor critical is 565°F. Safety and operating analyses for lower temperature have not been made.

APPLICABLE SAFETY ANALYSES

There are no accident analyses that dictate the minimum temperature for criticality, but all low power safety analyses assume initial temperatures near the 545°F limit (Ref. 1).

The RCS minimum temperature for criticality satisfies Criterion 2 of 10 CFR 50.36(c)(2)(ii).

LCO

The purpose of the LCO is to prevent criticality below the minimum normal operating temperature (550°F) and to prevent operation in an unanalyzed condition.

The LCO is only applicable in MODES 1 and 2 with $K_{eff} \geq 1.0$ and provides a reasonable distance to the limit of 545°F. This allows adequate time to trend its approach and take corrective actions prior to exceeding the limit.

(continued)

BASES (continued)

APPLICABILITY

The reactor has been designed and analyzed to be critical in MODES 1 and 2 only and in accordance with this specification. Criticality is not permitted in any other MODE. Therefore, this LCO is applicable in MODE 1, and MODE 2 when $K_{eff} \geq 1.0$. Monitoring is required at or below a T_{cold} of 550°F. The no load temperature of 565°F is maintained by the Steam Bypass Control System.

ACTIONS

A.1

If T_{cold} is below 545°F, the plant must be brought to a MODE in which the LCO does not apply. To achieve this status, the plant must be brought to MODE 3 within 30 minutes. Rapid reactor shutdown can be readily and practically achieved within a 30 minute period. The allowed time reflects the ability to perform this action and to maintain the plant within the analyzed range.

SURVEILLANCE REQUIREMENTS

SR 3.4.2.1

T_{cold} is required to be verified ≥ 545°F once within 30 minutes after any RCS loop T_{cold} < 550°F and every 30 minutes thereafter. The 30 minute time period is frequent enough to prevent inadvertent violation of the LCO. A Note states the Surveillance is required whenever the reactor is critical and temperature is below 550°F. A second Frequecy requires T_{cold} to be verified within 30 minutes of reaching criticality. This will require repeated performance of SR 3.4.2.1 since a reactor startup takes longer than 30 minutes. The 30 minute time period is frequent enough to prevent inadvertent violation of the LCO.

REFERENCES

1. UFSAR, Section 15.

B 3.4 REACTOR COOLANT SYSTEM (RCS)

B 3.4.3 RCS Pressure and Temperature (P/T) Limits

BASES

BACKGROUND

All components of the RCS are designed to withstand effects of cyclic loads due to system pressure and temperature changes. These loads are introduced by startup (heatup) and shutdown (cooldown) operations, power transients, and reactor trips. This LCO limits the pressure and temperature changes during RCS heatup and cooldown, within the design assumptions and the stress limits for cyclic operation.

Each P/T limit curve defines an acceptable region for normal operation. The usual use of the curves is operational guidance during heatup or cooldown maneuvering, when pressure and temperature indications are monitored and compared to the applicable curve to determine that operation is within the allowable region.

The LCO establishes operating limits that provide a margin to brittle failure of the reactor vessel and piping of the Reactor Coolant Pressure Boundary (RCPB). The vessel is the component most subject to brittle failure, and the LCO limits apply mainly to the vessel. The limits do not apply to the pressurizer, which has different design characteristics and operating functions.

10 CFR 50, Appendix G (Ref. 1), requires the establishment of P/T limits for material fracture toughness requirements of the RCPB materials. Reference 1 requires an adequate margin to brittle failure during normal operation, anticipated operational occurrences, and system hydrostatic tests. It mandates the use of the ASME Code, Section III, Appendix G (Ref. 2).

The actual shift in the RT_{NDT} of the vessel material will be established periodically by removing and evaluating the irradiated reactor vessel material specimens, in accordance with ASTM E 185 (Ref. 3) and Appendix H of 10 CFR 50 (Ref. 4). The operating P/T limit curves will be adjusted, as necessary, based on the evaluation findings and the recommendations of Reference 2.

(continued)

BASES

BACKGROUND (continued)

The P/T limit curves are composite curves established by superimposing limits derived from stress analyses of those portions of the reactor vessel and head that are the most restrictive. At any specific pressure, temperature, and temperature rate of change, one location within the reactor vessel will dictate the most restrictive limit. Across the span of the P/T limit curves, different locations are more restrictive, and, thus, the curves are composites of the most restrictive regions.

The heatup curve represents a different set of restrictions than the cooldown curve because the directions of the thermal gradients through the vessel wall are reversed. The thermal gradient reversal alters the location of the tensile stress between the outer and inner walls.

The criticality limit includes the Reference 1 requirement that the limit be no less than 40°F above the heatup curve or the cooldown curve and not less than the minimum permissible temperature for inservice leak and hydrostatic (ISLH) testing. However, the criticality limit is not operationally limiting; a more restrictive limit exists in LCO 3.4.2, "RCS Minimum Temperature for Criticality."

The consequence of violating the LCO limits is that the RCS has been operated under conditions that can result in brittle failure of the RCPB, possibly leading to a nonisolable leak or loss of coolant accident. In the event these limits are exceeded, an evaluation must be performed to determine the effect on the structural integrity of the RCPB components. The ASME Code, Section XI, Appendix E (Ref. 5), provides a recommended methodology for evaluating an operating event that causes an excursion outside the limits.

APPLICABLE SAFETY ANALYSES

The P/T limits are not derived from Design Basis Accident (DBA) Analyses. They are prescribed during normal operation to avoid encountering pressure, temperature, and temperature rate of change conditions that might cause undetected flaws to propagate and cause nonductile failure of the RCPB, an unanalyzed condition.

(continued)

BASES

APPLICABLE SAFETY ANALYSES (continued)

Since the P/T limits are not derived from any DBA, there are no acceptance limits related to the P/T limits. Rather, the P/T limits are acceptance limits themselves since they preclude operation in an unanalyzed condition.

The RCS P/T limits satisfy Criterion 2 of 10 CFR 50.36(c)(2)(ii).

LCO

The two elements of this LCO are:

a. The limit curves for heatup, cooldown, and ISLH testing; and

b. Limits on the rate of change of temperature.

The LCO limits apply to all components of the RCS, except the pressurizer.

These limits define allowable operating regions and permit a large number of operating cycles while providing a wide margin to nonductile failure.

The limits for the rate of change of temperature control the thermal gradient through the vessel wall and are used as inputs for calculating the heatup, cooldown, and ISLH testing P/T limit curves. Thus, the LCO for the rate of change of temperature restricts stresses caused by thermal gradients and also ensures the validity of the P/T limit curves.

Violating the LCO limits places the reactor vessel outside of the bounds of the stress analyses and can increase stresses in other RCPB components. The consequences depend on several factors, as follows:

a. The severity of the departure from the allowable operating P/T regime or the severity of the rate of change of temperature;

b. The length of time the limits were violated (longer violations allow the temperature gradient in the thick vessel walls to become more pronounced); and

(continued)

BASES

LCO (continued)

c. The existences, sizes, and orientations of flaws in the vessel material.

APPLICABILITY

The RCS P/T limits Specification provides a definition of acceptable operation for prevention of nonductile failure in accordance with 10 CFR 50, Appendix G (Ref. 2). Although the P/T limits were developed to provide guidance for operation during heatup or cooldown (MODES 3, 4, and 5) or ISLH testing, their Applicability is at all times, except when reactor vessel head is fully detensioned such that the RCS cannot be pressurized, in keeping with the concern for nonductile failure. The limits do not apply to the pressurizer.

During MODES 1 and 2, other Technical Specifications provide limits for operation that can be more restrictive than or can supplement these P/T limits. LCO 3.4.1, "RCS Pressure, Temperature, and Flow Departure from Nucleate Boiling (DNB) Limits"; LCO 3.4.2, "RCS Minimum Temperature for Criticality"; and Safety Limit 2.1, "Safety Limits," also provide operational restrictions for pressure and temperature and maximum pressure. Furthermore, MODES 1 and 2 are above the temperature range of concern for nonductile failure, and stress analyses have been performed for normal maneuvering profiles, such as power ascension or descent.

The actions of this LCO consider the premise that a violation of the limits occurred during normal plant maneuvering. Severe violations caused by abnormal transients, at times accompanied by equipment failures, may also require additional actions from emergency operating procedures.

ACTIONS

A.1 and A.2

Operation outside the P/T limits must be corrected so that the RCPB is returned to a condition that has been verified by stress analyses.

(continued)

BASES

ACTIONS

A.1 and A.2 (continued)

The 30 minute Completion Time reflects the urgency of restoring the parameters to within the analyzed range. Most violations will not be severe, and the activity can be accomplished in this time in a controlled manner.

Besides restoring operation to within limits, an evaluation is required to determine if RCS operation can continue. The evaluation must verify the RCPB integrity remains acceptable and must be completed before continuing operation. Several methods may be used, including comparison with pre-analyzed transients in the stress analyses, new analyses, or inspection of the components.

ASME Code, Section XI, Appendix E (Ref. 5), may be used to support the evaluation. However, its use is restricted to evaluation of the vessel beltline.

The 72 hour Completion Time is reasonable to accomplish the evaluation. The evaluation for a mild violation is possible within this time, but more severe violations may require special, event specific stress analyses or inspections. A favorable evaluation must be completed before continuing to operate.

Condition A is modified by a Note requiring Required Action A.2 to be completed whenever the Condition is entered. The Note emphasizes the need to perform the evaluation of the effects of the excursion outside the allowable limits. Restoration alone per Required Action A.1 is insufficient because higher than analyzed stresses may have occurred and may have affected the RCPB integrity.

B.1 and B.2

If a Required Action and associated Completion Time of Condition A are not met, the plant must be placed in a lower MODE because:

a. The RCS remained in an unacceptable P/T region for an extended period of increased stress; or

(continued)

BASES

ACTIONS

B.1 and B.2 (continued)

b. A sufficiently severe event caused entry into an unacceptable region.

Either possibility indicates a need for more careful examination of the event, best accomplished with the RCS at reduced pressure and temperature. With reduced pressure and temperature conditions, the possibility of propagation of undetected flaws is decreased.

Pressure and temperature are reduced by placing the plant in MODE 3 within 6 hours and in MODE 5 with RCS pressure < 500 psia within 36 hours.

The Completion Times are reasonable, based on operating experience, to reach the required plant conditions from full power conditions in an orderly manner and without challenging plant systems.

C.1 and C.2.

The actions of this LCO, anytime other than in MODE 1, 2, 3, or 4, consider the premise that a violation of the limits occurred during normal plant maneuvering. Severe violations caused by abnormal transients, at times accompanied by equipment failures, may also require additional actions from emergency operating procedures. Operation outside the P/T limits must be corrected so that the RCPB is returned to a condition that has been verified by stress analyses.

The Completion Time of "immediately" reflects the urgency of restoring the parameters to within the analyzed range. Most violations will not be severe, and the activity can be accomplished in a short period of time in a controlled manner.

(continued)

BASES

ACTIONS

C.1 and C.2 (continued)

Besides restoring operation to within limits, an evaluation is required to determine if RCS operation can continue. The evaluation must verify that the RCPB integrity remains acceptable and must be completed before continuing operation. Several methods may be used, including comparison with pre-analyzed transients in the stress analyses, new analyses, or inspection of the components.

ASME Code, Section XI, Appendix E (Ref. 5), may be used to support the evaluation. However, its use is restricted to evaluation of the vessel beltline.

The Completion Time of prior to entering MODE 4 forces the evaluation prior to entering a MODE where temperature and pressure can be significantly increased. The evaluation for a mild violation is possible within several days, but more severe violations may require special, event specific stress analyses or inspections.

Condition C is modified by a Note requiring Required Action C.2 to be completed whenever the Condition is entered. The Note emphasizes the need to perform the evaluation of the effects of the excursion outside the allowable limits. Restoration alone per Required Action C.1 is insufficient because higher than analyzed stresses may have occurred and may have affected the RCPB integrity.

SURVEILLANCE REQUIREMENTS

SR 3.4.3.1

Verification that operation is within limits is required every 30 minutes when RCS pressure and temperature conditions are undergoing planned changes. This Frequency is considered reasonable in view of the control room indication available to monitor RCS status. Also, since temperature rate of change limits are specified in hourly increments, 30 minutes permits assessment and correction for minor deviations within a reasonable time.

Surveillance for heatup, cooldown, or ISLH testing may be discontinued when the definition given in the relevant plant procedure for ending the activity is satisfied.

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.4.3.1 (continued)

This SR is modified by a Note that requires this SR be performed only during RCS system heatup, cooldown, and ISLH testing. No SR is given for criticality operations because LCO 3.4.2 contains a more restrictive requirement.

REFERENCES

1. 10 CFR 50, Appendix G.
2. ASME, Boiler and Pressure Vessel Code, Section III, Appendix G.
3. ASTM E 185-82, July 1982.
4. 10 CFR 50, Appendix H.
5. ASME, Boiler and Pressure Vessel Code, Section XI, Appendix E.

B 3.4 REACTOR COOLANT SYSTEM (RCS)

B 3.4.4 RCS Loops – MODES 1 and 2

BASES

BACKGROUND

The primary function of the RCS is removal of the heat generated in the fuel due to the fission process and transfer of this heat, via the steam generators (SGs), to the secondary plant.

The secondary functions of the RCS include:

a. Moderating the neutron energy level to the thermal state, to increase the probability of fission;

b. Improving the neutron economy by acting as a reflector;

c. Carrying the soluble neutron poison, boric acid;

d. Providing a second barrier against fission product release to the environment; and

e. Removing the heat generated in the fuel due to fission product decay following a unit shutdown.

The RCS configuration for heat transport uses two RCS loops. Each RCS loop contains a SG and two Reactor Coolant Pumps (RCPs). An RCP is located in each of the two SG cold legs. The pump flow rate has been sized to provide core heat removal with appropriate margin to Departure from Nucleate Boiling (DNB) during power operation and for anticipated transients originating from power operation. This Specification requires two RCS loops with both RCPs in operation in each loop. The intent of the Specification is to require core heat removal with forced flow during power operation. Specifying two RCS loops provides the minimum necessary paths (two SGs) for heat removal.

APPLICABLE SAFETY ANALYSES

Safety analyses contain various assumptions for the Design Bases Accident (DBA) initial conditions including RCS pressure, RCS temperature, reactor power level, core parameters, and safety system setpoints. The important

(continued)

BASES

APPLICABLE SAFETY ANALYSES (continued)

aspect for this LCO is the reactor coolant forced flow rate, which is represented by the number of RCS loops in service.

Both transient and steady state analyses have been performed to establish the effect of flow on DNB. The transient or accident analysis for the plant has been performed assuming four RCPs are in operation. The majority of the plant safety analyses are based on initial conditions at high core power or zero power. The accident analyses that are of most importance to RCP operation are the four pump coastdown, single pump locked rotor, single pump (broken shaft or coastdown), and rod withdrawal events (Ref. 1).

Steady state DNB analysis had been performed for the four pump combination. For four pump operation, the steady state DNB analysis, which generates the pressure and temperature and Safety Limit (i.e., the departure from nucleate boiling ratio (DNBR) limit), assumes a maximum power level of 107% RTP. This is the design overpower condition for four pump operation. The 107% value is the accident analysis setpoint of the nuclear overpower (high flux) trip and is based on an analysis assumption that bounds possible instrumentation errors. The DNBR limit defines a locus of pressure and temperature points that result in a minimum DNBR greater than or equal to the critical heat flux correlation limit.

RCS Loops – MODES 1 and 2 satisfy Criteria 2 and 3 of 10 CFR 50.36 (C)(2)(ii).

LCO

The purpose of this LCO is to require adequate forced flow for core heat removal. Flow is represented by having both RCS loops with both RCPs in each loop in operation for removal of heat by the two SGs. To meet safety analysis acceptance criteria for DNB, four pumps are required at rated power.

Each OPERABLE loop consists of two RCPs providing forced flow for heat transport to an SG that is OPERABLE in accordance with the Steam Generator Tube Surveillance Program. SG, and hence RCS loop, OPERABILITY with regard to SG water level is ensured by the Reactor Protection System (RPS) in MODES 1 and 2. A reactor trip places the plant in

(continued)

BASES

LCO (continued)

MODE 3 if any SG level is ≤ 44% wide range level as sensed by the RPS. The minimum water level to declare the SG OPERABLE is 25% wide range level.

APPLICABILITY

In MODES 1 and 2, the reactor is critical and thus has the potential to produce maximum THERMAL POWER. Thus, to ensure that the assumptions of the accident analyses remain valid, all RCS loops are required to be OPERABLE and in operation in these MODES to prevent DNB and core damage.

The decay heat production rate is much lower than the full power heat rate. As such, the forced circulation flow and heat sink requirements are reduced for lower, noncritical MODES as indicated by the LCOs for MODES 3, 4, 5, and 6.

Operation in other MODES is covered by:

LCO 3.4.5, "RCS Loops – MODE 3";
LCO 3.4.6, "RCS Loops – MODE 4";
LCO 3.4.7, "RCS Loops – MODE 5, Loops Filled";
LCO 3.4.8, "RCS Loops – MODE 5, Loops Not Filled";
LCO 3.9.4, "Shutdown Cooling (SDC) and Coolant Circulation – High Water Level" (MODE 6); and
LCO 3.9.5, "Shutdown Cooling (SDC) and Coolant Circulation – Low Water Level" (MODE 6).

ACTIONS

A.1

If the requirements of the LCO are not met, the Required Action is to reduce power and bring the plant to MODE 3. This lowers power level and thus reduces the core heat removal needs and minimizes the possibility of violating DNB limits. It should be noted that the reactor will trip and place the plant in MODE 3 as soon as the RPS senses less than four RCPs operating.

The Completion Time of 6 hours is reasonable, based on operating experience, to reach MODE 3 from full power conditions in an orderly manner and without challenging safety systems.

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.4.4.1

This SR requires verification every 12 hours that the required number of RCS loops are in operation and circulating reactor coolant. Verification includes flow rate, temperature, or pump status monitoring, which help to ensure that forced flow is providing heat removal while maintaining the margin to DNB. The Frequency of 12 hours has been shown by operating practice to be sufficient to regularly assess degradation and verify operation within safety analyses assumptions. In addition, control room indication and alarms will normally indicate loop status.

REFERENCES

1. UFSAR, Section 15.

B 3.4 REACTOR COOLANT SYSTEM (RCS)

B 3.4.5 RCS Loops – MODE 3

BASES

BACKGROUND

The primary function of the reactor coolant in MODE 3 is removal of decay heat and transfer of this heat, via the Steam Generators (SGs), to the secondary plant fluid. The secondary function of the reactor coolant is to act as a carrier for soluble neutron poison, boric acid.

In MODE 3, Reactor Coolant Pumps (RCPs) are used to provide forced circulation heat removal during heatup and cooldown. The MODE 3 decay heat removal requirements are low enough that a single RCS loop with one RCP is sufficient to remove core decay heat. However, two RCS loops are required to be OPERABLE to provide redundant paths for decay heat removal. Only one RCP needs to be OPERABLE to declare the associated RCS loop OPERABLE.

Reactor coolant natural circulation is not normally used but is sufficient for core cooling. However, natural circulation does not provide turbulent flow conditions. Therefore, boron reduction in natural circulation is prohibited because mixing to obtain a homogeneous concentration in all portions of the RCS cannot be ensured.

APPLICABLE SAFETY ANALYSES

Analyses have shown that the rod withdrawal event from MODE 3 with one RCS loop in operation is bounded by the rod withdrawal initiated from MODE 2.

Failure to provide heat removal may result in challenges to a fission product barrier. The RCS loops are part of the primary success path that functions or actuates to prevent or mitigate a Design Basis Accident or transient that either assumes the failure of, or presents a challenge to, the integrity of a fission product barrier.

RCS Loops – MODE 3 satisfy Criterion 3 of 10 CFR 50.36 (c)(2)(ii).

(continued)

BASES

LCO

The purpose of this LCO is to require two RCS loops to be available for heat removal, thus providing redundancy. The LCO requires the two loops to be OPERABLE with the intent of requiring both SGs to be capable (≥ 25% wide range water level) of transferring heat from the reactor coolant at a controlled rate. Forced reactor coolant flow is the required way to transport heat, although natural circulation flow provides adequate removal. A minimum of one running RCP meets the LCO requirement for one loop in operation.

The Note permits a limited period of operation without RCPs. All RCPs may be de-energized for ≤ 1 hour per 8 hour period. This means that natural circulation has been established. When in natural circulation, a reduction in boron concentration is prohibited because an even concentration distribution throughout the RCS cannot be ensured. The intent is to stop any known or direct positive reactivity additions to the RCS due to dilution. Core outlet temperature is to be maintained at least 10°F below the saturation temperature so that no vapor bubble may form and possibly cause a natural circulation flow obstruction.

In MODE 3 it is sometimes necessary to stop all RCPs (e.g., to perform surveillance or startup testing, or to avoid operation below the RCP minimum net positive suction head limit). The time period is acceptable because natural circulation is adequate for heat removal, or the reactor coolant temperature can be maintained subcooled and boron stratification affecting reactivity control is not expected.

An OPERABLE RCS loop (loop 1 or loop 2) consists of at least one associated RCP providing forced flow for heat transport and an associated SG that is OPERABLE in accordance with the Steam Generator Tube Surveillance Program. Also, an OPERABLE SG is defined as the ability to feed and the ability to steam. This ensures SG availability for an extended period of time to perform the heat removal function. An RCP is OPERABLE if it is capable of being powered and is able to provide forced flow if required.

APPLICABILITY

In MODE 3, the heat load is lower than at power; therefore, one RCS loop in operation is adequate for transport and heat removal. A second RCS loop is required to be OPERABLE but not in operation for redundant heat removal capability.

(continued)

BASES

APPLICABILITY (continued)

Operation in other MODES is covered by:

LCO 3.4.4 "RCS Loops-MODES 1 and 2";
LCO 3.4.6, "RCS Loops – MODE 4";
LCO 3.4.7, "RCS Loops – MODE 5, Loops Filled";
LCO 3.4.8, "RCS Loops – MODE 5, Loops Not Filled";
LCO 3.9.4, "Shutdown Cooling (SDC) and Coolant Circulation – High Water Level" (MODE 6); and
LCO 3.9.5, "Shutdown Cooling (SDC) and Coolant Circulation – Low Water Level" (MODE 6).

ACTIONS

A.1

If one required RCS loop is inoperable, redundancy for forced flow heat removal is lost. The Required Action is restoration of the required RCS loop to OPERABLE status within a Completion Time of 72 hours. This time allowance is a justified period to be without the redundant, nonoperating loop because a single loop in operation has a heat transfer capability greater than that needed to remove the decay heat produced in the reactor core.

B.1

If restoration is not possible within 72 hours, the unit must be placed in MODE 4 within 12 hours. In MODE 4, the plant may be placed on the SDC System. The Completion Time of 12 hours is compatible with required operation to achieve cooldown and depressurization from the existing plant conditions in an orderly manner and without challenging plant systems.

(continued)

BASES

ACTIONS (continued)

C.1 and C.2

If no RCS loop is OPERABLE or in operation, all operations involving a reduction of RCS boron concentration must be immediately suspended. This is necessary because boron dilution requires forced circulation for proper homogenization. Action to restore one RCS loop to OPERABLE status and operation shall be initiated immediately and continued until one RCS loop is restored to OPERABLE status and operation. The immediate Completion Times reflect the importance of maintaining operation for decay heat removal.

SURVEILLANCE REQUIREMENTS

SR 3.4.5.1

This SR requires verification every 12 hours that the required number of RCS loops are in operation and circulating Reactor Coolant. Verification includes flow rate, temperature, or pump status monitoring, which help ensure that forced flow is providing heat removal. The 12 hour interval has been shown by operating practice to be sufficient to regularly assess degradation and verify operation within safety analyses assumptions. In addition, control room indication and alarms will normally indicate loop status.

SR 3.4.5.2

This SR requires verification every 12 hours that the secondary side water level in each SG is ≥ 25% wide range. An adequate SG water level is required in order to have a heat sink for removal of the core decay heat from the reactor coolant. The 12 hour interval has been shown by operating practice to be sufficient to regularly assess degradation and verify operation within the safety analyses assumptions.

(continued)

BASES (continued)

SURVEILLANCE REQUIREMENTS (continued)

SR 3.4.5.3

Verification that the required number of RCPs are OPERABLE ensures that the single failure criterion is met and that an additional RCS loop can be placed in operation, if needed, to maintain decay heat removal and reactor coolant circulation. Verification is performed by verifying proper breaker alignment and power availability to the required RCPs. The Frequency of 7 days is considered reasonable in view of other administrative controls available and has been shown to be acceptable by operating experience.

REFERENCES

None.

B 3.4 REACTOR COOLANT SYSTEM (RCS)

B 3.4.6 RCS Loops — MODE 4

BASES

BACKGROUND

In MODE 4, the primary function of the reactor coolant is the removal of decay heat and transfer of this heat to the Steam Generators (SGs) or Shutdown Cooling (SDC) heat exchangers. The secondary function of the reactor coolant is to act as a carrier for soluble neutron poison, boric acid.

In MODE 4, either Reactor Coolant Pumps (RCPs) or SDC trains can be used for coolant circulation. The intent of this LCO is to provide forced flow from at least one RCP or one SDC train for decay heat removal and transport. The flow provided by one RCP loop or SDC train is adequate for heat removal. The other intent of this LCO is to require that two paths be available to provide redundancy for heat removal.

APPLICABLE SAFETY ANALYSES

In MODE 4, RCS circulation is considered in the determination of the time available for mitigation of the accidental boron dilution event. The RCS loops and SDC trains provide this circulation.

RCS Loops — MODE 4 have been identified in 10 CFR. 50.36 (c)(2)(ii) as important contributors to risk reduction.

LCO

The purpose of this LCO is to require that at least two loops or trains, RCS or SDC, be OPERABLE in MODE 4 and one of these loops or trains be in operation. The LCO allows the two loops that are required to be OPERABLE to consist of any combination of RCS and SDC System loops. . Any one loop or train in operation provides enough flow to remove the decay heat from the core with forced circulation. An additional loop or train is required to be OPERABLE to provide redundancy for heat removal.

(continued)

BASES

LCO (continued)

Note 1 permits all RCPs and SDC pumps to be de-energized ≤ 1 hour per 8 hour period. This means that natural circulation should be established, after the operating RCP or SDC pump is secured, using the SGs. Depending on decay heat and current RCS temperature, it may be difficult to establish verifiable natural circulation. The Note prohibits boron dilution when forced flow is stopped because an even concentration distribution cannot be ensured. The intent is to stop any known or direct positive reactivity additions to the RCS due to dilution. Core outlet temperature is to be maintained at least 10°F below saturation temperature so that no vapor bubble may form and possibly cause a natural circulation flow obstruction. The response of the RCS without the RCPs or SDC pumps depends on the core decay heat load and the length of time that the pumps are stopped. As decay heat diminishes, the effects on RCS temperature and pressure diminish. Without cooling by forced flow, higher heat loads will cause the reactor coolant temperature and pressure to increase at a rate proportional to the decay heat load. Because pressure can increase, the applicable system pressure limits (Pressure and Temperature (P/T) limits or Low Temperature Overpressure Protection (LTOP) limits) must be observed and forced SDC flow or heat removal via the SGs must be re-established prior to reaching the pressure limit. The circumstances for stopping both RCPs or SDC pumps are to be limited to situations where:

a. Pressure and temperature increases can be maintained well within the allowable pressure (P/T limits and LTOP) and 10°F subcooling limits; or

b. An alternate heat removal path through the SGs is in operation.

Note 2 requires, that before an RCP may be started with any RCS cold leg temperature ≤ 214°F during cooldown, or ≤ 291°F during heatup, that secondary side water temperature (saturation temperature corresponding to SG pressure) in each SG is < 100°F above each of the RCS cold leg temperatures.

Satisfying the above condition will preclude a large pressure surge in the RCS when the RCP is started.

(continued)

BASES

LCO (continued)

An OPERABLE RCS loop consists of at least one OPERABLE RCP and an SG that is OPERABLE in accordance with the Steam Generator Tube Surveillance Program and has the minimum water level specified in SR 3.4.6.2. Also, an OPERABLE SG is defined as the ability to feed and the ability to steam. This ensures SG availability for an extended period of time to perform the heat removal function.

Similarly, for the SDC System, an OPERABLE SDC train is composed of an OPERABLE SDC pump capable of providing flow to the SDC heat exchanger for heat removal. RCPs and SDC pumps are OPERABLE if they are capable of being powered and are able to provide flow (current Section XI), if required.

APPLICABILITY

In MODE 4, this LCO applies because it is possible to remove core decay heat and to provide proper boron mixing with either the RCS loops and SGs or the SDC System.

Operation in other MODES is covered by:

LCO 3.4.4 "RCS Loops-MODES 1 and 2";
LCO 3.4.5, "RCS Loops — MODE 3";
LCO 3.4.7, "RCS Loops — MODE 5, Loops Filled";
LCO 3.4.8, "RCS Loops — MODE 5, Loops Not Filled";
LCO 3.9.4, "Shutdown Cooling (SDC) and Coolant Circulation — High Water Level" (MODE 6); and
LCO 3.9.5, "Shutdown Cooling (SDC) and Coolant Circulation — Low Water Level" (MODE 6).

ACTIONS

A.1

If only one required RCS loop is OPERABLE and in operation, redundancy for heat removal is lost. Action must be initiated immediately to restore a second loop to OPERABLE status. The immediate Completion Time reflects the importance of maintaining the availability of two paths for decay heat removal.

(continued)

BASES

ACTIONS (continued)

B.1

If only one required SDC train is OPERABLE and in operation, redundancy for heat removal is lost. The plant must be placed in MODE 5 within the next 24 hours. Placing the plant in MODE 5 is a conservative action with regard to decay heat removal. With only one SDC train OPERABLE, redundancy for decay heat removal is lost and, in the event of a loss of the remaining SDC train, it would be safer to initiate that loss from MODE 5 (≤ 210°F) rather than MODE 4 (210°F to 350°F). The Completion Time of 24 hours is reasonable, based on operating experience, to reach MODE 5 from MODE 4, with only one SDC train operating; in an orderly manner and without challenging plant systems.

C.1 and C.2

If no RCS loops or SDC trains are OPERABLE, or in operation, all operations involving reduction of RCS boron concentration must be suspended and action to restore one RCS loop or SDC train to OPERABLE status and operation must be initiated. Boron dilution requires forced circulation for proper mixing, and the margin to criticality must not be reduced in this type of operation. The immediate Completion Times reflect the importance of decay heat removal. The action to restore must continue until one loop or train is restored to operation.

SURVEILLANCE REQUIREMENTS

SR 3.4.6.1

This SR requires verification every 12 hours that one required loop or train is in operation and circulating reactor coolant. This ensures forced flow is providing heat removal. Verification includes flow rate, temperature, or pump status monitoring. The 12 hour Frequency has been shown by operating practice to be sufficient to regularly assess RCS loop status. In addition, control room indication and alarms will normally indicate loop status.

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.4.6.2

This SR requires verification every 12 hours of secondary side water level in the required SG(s) ≥ 25% wide range. An adequate SG water level is required in order to have a heat sink for removal of the core decay heat from the reactor coolant. The 12 hour interval has been shown by operating practice to be sufficient to regularly assess degradation and verify operation within safety analyses assumptions.

SR 3.4.6.3

Verification that the required pump is OPERABLE ensures that an additional RCS loop or SDC train can be placed in operation, if needed to maintain decay heat removal and reactor coolant circulation. Verification is performed by verifying proper breaker alignment and power available to the required pumps. The Frequency of 7 days is considered reasonable in view of other administrative controls available and has been shown to be acceptable by operating experience.

REFERENCES

None.

B 3.4 REACTOR COOLANT SYSTEM (RCS)

B 3.4.7 RCS Loops - MODE 5, Loops Filled

BASES

BACKGROUND

In MODE 5 with the RCS loops filled, the primary function of the reactor coolant is the removal of decay heat and transfer this heat either to the Steam Generator (SG) secondary side coolant or the essential cooling water via the Shutdown Cooling (SDC) heat exchangers. While the principal means for decay heat removal is via the SDC System, the SGs are specified as a backup means for redundancy. Even though the SGs cannot produce steam in this MODE, they are capable of being a heat sink due to their large contained volume of secondary side water. As long as the SG secondary side water is at a lower temperature than the reactor coolant, heat transfer will occur. The rate of heat transfer is directly proportional to the temperature difference. The secondary function of the reactor coolant is to act as a carrier for soluble neutron poison, boric acid.

In MODE 5 with RCS loops filled, the SDC trains are the principal means for decay heat removal. The number of trains in operation can vary to suit the operational needs. The intent of this LCO is to provide forced flow from at least one SDC train for decay heat removal and transport. The flow provided by one SDC train is adequate for decay heat removal. The other intent of this LCO is to require that a second path be available to provide redundancy for decay heat removal.

The LCO provides for redundant paths of decay heat removal capability. The first path can be an SDC train that must be OPERABLE and in operation. The second path can be another OPERABLE SDC train, or through the SGs, each having an adequate water level.

APPLICABLE SAFETY ANALYSES

In MODE 5, RCS circulation is considered in the determination of the time available for mitigation of the accidental boron dilution event. The SDC trains provide this circulation.

(continued)

BASES

APPLICABLE SAFETY ANALYSES (continued)

RCS Loops – MODE 5 (Loops Filled) have been identified in 10 CFR 50.36 (c)(2)(ii) as important contributors to risk reduction.

LCO

The purpose of this LCO is to require at least one of the SDC trains be OPERABLE and in operation with an additional SDC train OPERABLE or secondary side water level of each SG shall be ≥ 25% wide range level. One SDC train provides sufficient forced circulation to perform the safety functions of the reactor coolant under these conditions. The second SDC train is normally maintained OPERABLE as a backup to the operating SDC train to provide redundant paths for decay heat removal. However, if the standby SDC train is not OPERABLE, a sufficient alternate method to provide redundant paths for decay heat removal is two SGs with their secondary side water levels ≥ 25% wide range. Should the operating SDC train fail, the SGs could be used to remove the decay heat.

Note 1 permits all SDC pumps to be de-energized ≤ 1 hour per 8 hour period. The circumstances for stopping both SDC trains are to be limited to situations where pressure and temperature increases can be maintained well within the allowable pressure (pressure and temperature and low temperature overpressure protection) and 10°F subcooling limits, or an alternate heat removal path through the SG(s) is in operation.

This LCO is modified by a Note that prohibits boron dilution when SDC forced flow is stopped because an even concentration distribution cannot be ensured. The intent is to stop any known or direct positive reactivity changes to the RCS due to dilution. Core outlet temperature is to be maintained at least 10°F below saturation temperature, so that no vapor bubble would form and possibly cause a natural circulation flow obstruction. In this MODE, the SG(s) can be used as the backup for SDC heat removal. To ensure their availability, the RCS loop flow path is to be maintained with subcooled liquid.

(continued)

BASES

LCO (continued)

In MODE 5, it is sometimes necessary to stop all RCP or SDC forced circulation. This is permitted to change operation from one SDC train to the other, perform surveillance or startup testing, perform the transition to and from the SDC, or to avoid operation below the RCP minimum net positive suction head limit. The time period is acceptable because natural circulation is acceptable for decay heat removal the reactor coolant temperature can be maintained subcooled, and boron stratification affecting reactivity control is not expected.

Note 2 allows one SDC train to be inoperable for a period of up to 2 hours provided that the other SDC train is OPERABLE and in operation. This permits periodic surveillance tests to be performed on the inoperable train during the only time when such testing is safe and possible.

Note 3 requires that before an RCP may be started with any RCS cold leg temperature ≤ 214°F during a cooldown, or ≤ 291°F during a heatup, the secondary side water temperature (saturation temperature corresponding to SG pressure) in each SG must be < 100°F above each of the RCS cold leg temperatures.

Satisfying the above condition will preclude a low temperature overpressure event due to a thermal transient when the RCP is started.

Note 4 provides for an orderly transition from MODE 5 to MODE 4 during a planned heatup by permitting removal of SDC trains from operation when at least one RCP is in operation. This Note provides for the transition to MODE 4 where an RCP is permitted to be in operation and replaces the RCS circulation function provided by the SDC trains.

An OPERABLE SDC train is composed of an OPERABLE SDC pump capable of providing flow to the SDC heat exchanger for heat removal.

(continued)

BASES

LCO (continued)

SDC pumps are OPERABLE if they are capable of being powered and are able to provide flow (current Section XI), if required. An OPERABLE SG can perform as a heat sink when it is OPERABLE in accordance with the SG Tube Surveillance Program and has the minimum water level specified in SR 3.4.7.2. The ability to feed and the ability to steam SGs is not a requirement. Since RCS temperature is less than 210°F in MODE 5-Loops Filled, no boiling (i.e. loss of SG inventory) will occur, therefore, the ability to feed and the ability to steam SGs is not a requirement. However, a means to feed and steam the SGs, whenever the Unit is in MODE 5-Loops Filled, should be provided. Feed sources available are not limited only to Essential Auxiliary Feedwater Pumps and the Condensate Storage Tank (Ref. 1). Steaming capability is usually via ADVs. Also, the RCS must be intact (ability to pressurize to at least 100 psia) for the SGs to be considered as a heat sink. With the RCS not intact a majority of heat removal, assuming a loss of SDC flow, will be out the vent (Ref. 2). Therefore, with the RCS not intact, transition to LCO 3.4.8, RCS Loops-MODE 5 Loops not Filled, is appropriate.

When entering RCS Loops-MODE 5 Loops Filled from RCS Loops-MODE 5 Loops not Filled the additional requirement of total gas concentration must be addressed for SGs to be considered as a heat sink. A total gas concentration of < 20 cc/kg is required for MODE 5 operations. This limit ensures that gases coming out of solution in the SG U-tubes will not adversely affect natural circulation with RCS pressure at atmospheric conditions. Normal operating procedures implement the findings for determination of when RCS loops are considered filled, which in turn allows for transition from RCS Loops-MODE 5 Loops not Filled to RCS Loops-MODE 5 Loops Filled.

(continued)

BASES (continued)

APPLICABILITY

In MODE 5 with RCS loops filled, this LCO requires forced circulation to remove decay heat from the core and to provide proper boron mixing. One SDC train provides sufficient circulation for these purposes.

Operation in other MODES is covered by:

LCO 3.4.4, "RCS Loops-MODES 1 and 2";
LCO 3.4.5, "RCS Loops – MODE 3";
LCO 3.4.6, "RCS Loops – MODE 4";
LCO 3.4.8, "RCS Loops – MODE 5, Loops Not Filled";
LCO 3.9.4, "Shutdown Cooling (SDC) and Coolant Circulation – High Water Level" (MODE 6); and
LCO 3.9.5, "Shutdown Cooling (SDC) and Coolant Circulation – Low Water Level" (MODE 6).

ACTIONS

<u>A.1 and A.2</u>

If a SDC train is inoperable and any SGs have secondary side water levels < 25% wide range, redundancy for heat removal is lost. Action must be initiated immediately to restore a second SDC train to OPERABLE status or to restore the water level in the required SGs. Either Required Action A.1 or Required Action A.2 will restore redundant decay heat removal paths. The immediate Completion Times reflect the importance of maintaining the availability of two paths for decay heat removal.

<u>B.1 and B.2</u>

If the required SDC train is not OPERABLE or no SDC train is in operation, all operations involving the reduction of RCS boron concentration must be suspended. Action to restore one SDC train to OPERABLE status and operation must be initiated. Boron dilution requires forced circulation for proper mixing and the margin to criticality must not be reduced in this type of operation. The immediate Completion Times reflect the importance of maintaining operation for decay heat removal.

(continued)

BASES (continued)

SURVEILLANCE REQUIREMENTS

SR 3.4.7.1

This SR requires verification every 12 hours that one SDC train is in operation and circulating reactor coolant. Verification includes flow rate, temperature, or pump status monitoring, which help ensure that forced flow is providing decay heat removal. The 12 hour Frequency has been shown by operating practice to be sufficient to regularly assess degradation and verify operation is within safety analyses assumptions. In addition, control room indication and alarms will normally indicate loop status.

The SDC flow is established to ensure that core outlet temperature is maintained sufficiently below saturation to allow time for swapover to the standby SDC train should the operating train be lost.

SR 3.4.7.2

Verifying the SGs are OPERABLE by ensuring their secondary side water levels are ≥ 25% wide range level ensures that redundant heat removal paths are available if the second SDC train is inoperable. The Surveillance is required to be performed when the LCO requirement is being met by use of the SGs. If both SDC trains are OPERABLE, this SR is not needed. The 12 hour Frequency has been shown by operating practice to be sufficient to regularly assess degradation and verify operation within safety analyses assumptions.

SR 3.4.7.3

Verification that the second SDC train is OPERABLE ensures that redundant paths for decay heat removal are available. The requirement also ensures that the additional train can be placed in operation, if needed, to maintain decay heat removal and reactor coolant circulation. Verification is performed by verifying proper breaker alignment and power available to the required pumps. The Surveillance is required to be performed when the LCO requirement is being met by one of two SDC trains, e.g., both SGs have < 25% wide range water level. The Frequency of 7 days is considered reasonable in view of other administrative controls available and has been shown to be acceptable by operating experience.

(continued)

BASES (continued)

REFERENCES

1. Technical Specification Interpretation 3.4.1.4.1-13-01-00.

2. CEN-PSD-770 Analysis for Lower Mode Functional Recovery Guidelines.

B 3.4 REACTOR COOLANT SYSTEM (RCS)

B 3.4.8 RCS Loops – MODE 5, Loops Not Filled

BASES

BACKGROUND

In MODE 5 with the RCS loops not filled, the primary function of the reactor coolant is the removal of decay heat and transfer of this heat to the Shutdown Cooling (SDC) heat exchangers. The Steam Generators (SGs) are not available as a heat sink when the loops are not filled. The secondary function of the reactor coolant is to act as a carrier for the soluble neutron poison, boric acid.

In MODE 5 with loops not filled, only the SDC System can be used for coolant circulation. The number of trains in operation can vary to suit the operational needs. The intent of this LCO is to provide forced flow from at least one SDC train for decay heat removal and transport and to require that two paths be available to provide redundancy for heat removal.

APPLICABLE SAFETY ANALYSES

In MODE 5, RCS circulation is considered in determining the time available for mitigation of the accidental boron dilution event. The SDC trains provide this circulation. The flow provided by one SDC train is adequate for decay heat removal and for boron mixing.

RCS loops – MODE 5 (loops not filled) have been identified in 10 CFR 50.36 (c)(2)(ii) as important contributors to risk reduction.

LCO

The purpose of this LCO is to require a minimum of two SDC trains be OPERABLE and one of these trains be in operation. An OPERABLE train is one that is capable of transferring heat from the reactor coolant at a controlled rate. Heat cannot be removed via the SDC System unless forced flow is used. A minimum of one running SDC pump meets the LCO requirement for one train in operation. An additional SDC train is required to be OPERABLE to meet the single failure criterion.

(continued)

BASES

LCO (continued)

Note 1 permits all SDC pumps to be de-energized ≤ 1 hour per 8 hour period. The circumstances for stopping both SDC pumps are to be limited to situations when the outage time is short and the core outlet temperature is maintained > 10°F below saturation temperature. The Note prohibits boron dilution or draining operations when SDC forced flow is stopped.

Note 2 allows one SDC train to be inoperable for a period of 2 hours provided that the other train is OPERABLE and in operation. This permits periodic surveillance tests to be performed on the inoperable train during the only time when these tests are safe and possible.

An OPERABLE SDC train is composed of an OPERABLE SDC pump (CS or LPSI) capable of providing flow to the SDC heat exchanger for heat removal. SDC pumps are OPERABLE if they are capable of being powered and are able to provide flow (current Section XI), if required.

APPLICABILITY

In MODE 5 with loops not filled, this LCO requires core heat removal and coolant circulation by the SDC System.

Operation in other MODES is covered by:

LCO 3.4.4, "RCS Loops-MODES 1 and 2";
LCO 3.4.5, "RCS Loops – MODE 3";
LCO 3.4.6, "RCS Loops – MODE 4";
LCO 3.4.7, "RCS Loops – MODE 5, Loops Filled";
LCO 3.9.4, "Shutdown Cooling (SDC) and Coolant Circulation – High Water Level" (MODE 6); and
LCO 3.9.5, "Shutdown Cooling (SDC) and Coolant Circulation – Low Water Level" (MODE 6).

ACTIONS

A.1

If a SDC train is inoperable, redundancy for heat removal is lost. Action must be initiated immediately to restore a second train to OPERABLE status. The Completion Time reflects the importance of maintaining the availability of two paths for heat removal.

(continued)

BASES

ACTIONS (continued)

B.1 and B.2

If the required SDC train is not OPERABLE or no SDC train is in operation, all operations involving the reduction of RCS boron concentration must be suspended. Action to restore one SDC train to OPERABLE status and operation must be initiated immediately. Boron dilution requires forced circulation for proper mixing and the margin to criticality must not be reduced in this type of operation. The immediate Completion Time reflects the importance of maintaining operation for decay heat removal.

SURVEILLANCE REQUIREMENTS

SR 3.4.8.1

This SR requires verification every 12 hours that one SDC train is in operation and circulating reactor coolant. Verification includes flow rate, temperature, or pump status monitoring, which help ensure that forced flow is providing decay heat removal. The 12 hour Frequency has been shown by operating practice to be sufficient to regularly assess degradation and verify operation is within safety analyses assumptions.

SR 3.4.8.2

Verification that the required number of trains are OPERABLE ensures that redundant paths for heat removal are available and that an additional train can be placed in operation, if needed, to maintain decay heat removal and reactor coolant circulation. Verification is performed by verifying proper breaker alignment and indicated power available to the required pumps. The Frequency of 7 days is considered reasonable in view of other administrative controls available and has been shown to be acceptable by operating experience.

REFERENCES

None.

B 3.4 REACTOR COOLANT SYSTEMS (RCS)

B 3.4.9 Pressurizer

BASES

BACKGROUND

The pressurizer provides a point in the RCS where liquid and vapor are maintained in equilibrium under saturated conditions for pressure control purposes to prevent bulk boiling in the remainder of the RCS. Key functions include maintaining required primary system pressure during steady state operation and limiting the pressure changes caused by reactor coolant thermal expansion and contraction during normal load transients.

The pressure control components addressed by this LCO include the pressurizer water level, the required heaters and their backup heater controls, and emergency power supplies. Pressurizer safety valves and pressurizer vents are addressed by LCO 3.4.10 "Pressurizer Safety Valves-MODES 1,2, and 3," LCO 3.4.11 "Pressurizer Safety Valves-MODE 4," and LCO 3.4.12 "Pressurizer Vents", respectively.

The maximum steady state water level limit has been established to ensure that a liquid to vapor interface exists to permit RCS pressure control, using the sprays and heaters during normal operation and proper pressure response for anticipated design basis transients. The maximum and minimum steady state water level limit serves two purposes:

a. Pressure control during normal operation maintains subcooled reactor coolant in the loops and thus in the preferred state for heat transport; and

b. By restricting the level to a maximum, expected transient reactor coolant volume increases (pressurizer insurge) will not cause excessive level changes that could result in degraded ability for pressure control.

The maximum steady state water level limit permits pressure control equipment to function as designed. The limit preserves the steam space during normal operation, thus, both sprays and heaters can operate to maintain the design operating pressure. The level limit also prevents filling the pressurizer (water solid) for anticipated design basis transients, thus ensuring that pressure relief devices

(continued)

BASES

BACKGROUND (continued)

(pressurizer safety valves) can control pressure by steam relief rather than water relief. If the level limits were exceeded prior to a transient that creates a large pressurizer insurge volume leading to water relief, the maximum RCS pressure might exceed the Safety Limit of 2750 psia.

The minimum steady state water level in the pressurizer assures pressurizer heaters, which are required to achieve and maintain pressure control, remain covered with water to prevent failure, which could occur if the heaters were energized uncovered.

The requirement to have two groups of pressurizer heaters ensures that RCS pressure can be maintained. The pressurizer heaters maintain RCS pressure to keep the reactor coolant subcooled. Inability to control RCS pressure during natural circulation flow could result in loss of single phase flow and decreased capability to remove core decay heat.

APPLICABLE SAFETY ANALYSES

In MODES 1, 2, and 3, the LCO requirement for a steam bubble is reflected implicitly in the accident analyses. No safety analyses are performed in lower MODES. All analyses performed from a critical reactor condition assume the existence of a steam bubble and saturated conditions in the pressurizer. In making this assumption, the analyses neglect the small fraction of noncondensable gases normally present.

Safety analyses presented in the UFSAR do not take credit for pressurizer heater operation; however, an implicit initial condition assumption of the safety analyses is that the RCS is operating at normal pressure.

(continued)

BASES

APPLICABLE SAFETY ANALYSES (continued)

Although the heaters are not specifically used in accident analysis, the need to maintain subcooling in the long term during loss of offsite power, as indicated in NUREG-0737 (Ref. 1), is the reason for their inclusion. The requirement for emergency power supplies is based on NUREG-0737 (Ref. 1). The intent is to keep the reactor coolant in a subcooled condition with natural circulation at hot, high pressure conditions for an undefined, but extended, time period after a loss of offsite power. While loss of offsite power is a coincident occurrence assumed in the accident analyses, maintaining hot, high pressure conditions over an extended time period is not evaluated in the accident analyses. The pressurizer satisfies Criterion 2 and Criterion 3 of 10 CFR 50.36(c)(2)(ii).

LCO

The LCO requirement for the pressurizer to be OPERABLE with water level ≥ 27% and ≤ 56% ensures that a steam bubble exists. Limiting the maximum operating water level preserves the steam space for pressure control. The LCO has been established to minimize the consequences of potential overpressure transients. Requiring the presence of a steam bubble is also consistent with analytical assumptions.

The LCO requires two groups of OPERABLE pressurizer heaters, each with a capacity ≥ 125 kW and capable of being powered from an emergency power supply. The minimum heater capacity required is sufficient to maintain the RCS near normal operating pressure when accounting for heat losses through the pressurizer insulation. By maintaining the pressure near the operating conditions, a wide subcooling margin to saturation can be obtained in the loops.

APPLICABILITY

The need for pressure control is most pertinent when core heat can cause the greatest effect on RCS temperature resulting in the greatest effect on pressurizer level and RCS pressure control. Thus, Applicability has been designated for MODES 1 and 2. The Applicability is also provided for MODE 3. It is assumed pressurizer level is under steady state conditions. The purpose is to prevent solid water RCS operation during heatup and cooldown to avoid rapid pressure rises caused by normal operational

(continued)

BASES

APPLICABILITY (continued)

perturbation, such as reactor coolant pump startup. The LCO does not apply to MODE 5 (Loops Filled) because LCO 3.4.13, "Low Temperature Overpressure Protection (LTOP) System," applies. The LCO does not apply to MODES 5 and 6 with partial loop operation. Also, a Note has been added to indicate the limit on pressurizer level may be exceeded during short term operational transients such as a THERMAL POWER ramp increase of > 5% RTP per minute or a THERMAL POWER step increase of > 10% RTP.

In MODES 1, 2, and 3, there is the need to maintain the availability of pressurizer heaters capable of being powered from an emergency power supply. In the event of a loss of offsite power, the initial conditions of these MODES gives the greatest demand for maintaining the RCS in a hot pressurized condition with loop subcooling for an extended period. For MODES 4, 5, or 6, it is not necessary to control pressure (by heaters) to ensure loop subcooling for heat transfer when the Shutdown Cooling System is in service and therefore the LCO is not applicable.

ACTIONS

A.1 and A.2

With pressurizer water level not within the limit, action must be taken to restore the plant to operation within the bounds of the safety analyses. To achieve this status, the unit must be brought to MODE 3, with the reactor trip breakers open, within 6 hours and to MODE 4 within 12 hours. This takes the plant out of the applicable MODES and restores the plant to operation within the bounds of the safety analyses.

Six hours is reasonable, based on operating experience, to reach MODE 3 from full power in an orderly manner and without challenging plant systems. Further pressure and temperature reduction to MODE 4 brings the plant to a MODE where the LCO is not applicable. The 12 hour time to reach the nonapplicable MODE is reasonable based on operating experience for that evolution.

(continued)

BASES

ACTIONS (continued)

B.1

If one required group of pressurizer heaters is inoperable, restoration is required within 72 hours. The Completion Time of 72 hours is reasonable considering that a demand caused by loss of offsite power would be unlikely in this period. Pressure control may be maintained during this time using normal station powered heaters.

C.1 and C.2

If one required group of pressurizer heaters is inoperable and cannot be restored within the allowed Completion Time of Required Action B.1, the plant must be brought to a MODE in which the LCO does not apply. To achieve this status, the plant must be brought to MODE 3 within 6 hours and to MODE 4 within 12 hours. The Completion Time of 6 hours is reasonable, based on operating experience, to reach MODE 3 from full power in an orderly manner and without challenging safety systems. Similarly, the Completion Time of 12 hours is reasonable, based on operating experience, to reach MODE 4 from full power in an orderly manner and without challenging plant systems.

SURVEILLANCE REQUIREMENTS

SR 3.4.9.1

This Surveillance ensures that during steady state operation, pressurizer water level is maintained below the nominal upper limit to provide a minimum space for a steam bubble. The Surveillance is performed by observing the indicated level. The 12 hour interval has been shown by operating practice to be sufficient to regularly assess the level for any deviation and verify that operation is within safety analyses assumptions. Alarms are also available for early detection of abnormal level indications.

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.4.9.2

The Surveillance is satisfied when the power supplies are demonstrated to be capable of producing the minimum power and the associated pressurizer heaters are verified to be at their design rating. (This may be done by testing the power supply output and by performing an electrical check on heater element continuity and resistance.) The Frequency of 92 days is considered adequate to detect heater degradation and has been shown by operating experience to be acceptable.

REFERENCES

1. NUREG-0737, November 1980.

B 3.4 REACTOR COOLANT SYSTEM (RCS)

B 3.4.10 Pressurizer Safety Valves

BASES

BACKGROUND

The purpose of the four spring loaded pressurizer safety valves is to provide RCS overpressure protection. Operating in conjunction with the Reactor Protection System, four valves are used to ensure that the Safety Limit (SL) of 2750 psia is not exceeded for analyzed transients during operation in MODES 1, 2 and 3. One safety valve used for MODE 4. For MODE 5, and MODE 6 with the head on, overpressure protection is provided by operating procedures and the LCO 3.4.13, "Low Temperature Overpressure Protection (LTOP) System."

The self actuated pressurizer safety valves are designed in accordance with the requirements set forth in the ASME, Boiler and Pressure Vessel Code, Section III (Ref. 1). The required lift pressure is 2475 psia +3%, -1%. The safety valves discharge steam from the pressurizer to a quench tank located in the containment. The discharge flow is indicated by an increase in temperature downstream of the safety valves and by an increase in the quench tank temperature and level.

The lift setting is for the ambient conditions associated with MODES 1, 2, and 3. This requires either that the valves be set hot or that a correlation between hot and cold settings be established.

The pressurizer safety valves are part of the primary success path and mitigate the effects of postulated accidents. OPERABILITY of the safety valves ensures that the RCS pressure will be limited to 110% of design pressure. The consequences of exceeding the ASME pressure limit (Ref. 1) could include damage to RCS components, increased leakage, or a requirement to perform additional stress analyses prior to resumption of reactor operation.

(continued)

BASES

APPLICABLE SAFETY ANALYSES	All accident analyses in the UFSAR that require safety valve actuation assume operation of four pressurizer safety valves to limit increasing reactor coolant pressure. The overpressure protection analysis is also based on operation of four safety valves and assumes that the valves open at the high range of the setting (2475 psia + 3%). These valves must accommodate pressurizer insurges that could occur during a startup, rod withdrawal, ejected rod, loss of main feedwater, or main feedwater line break accident. The Loss of Load with Delayed Reactor Trip accident establishes the minimum safety valve capacity. The Loss of Load with Delayed Reactor Trip accident is assumed to occur at 100% power. Single failure of a safety valve is neither assumed in the accident analysis nor required to be addressed by the ASME Code. Compliance with this specification is required to ensure that the accident analysis and design basis calculations remain valid. The pressurizer safety valves satisfy Criterion 3 of 10 CFR 50.36 (c)(2)(ii).
LCO	The four pressurizer safety valves are set to open at 25 psia less than RCS design pressure (2475 psia) and within the ASME specified tolerance to avoid exceeding the maximum RCS design pressure SL, to maintain accident analysis assumptions, and to comply with ASME Code requirements. The limit protected by this specification is the Reactor Coolant Pressure Boundary (RCPB) SL of 110% of design pressure. Inoperability of one or more valves could result in exceeding the SL if a transient were to occur. The consequences of exceeding the ASME pressure limit could include damage to one or more RCS components, increased leakage, or additional stress analysis being required prior to resumption of reactor operation.
APPLICABILITY	In MODES 1, 2, and 3, OPERABILITY of four valves is required because the combined capacity is required to keep reactor coolant pressure below 110% of its design value during certain accidents. MODE 3 is conservatively included, although the listed accidents may not require four safety valves for protection.

(continued)

BASES

APPLICABILITY (continued)

The LCO is not applicable in MODE 4, because LCO 3.4.11 covers MODE 4, and MODE 5 because LTOP protection is provided. Overpressure protection is not required in MODE 6 with the reactor vessel head detensioned.

The Note allows entry into MODES 3 and 4 with the lift settings outside the LCO limits. This permits testing and examination of the safety valves at high pressure and temperature near their normal operating range, but only after the valves have had a preliminary cold setting. The cold setting gives assurance that the valves are OPERABLE near their design condition. Only one valve at a time will be removed from service for testing. The 72 hour exception is based on 18 hour outage time for each of the four valves. The 18 hour period is derived from operating experience that hot testing can be performed within this timeframe.

ACTIONS

A.1

With one pressurizer safety valve inoperable, restoration must take place within 15 minutes. The Completion Time of 15 minutes reflects the importance of maintaining the RCS overpressure protection system. An inoperable safety valve coincident with an RCS overpressure event could challenge the integrity of the RCPB.

B.1 and B.2

If the Required Action cannot be met within the required Completion Time or if two or more pressurizer safety valves are inoperable, the plant must be brought to a MODE in which the requirement does not apply. To achieve this status, the plant must be brought to at least MODE 3 within 6 hours and to MODE 4 within 12 hours. The 6 hours allowed is reasonable, based on operating experience, to reach MODE 3 from full power without challenging plant systems. Similarly, the 12 hours allowed is reasonable, based on operating experience, to reach MODE 4 without challenging plant systems.

(continued)

BASES

ACTIONS

B.1 and B.2 (continued)

The change from MODE 1, 2, or 3 to MODE 4 reduces the RCS energy (core power and pressure), lowers the potential for large pressurizer insurges, and thereby removes the need for overpressure protection by four pressurizer safety valves.

SURVEILLANCE REQUIREMENTS

SR 3.4.10.1

SRs are specified in the Inservice Testing Program. Pressurizer safety valves are to be tested in accordance with the requirements of Section XI of the ASME Code (Ref. 1), which provides the activities and the Frequency necessary to satisfy the SRs. No additional requirements are specified.

The pressurizer safety valve setpoint is +3%, - 1% for OPERABILITY; however, the valves are reset to ± 1% during the Surveillance to allow for drift.

REFERENCES

1. ASME, Boiler and Pressure Vessel Code, Section III, Section XI.

B 3.4 REACTOR COOLANT SYSTEM (RCS)

B 3.4.11 Pressurizer Safety Valves-MODE 4

BASES

BACKGROUND

The purpose of the four spring loaded pressurizer safety valves is to provide RCS overpressure protection. One safety valve is used for portions of MODE 4. For the remainder of MODE 4, MODE 5, and MODE 6 with the head on, overpressure protection is provided by operating procedures and the LCO 3.4.13, "Low Temperature Overpressure Protection (LTOP) System."

The self actuated pressurizer safety valves are designed in accordance with the requirements set forth in the ASME, Boiler and Pressure Vessel Code, Section III (Ref. 1). The required lift pressure is 2475 psia +3%, -1%. The safety valves discharge steam from the pressurizer to a quench tank located in the containment. The discharge flow is indicated by an increase in temperature downstream of the safety valves and by an increase in the quench tank temperature and level.

The lift setting is for the ambient conditions associated with MODES 1, 2, and 3. This requires either that the valves be set hot or that a correlation between hot and cold settings be established.

The pressurizer safety valves are part of the primary success path and mitigate the effects of postulated accidents. OPERABILITY of the safety valves ensures that the RCS pressure will be limited to 110% of design pressure. The consequences of exceeding the ASME pressure limit (Ref. 1) could include damage to RCS components, increased leakage, or a requirement to perform additional stress analyses prior to resumption of reactor operation.

(continued)

BASES

BACKGROUND (continued)

Pressurizer Safety Valve Requirements

The pressurizer code safety valves operate to prevent the RCS from being pressurized above its Safety Limit (SL) of 2750 psia. Each safety valve is designed to relieve a minimum of 460,000 lb per hour of saturated steam at valve setpoint. The relief capacity of a single safety valve is adequate to relieve any overpressure condition which could occur during shutdown above L-Top System temperatures.

Shutdown Cooling System Suction Line Relief Valve Requirements

A single Shutdown Cooling System suction line relief valve provides overpressure relief capability and will prevent RCS overpressurization in the event that no pressurizer safety valves are OPERABLE.

APPLICABLE SAFETY ANALYSES

All accident analyses in the UFSAR that require safety valve actuation assume operation of four pressurizer safety valves to limit increasing reactor coolant pressure. The overpressure protection analysis is also based on operation of four safety valves and assumes that the valves open at the high range of the setting (2475 psia + 3%). These valves must accommodate pressurizer insurges that could occur during a startup, rod withdrawal, ejected rod, loss of main feedwater, or main feedwater line break accident. The Loss of Load with Delayed Reactor Trip accident establishes the minimum safety valve capacity. The Loss of Load with Delayed Reactor Trip accident is assumed to occur at 100% power. Single failure of a safety valve is neither assumed in the accident analysis nor required to be addressed by the ASME Code. Compliance with this specification is required to ensure that the accident analysis and design basis calculations remain valid.

The pressurizer safety valves satisfy Criterion 3 of 10 CFR 50.36 (c)(2)(ii).

(continued)

BASES (continued)

LCO

One pressurizer safety valve is required to be OPERABLE in MODE 4 with no Shutdown Cooling System suction line relief valves in service. The four pressurizer safety valves are set to open 25 psia less than RCS design pressure (2475 psia) and within the ASME specified tolerance to avoid exceeding the maximum RCS design pressure SL to maintain accident analysis assumptions, and to comply with ASME Code requirements. The limit protected by this specification is the Reactor Coolant Pressure Boundary (RCPB) SL of 110% of design pressure. Inoperability of all valves could result in exceeding the SL if a transient were to occur. The consequences of exceeding the ASME pressure limit could include damage to one or more RCS components, increased leakage, or additional stress analysis being required prior to resumption of reactor operation.

APPLICABILITY

In MODE 4 above the LTOP System temperatures OPERABILITY of one valve is required. MODE 4 is conservatively included, although the listed accidents may not require a safety valve for protection.

In MODES 1, 2, and 3 the LCO does not apply because RCS overpressure protection is provided by four pressurizer safety valves. Also, the LCO is not applicable in MODE 4 when any RCS cold leg temperature ≤ 214°F during cooldown or ≤ 291°F during heatup, and MODE 5 because LTOP protection is provided. Overpressure protection is not required in MODE 6 with the reactor vessel head fully detensioned.

The Note allows entry into MODES 3 and 4 with the lift settings outside the LCO limits. This permits testing and examination of the safety valves at high pressure and temperature near their normal operating range, but only after the valves have had a preliminary cold setting. The cold setting gives assurance that the valves are OPERABLE near their design condition. Only one valve at a time will be removed from service for testing. The 72 hour exception is based on 18 hour outage time for each of the four valves. The 18 hour period is derived from operating experience that hot testing can be performed within this timeframe.

(continued)

BASES (continued)

ACTIONS

A.1 and A.2

If all pressurizer safety valves are inoperable, the plant must be brought to a MODE in which the requirement does not apply. To achieve this status, one shutdown Cooling System suction line relief must be placed in service within 12 hours. The 12 hours allowed is reasonable, based on operating experience, to place a Shutdown Cooling System suction line relief valve in service without challenging plant systems.

For the Shutdown Cooling System suction line relief valve that is required to be in service in accordance with Required Action A.1, SR 3.4.11.2 and SR 3.4.11.3 must be performed or verified performed within 12 hours. This ensures that the required Shutdown Cooling System suction line relief valve is OPERABLE. A Shutdown Cooling System suction line relief valve is OPERABLE when its isolation valves are open, its lift setpoint is set at 467 psig or less, and testing has proven its ability to open at that setpoint.

B.1

If the Required Actions and associated Completion Times are not met, overpressurization is possible.

The 8 hours Completion Time to be in MODE 4 with all RCS cold leg temperatures ≤214°F during cooldown or ≤291°F during heatup places the unit in a condition where the LCO does not apply.

(continued)

BASES (continued)

SURVEILLANCE REQUIREMENTS

SR 3.4.11.1

SRs are specified in the Inservice Testing Program. Pressurizer safety valves are to be tested in accordance with the requirements of Section XI of the ASME Code (Ref. 1), which provides the activities and the Frequency necessary to satisfy the SRs. No additional requirements are specified.

The pressurizer safety valve setpoint is +3%, -1% for OPERABILITY; however, the valves are reset to ± 1% during the Surveillance to allow for drift.

SR 3.4.11.2

SR 3.4.11.2 requires that the required Shutdown Cooling System suction line relief valve is OPERABLE by verifying its open pathway condition either:

a. Once every 12 hours for a valve that is unlocked, not sealed, or otherwise not secured open in the vent pathway, or

b. Once every 31 days for a valve that is locked, sealed or otherwise secured open in the vent pathway.

The SR has been modified by a Note that requires performance only if a Shutdown Cooling System suction line relief valve is being used for overpressure protection. The Frequencies consider operating experience with mispositioning of unlocked and locked pathway vent valves.

SR 3.4.11.3

SRs are specified in the Inservice Testing Program. Shutdown Cooling System suction line relief valves are to be tested in accordance with the requirements of Section XI of the ASME Code (Ref. 2), which provides the activities and the Frequency necessary to satisfy the SRs. The Shutdown Cooling System suction line relief valve setpoint is 467 psig.

(continued)

BASES (continued)

REFERENCES

1. ASME, Boiler and Pressure Vessel Code, Section III, Section XI.
2. ASME, Boiler and Pressure Vessel Code, Section XI.

B 3.4 REACTOR COOLANT SYSTEM (RCS)

B 3.4.12 Pressurizer Vents

BASES

BACKGROUND

The pressurizer vents are part of the Reactor Coolant Gas Vent System (RCGVS). The RCGVS is designed to be used to remotely vent gases from the reactor vessel head and pressurizer steam space during post-accident situations when large quantities of noncondensables may collect in these high points. The collection of these non-condensables could impact the accomplishment of core heat removal. Although primarily designed to be available during post-accident conditions, the system can also be used to aid in RCS venting procedures following a maintenance outage.

The primary purpose of this LCO is to ensure the pressurizer vent path is available for RCS pressure reduction during a design basis Steam Generator Tube Rupture (SGTR) (Ref. 1)

The system permits the control room operator to remotely vent the pressurizer and reactor vessel head. The pressurizer vent line ties into an existing 3/4 inch vent line. The reactor vessel head vent ties into the existing 3/4 inch reactor vessel vent, which is flanged to permit head removal for refueling, that later connects to the pressurizer relief common discharge header. The pressurizer vent line also connects to the pressurizer relief common discharge header which terminates in the Reactor Drain Tank (RDT). The capability to vent directly to containment atmosphere is also provided should it not be desired to rupture the RDT rupture disc when large quantities of gas must be vented. The vent to containment atmosphere terminates in an area where there is adequate ventilation to promote mixing, and there is no equipment in the area of discharge that could be affected by system operation.

The normal vent paths are either from the pressurizer or reactor vessel head to the RDT. These paths are powered from emergency power sources, Seismic Category I, and are of the appropriate quality class to conform to existing standards. No single active failure can prevent the RCGVS from performing its design function.

(continued)

BASES

APPLICABLE SAFETY ANALYSES

The requirement for pressurizer path vent path to be OPERABLE is based in the SGTR with LOP and a Single Failure Safety analysis. It is assumed that the Auxiliary Pressurizer Spray System (APSS) is not available for this event.

Instead, RCS depressurization is performed, 2 hours after the initial SGTR, by venting the RCS via the pressurizer vent path and throttling HPSI flow. The analysis also incorporates an additional failure by assuming that only the smallest of the four available pressurizer vent paths is used. This is identified as the orificed flow path to the RDT.

SSER 10 (Appendix M) states that the reanalysis (Ref. 3) assumes that the APSS is inoperable and the pressurizer gas vent system performs the functions of RCS depressurization. The staff has reviewed and accepted the results of the reanalysis and the design of the pressurizer gas vent system. The staff's detailed evaluation has been reported in Supplement No. 9 to PVNGS SER (Ref. 2).

The pressurizer vent path satisfy Criterion 3 of 10 CFR 50.36 (C) (2) (ii).

LCO

The LCO requires four pressurizer vent paths be OPERABLE. A vent path is flow capability from the pressurizer to the RDT or from the pressurizer to containment atmosphere. To minimize the possibility of common mode failure of solenoid operated valves to shut when deenergized, the operation procedure for the RCGVS will require that when both trains A and B are available, one valve powered from train A and one valve powered from train B will be used to complete the vent path (Ref. 4). This LCO, however, is concerned with the ability to depressurize. Therefore, any vent path that provides flow capability from the pressurizer to the RDT or from the pressurizer to containment atmosphere, independent of which train is powering the valves in the flow path, will meet the intent of the LCO. Loss of any single valve will cause two flow paths to become inoperable. A pressurizer vent path is required to depressurize the RCS in a SGTR design basis event.

(continued)

BASES

APPLICABILITY

In MODES 1, 2, 3, and MODE 4 with RCS pressure ≥ 385 psia the four pressurizer vent paths are required to be OPERABLE. The event that requires pressurizer vent paths to be OPERABLE is the SGTR with LOP and a Single Failure Safety. Once this event occurs it is assumed that the APSS is not available. The pressurizer vent paths are the credited method of RCS depressurization.

In MODES 1, 2, 3, and MODE 4 with RCS pressure ≥ 385 psia the SGs are the primary means of heat removal in the RCS, until shutdown cooling can be initiated. In MODES 1, 2, 3, and MODE 4 with RCS pressure ≥ 385 psia, assuming the APSS is not available, the pressurizer vent paths are the credited means to depressurize the RCS to Shutdown Cooling System entry conditions. Further depressurization into MODE 5 requires use of the pressurizer vent paths. In MODE 5 with the reactor vessel head in place, temperature requirements of MODE 5 (≤ 210°F) ensure the RCS remains depressurized. In MODE 6 with the reactor vessel head fully detensioned the RCS is depressurized.

ACTIONS

A.1

If two or three pressurizer vent paths are inoperable, they must be restored to OPERABLE status. The Completion Time of 72 hours is reasonable because there is at least one pressurizer vent path that remains OPERABLE.

B.1

If all pressurizer vent paths are inoperable, then restore at least one pressurizer vent path to OPERABLE status. The Completion Time of 6 hours is reasonable to allow time to correct the situation, yet emphasize the importance of restoring at least one pressurizer vent path..If at least one pressurizer vent path is not restored to OPERABLE within the Completion Time, then Action C is entered.

(continued)

BASES

C.1

If the required Actions, A and B, cannot be met within the associated Completion Times , the plant must be brought to a MODE in which the requirement does not apply. To achieve this status, the plant must be brought to at least MODE 3 within 6 hours, and to MODE 4 with RCS pressure < 385 psia within 24 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required plant conditions from full power conditions in an orderly manner without challenging plant systems.

SURVEILLANCE REQUIREMENTS

SR 3.4.12.1

SR 3.4.12.1 requires complete cycling of each pressurizer vent path valve. Pressurizer vent path valve cycling demonstrates its function. The frequency of 18 months is based on a typical refueling cycle and industry accepted practice.

SR 3.4.12.2

SR 3.4.12.2 requires verification of flow through each pressurizer vent path. Verification of pressurizer vent path flow demonstrates its function. The frequency of 18 months is based on a typical refueling cycle and industry accepted practice.

REFERENCES

1. UFSAR, Section 15 and 18.
2. NUREG-0857, initial issue, November 1981, through Amendment 12, November 1987.
3 CE Calculation, V-FS-022, Reanalysis with no Auxiliary Spray and with Pressurizer Vent Open at 2 Hours.
4. UFSAR, Section 18.

B 3.4 REACTOR COOLANT SYSTEM (RCS)

B 3.4.13 Low Temperature Overpressure Protection (LTOP) System

BASES

BACKGROUND

The LTOP System controls RCS pressure at low temperatures so the integrity of the Reactor Coolant Pressure Boundary (RCPB) is not compromised by violating the Pressure and Temperature (P/T) limits of 10 CFR 50, Appendix G (Ref. 1). The reactor vessel is the limiting RCPB component for demonstrating such protection. LCO 3.4.3, "RCS Pressure and Temperature (P/T) Limits," provides the allowable combinations for operational pressure and temperature during cooldown, shutdown, and heatup to keep from violating the Reference 1 requirements during the LTOP MODES.

The reactor vessel material is less tough at low temperatures than at normal operating temperatures. As the vessel neutron exposure accumulates, the material toughness decreases and becomes less resistant to pressure stress at low temperatures (Ref. 2). RCS pressure, therefore, is maintained low at low temperatures and is increased only as temperature is increased.

The potential for vessel overpressurization is most acute when the RCS is water solid, occurring only while shutdown; a pressure fluctuation can occur more quickly than an operator can react to relieve the condition. Exceeding the RCS P/T limits by a significant amount could cause brittle cracking of the reactor vessel. LCO 3.4.3 requires administrative control of RCS pressure and temperature during heatup and cooldown to prevent exceeding the P/T limits.

This LCO provides RCS overpressure protection by having adequate pressure relief capacity. The pressure relief capacity requires either two OPERABLE redundant Shutdown Cooling System suction line relief valves or the RCS depressurized and an RCS vent of sufficient size. One Shutdown Cooling System suction line relief valve or the RCS vent is the overpressure protection device that acts to terminate an increasing pressure event.

(continued)

BACKGROUND (continued)

The LTOP System for pressure relief consists of two Shutdown Cooling System suction line relief valves or an RCS vent of sufficient size. Two relief valves are required for redundancy. One Shutdown Cooling System suction line relief valve has adequate relieving capability to prevent overpressurization for the required coolant input capability.

Shutdown Cooling System Suction Line Relief Valve Requirements

As designed for the LTOP System, each Shutdown Cooling System suction line relief valve is designed to lift and relieve RCS pressure if RCS pressure approaches the Shutdown Cooling System suction line relief valve lift setpoint.

Each Shutdown Cooling System suction line relief valve is designed to protect the reactor vessel given a single failure in addition to a failure that initiated the pressure transient. No single failure of a Shutdown Cooling System suction line relief valve isolation valve (SI-651, 652, 653, or 654) will prevent one Shutdown Cooling System suction line relief valve from performing its intended function (Ref. 7).

The OPERABILITY of two Shutdown Cooling System suction line relief valves, while maintaining the limits imposed on the RCS heatup and cooldown rates, ensures that the RCS will be protected from analyzed pressure transients. Either Shutdown Cooling System suction line relief valve provides overpressure protection for the RCS due to the most limiting transients initiated by a single operator or equipment failure.

a. The start of an idle RCP with secondary water temperature of the SG ≤ 100°F above RCS cold leg temperatures

b. An inadvertent SIAS with two HPSI pumps injecting into a water solid RCS, three charging pumps injecting, and letdown isolated.

These events are the most limiting energy and mass addition transients, respectively, when the RCS is at low temperatures (Refs. 7, 8 and 9).

(continued)

BACKGROUND (continued)

Shutdown Cooling System Suction Line Relief Valve Requirements. (continued)

When a Shutdown Cooling System suction line relief valve lifts due to an increasing pressure transient, the release of coolant causes the pressure increase to slow and reverse. As the Shutdown Cooling System suction line relief valve releases coolant, the system pressure decreases until valve reseat pressure is reached and the Shutdown Cooling system suction line relief valve closes.

At low temperatures with the Shutdown Cooling System suction line relief valves aligned to the RCS, it is necessary to restrict heatup and cooldown rates to assure that P-T limits are not exceeded. These P-T limits are usually applicable to a finite time period such a one cycle, 5 EFPY, etc. and are based upon irradiation damage prediction by the end of the period. Accordingly, each time P-T limits change, the LTOP System needs to be reanalyzed and modified, if necessary, to continue its function.

Once the RCS is depressurized, a vent exposed to the containment atmosphere will maintain the RCS at containment ambient pressure in an RCS overpressure transient, if the relieving requirements of the transient do not exceed the capabilities of the vent. Thus, the vent path must be capable of relieving the flow resulting from the limiting LTOP mass or heat input transient and maintaining pressure below the P/T limits. The required vent capacity may be provided by one or more vent paths.

For an RCS vent to meet the specified flow capacity, it requires removing all pressurizer safety valves, or similarly establishing a vent by opening the pressurizer manway (Ref. 11). The vent path(s) must be above the level of reactor coolant, so as not to drain the RCS when open.

(continued)

APPLICABLE SAFETY ANALYSES

Safety analyses (Ref. 3) demonstrate that the reactor vessel is adequately protected against exceeding the Reference 1 P/T limits during shutdown. In MODES 1, 2, and 3, and in MODE 4 with any RCS cold leg temperature exceeding 214°F during cooldown or 291°F during heatup, the pressurizer safety valves prevent RCS pressure from exceeding the Reference 1 limits. At about 214°F and below, during cooldown or 291°F and below during heatup, overpressure prevention falls to the OPERABLE Shutdown Cooling System suction line relief valves or to a depressurized RCS and a sufficient sized RCS vent. Each of these means has a limited overpressure relief capability.

The actual temperature at which the pressure in the P/T limit curve falls below the pressurizer safety valve setpoint increases as the reactor vessel material toughness decreases due to neutron embrittlement. Each time the P/T limit curves are revised, the LTOP System will be re-evaluated to ensure its functional requirements can still be satisfied using the Shutdown Cooling System suction line relief valve method or the depressurized and vented RCS condition.

Reference 3 contains the acceptance limits that satisfy the LTOP requirements. Any change to the RCS must be evaluated against these analyses to determine the impact of the change on the LTOP acceptance limits.

Transients that are capable of overpressurizing the RCS are categorized as either mass or heat input transients, examples of which follow:

<u>Mass Input Type Transients</u>

a. Inadvertent safety injection; or

b. Charging/letdown flow mismatch.

<u>Heat Input Type Transients</u>

a. Inadvertent actuation of pressurizer heaters;

b. Loss of shutdown cooling (SDC); or

c. Reactor coolant pump (RCP) startup with temperature asymmetry within the RCS or between the RCS and steam generators.

(continued)

APPLICABLE SAFETY ANALYSES (continued)

References 3, 7, 8 and 9 analyses demonstrate that either one Shutdown Cooling System suction line relief valve or the RCS vent can maintain RCS pressure below limits for the two most limiting analyzed events:

a. The start of an idle RCP with secondary water temperature of the SG ≤ 100°F above RCS cold leg temperatures.

b. An inadvertent SIAS with two HPSI pumps injecting into a water solid RCS, three charging pumps injecting, and letdown isolated.

Fracture mechanics analyses established the temperature of LTOP Applicability at 214°F and below during cooldown and 291°F and below during heatup. Above these temperatures, the pressurizer safety valves provide the reactor vessel pressure protection. The vessel materials were assumed to have a neutron irradiation accumulation equal to 32 effective full power years of operation.

The consequences of a small break Loss Of Coolant Accident (LOCA) in LTOP MODE 4 conform to 10 CFR 50.46 and 10 CFR 50, Appendix K (Refs. 4 and 5).

The fracture mechanics analyses show that the vessel is protected when the Shutdown Cooling System suction line relief valves are set to open at or below 467 psig. The setpoint is derived by modeling the performance of the LTOP System, assuming the limiting allowed LTOP transient. The Shutdown Cooling System suction line relief valves setpoints at or below the derived limit ensure the Reference 1 limits will be met.

The Shutdown Cooling System suction line relief valves setpoints will be re-evaluated for compliance when the revised P/T limits conflict with the LTOP analysis limits. The P/T limits are periodically modified as the reactor vessel material toughness decreases due to embrittlement caused by neutron irradiation. Revised P/T limits are determined using neutron fluence projections and the results of examinations of the reactor vessel material irradiation surveillance specimens. The Bases for LCO 3.4.3, "RCS Pressure and Temperature (P/T) Limits," discuss these examinations.

(continued)

BASES

APPLICABLE SAFETY ANALYSES (continued)

The Shutdown Cooling System suction line relief valves are considered active components. Thus, the failure of one Shutdown Cooling System suction line relief valve represents the worst case, single active failure.

RCS Vent Performance

With the RCS depressurized, analyses show a vent size of 16 square inches is capable of mitigating the limiting allowed LTOP overpressure transient. In that event, this size vent maintains RCS pressure less than the maximum RCS pressure on the P/T limit curve.

The RCS vent size will also be re-evaluated for compliance each time the P/T limit curves are revised based on the results of the vessel material surveillance.

The RCS vent is passive and is not subject to active failure.

LTOP System satisfies Criterion 2 of 10 CFR 50.36 (c)(2)(ii).

LCO

This LCO is required to ensure that the LTOP System is OPERABLE. The LTOP System is OPERABLE when the pressure relief capabilities are OPERABLE. Violation of this LCO could lead to the loss of low temperature overpressure mitigation and violation of the Reference 1 limits as a result of an operational transient.

The elements of the LCO that provide overpressure mitigation through pressure relief are:

a. Two OPERABLE Shutdown Cooling System suction line relief valves; or

b. The depressurized RCS and an RCS vent.

A Shutdown Cooling System suction line relief valve is OPERABLE for LTOP when its isolation valves are open, its lift setpoint is set at 467 psig or less and testing has proven its ability to open at that setpoint.

An RCS vent is OPERABLE when open with an area ≥ 16 square inches.

(continued)

LCO (continued)

Each of these methods of overpressure prevention is capable of mitigating the limiting LTOP transient.

APPLICABILITY

This LCO is applicable in MODE 4 when the temperature of any RCS cold leg is ≤ 214°F during cooldown or ≤ 291°F during heatup, in MODE 5, and in MODE 6 when the reactor vessel head is on. The pressurizer safety valves provide overpressure protection that meets the Reference 1 P/T limits above 214°F during cooldown and 291°F during heatup. When the reactor vessel head is off or fully detensioned such that overpressurization cannot occur, this LCO does not apply.

LCO 3.4.3"provides the operational P/T limits for all MODES. LCO 3.4.10, "Pressurizer Safety Valves-MODES 1, 2, and 3," requires the OPERABILITY of the pressurizer safety valves that provide overpressure protection during MODES 1, 2, and 3. LCO 3.4.11, "Pressurizer Safety Valves-MODE 4", requires OPERABILITY of one pressurizer safety valve to provide overpressure protection in MODE 4 above 214°F during cooldown and above 291°F during heatup.

Low temperature overpressure prevention is most critical during shutdown when the RCS is water solid, and a mass or heat input transient can cause a very rapid increase in RCS pressure when little or no time allows operator action to mitigate the event.

The Applicability is modified by a Note stating when one or more cold legs reach 214°F, this LCO remains applicable during periods of steady state temperature conditions until all RCS cold leg temperatures reach 291°F. Also, if a cooldown is terminated prior to reaching 214°F and a heatup is commenced, this LCO is applicable until all RCS cold leg temperatures reach 291°F. This Note provides clarification about Applicability intent. Since PVNGS uses two different temperatures at which the Shutdown Cooling System suction line relief valves must be placed in service there is some possibility of confusion. This Note clarifies those circumstances where the Shutdown Cooling System suction line relief valves must be placed in service.

(continued)

ACTIONS

A.1

In MODE 4 when any RCS cold leg temperature is ≤ 214°F, during cooldown or ≤ 291°F during heatup with one Shutdown Cooling System suction line relief valve inoperable, two Shutdown Cooling System suction line relief valves must be restored to OPERABLE status within a Completion Time of 7 days. Two valves are required to meet the LCO requirement and to provide low temperature overpressure mitigation while withstanding a single failure of an active component.

The Completion Time is based on the facts that only one Shutdown Cooling System suction line relief valve is required to mitigate an overpressure transient and that the likelihood of an active failure of the remaining valve path during this time period is very low.

B.1

The consequences of operational events that will overpressure the RCS are more severe at lower temperature (Ref. 6). Thus, one required Shutdown Cooling System suction line relief valve inoperable in MODE 5 or in MODE 6 with the head on, the Completion Time to restore inoperable valve to OPERABLE status is 24 hours.

The 24 hour Completion Time to restore two Shutdown Cooling System suction line relief valves OPERABLE in MODE 5 or in MODE 6 when the vessel head is on is a reasonable amount of time to investigate and repair several types of Shutdown Cooling System suction line relief valve failures without exposure to a lengthy period with only one Shutdown Cooling System suction line relief valve OPERABLE to protect against overpressure events.

(continued)

ACTIONS (continued)

C.1

If two required Shutdown Cooling System suction line relief valves are inoperable, or if a Required Action and the associated Completion Time of Condition A or B are not met, the RCS must be depressurized and a vent established within 8 hours. The vent must be sized at least 16 square inches to ensure the flow capacity is greater than that required for the worst case mass input transient reasonable during the applicable MODES. This action protects the RCPB from a low temperature overpressure event and a possible brittle failure of the reactor vessel.

The Completion Time of 8 hours to depressurize and vent the RCS is based on the time required to place the plant in this condition and the relatively low probability of an overpressure event during this time period due to increased operator awareness of administrative control requirements.

SURVEILLANCE REQUIREMENTS

SR 3.4.13.1 and 3.4.13.2

SR 3.4.13.1 and SR 3.4.13.2 require verifying that the RCS vent is open ≥ 16 square inches or that the Shutdown Cooling System suction line relief valves be aligned to provide overpressure protection for the RCS is proven OPERABLE by verifying its open pathway condition either:

Shutdown Locking System Suction relief valves

a. Once every 12 hours for a valve that is unlocked, not sealed, or otherwise not secured open in the vent pathway, or

b. Once every 31 days for a valve that is locked, sealed, or otherwise secured open in the vent pathway.

RCS Vent

a. Once every 12 hours for a vent pathway that is unlocked, not sealed, or otherwise not secured open

b. Once every 31 days for a vent pathway that is locked, sealed, or otherwise secured open.

(continued)

SURVEILLANCE REQUIREMENTS

SR 3.4.13.1 and 3.4.13.2 (continued)

The passive vent arrangement must only be open (vent pathway exists) to be OPERABLE. These Surveillances need only be performed if the vent or the Shutdown Cooling System suction line relief valves are being used to satisfy the requirements of this LCO. The Frequencies consider operating experience with mispositioning of unlocked and locked pathway vent valves, and passive pathway obstructions.

SR 3.4.13.3

SRs are specified in the Inservice Testing Program. Shutdown Cooling System suction line relief valves are to be tested in accordance with the requirements of Section XI of the ASME Code (Ref. 10), which provides the activities and the Frequency necessary to satisfy the SRs. The Shutdown Cooling System suction line relief valve set point is 467 psig.

REFERENCES

1. 10 CFR 50, Appendix G.
2. Generic Letter 88-11.
3. UFSAR, Section 15.
4. 10 CFR 50.46.
5. 10 CFR 50, Appendix K.
6. Generic Letter 90-06.
7. UFSAR, Section 5.2.
8. V-PSAC-009, Pressure Transient Analysis.
9. V-PSAC-010, Mass Input Pressure Transient in Water Solid RCS.
10. ASME, Boiler and Pressure Vessel Code, Section XI.
11. 13-C00-93-016, Sensitivity Study on Pressurizer Vent Paths vs. Days Post Shutdown.

B 3.4 REACTOR COOLANT SYSTEM (RCS)

B 3.4.14 RCS Operational LEAKAGE

BASES

BACKGROUND

Components that contain or transport the coolant to or from the reactor core make up the RCS. Component joints are made by welding, bolting, rolling, or pressure loading, and valves isolate connecting systems from the RCS.

During plant life, the joint and valve interfaces can produce varying amounts of reactor coolant LEAKAGE, through either normal operational wear or mechanical deterioration. The purpose of the RCS Operational LEAKAGE LCO is to limit system operation in the presence of LEAKAGE from these sources to amounts that do not compromise safety. This LCO specifies the types and amounts of LEAKAGE.

10 CFR 50, Appendix A, GDC 30 (Ref. 1), requires means for detecting and, to the extent practical, identifying the source of reactor coolant LEAKAGE. Regulatory Guide 1.45 (Ref. 2) describes acceptable methods for selecting leakage detection systems.

The safety significance of RCS LEAKAGE varies widely depending on its source, rate, and duration. Therefore, detecting and monitoring reactor coolant LEAKAGE into the containment area is necessary. Quickly separating the identified LEAKAGE from the unidentified LEAKAGE is necessary to provide quantitative information to the operators, allowing them to take corrective action should a leak occur detrimental to the safety of the facility and the public.

A limited amount of leakage inside containment is expected from auxiliary systems that cannot be made 100% leaktight. Leakage from these systems should be detected, located, and isolated from the containment atmosphere, if possible, to not interfere with RCS LEAKAGE detection.

This LCO deals with protection of the Reactor Coolant Pressure Boundary (RCPB) from degradation and the core from inadequate cooling, in addition to preventing the accident analysis radiation release assumptions from being exceeded. The consequences of violating this LCO include the possibility of a Loss Of Coolant Accident (LOCA).

(continued)

BASES (continued)

APPLICABLE SAFETY ANALYSES

Except for primary to secondary LEAKAGE, the safety analyses do not address operational LEAKAGE. However, other operational LEAKAGE is related to the safety analyses for LOCA; the amount of leakage can affect the probability of such an event. The safety analysis for an event resulting in steam discharge to the atmosphere assumes a 1 gpm primary to secondary LEAKAGE as the initial condition.

Primary to secondary LEAKAGE is a factor in the dose releases outside containment resulting from a Steam Line Break (SLB) accident. To a lesser extent, other accidents or transients involve secondary steam release to the atmosphere, such as a Steam Generator Tube Rupture (SGTR). The leakage contaminates the secondary fluid.

The UFSAR (Ref. 3) analysis for SGTR assumes the contaminated secondary fluid is only briefly released via safety valves and the majority is steamed to the condenser. The 1 gpm primary to secondary LEAKAGE is relatively inconsequential.

The SLB is more limiting for site radiation releases. The safety analysis for the SLB accident assumes 1 gpm primary to secondary LEAKAGE in one generator as an initial condition. The dose consequences resulting from the SLB accident are well within the limits defined in 10 CFR 50 or the staff approved licensing basis (i.e., a small fraction of these limits).

RCS operational LEAKAGE satisfies Criterion 2 of 10 CFR 50.36 (C)(2)(ii).

LCO

RCS operational LEAKAGE shall be limited to:

a. <u>Pressure Boundary LEAKAGE</u>

No pressure boundary LEAKAGE is allowed, being indicative of material deterioration. LEAKAGE of this type is unacceptable as the leak itself could cause further deterioration, resulting in higher LEAKAGE. Violation of this LCO could result in continued degradation of the RCPB. LEAKAGE past seals and gaskets is not pressure boundary LEAKAGE.

(continued)

BASES

LCO (continued)

b. Unidentified LEAKAGE

One gallon per minute (gpm) of unidentified LEAKAGE is allowed as a reasonable minimum detectable amount that the containment air monitoring and containment sump level monitoring equipment can detect within a reasonable time period. Violation of this LCO could result in continued degradation of the RCPB, if the LEAKAGE is from the pressure boundary.

c. Identified LEAKAGE

Up to 10 gpm of identified LEAKAGE is considered allowable because LEAKAGE is from known sources that do not interfere with detection of identified LEAKAGE and is well within the capability of the RCS makeup system. Identified LEAKAGE includes LEAKAGE to the containment from specifically known and located sources, but does not include pressure boundary LEAKAGE or controlled Reactor Coolant Pump (RCP) seal leakoff (a normal function not considered LEAKAGE). Violation of this LCO could result in continued degradation of a component or system.

LCO 3.4.14, "RCS Pressure Isolation Valve (PIV) Leakage," measures leakage through each individual PIV and can impact this LCO. Of the two PIVs in series in each isolated line, leakage measured through one PIV does not result in RCS LEAKAGE when the other is leaktight. If both valves leak and result in a loss of mass from the RCS, the loss must be included in the allowable identified LEAKAGE.

d. Primary to Secondary LEAKAGE through All Steam Generators (SGs)

Total primary to secondary LEAKAGE amounting to 1 gpm through all SGs produces acceptable offsite doses in the SLB accident analysis. Violation of this LCO could exceed the offsite dose limits for this accident analysis. Primary to secondary LEAKAGE must be included in the total allowable limit for identified LEAKAGE.

(continued)

BASES

LCO (continued)

e. Primary to Secondary LEAKAGE through Any One SG

The 720 gallon per day limit on primary to secondary LEAKAGE through any one SG allocates the total 1 gpm allowed primary to secondary LEAKAGE equally between the two generators.

APPLICABILITY

In MODES 1, 2, 3, and 4, the potential for RCPB LEAKAGE is greatest when the RCS is pressurized.

In MODES 5 and 6, LEAKAGE limits are not required because the reactor coolant pressure is far lower, resulting in lower stresses and reduced potentials for LEAKAGE.

ACTIONS

A.1

Unidentified LEAKAGE, identified LEAKAGE, or primary to secondary LEAKAGE in excess of the LCO limits must be reduced to within limits within 4 hours. This Completion Time allows time to verify leakage rates and either identify unidentified LEAKAGE or reduce LEAKAGE to within limits before the reactor must be shut down. This action is necessary to prevent further deterioration of the RCPB.

B.1 and B.2

If any pressure boundary LEAKAGE exists or if unidentified, identified, or primary to secondary LEAKAGE cannot be reduced to within limits within 4 hours, the reactor must be brought to lower pressure conditions to reduce the severity of the LEAKAGE and its potential consequences. The reactor must be brought to MODE 3 within 6 hours and to MODE 5 within 36 hours. This action reduces the LEAKAGE and also reduces the factors that tend to degrade the pressure boundary.

(continued)

BASES

ACTIONS

B.1 and B.2 (continued)

The allowed Completion Times are reasonable, based on operating experience, to reach the required conditions from full power conditions in an orderly manner and without challenging plant systems. In MODE 5, the pressure stresses acting on the RCPB are much lower, and further deterioration is much less likely.

C.1

If one or more SGs are inoperable, due to SR 3.4.14.2, the unit is in a condition outside the accident analyses. Therefore, LCO 3.0.3 must be entered immediately.

SURVEILLANCE REQUIREMENTS

SR 3.4.14.1

Verifying RCS LEAKAGE to be within the LCO limits ensures the integrity of the RCPB is maintained. Pressure boundary LEAKAGE would at first appear as unidentified LEAKAGE and can only be positively identified by inspection. Unidentified LEAKAGE and identified LEAKAGE are determined by performance of an RCS water inventory balance. Primary to secondary LEAKAGE is also measured by performance of an RCS water inventory balance in conjunction with effluent monitoring within the secondary steam and feedwater systems.

The RCS water inventory balance must be performed with the reactor at steady state operating conditions and near operating pressure. Therefore, this SR is not required to be performed in MODES 3 and 4, until 12 hours of steady state operation near operating pressure have elapsed. This means that once steady state operating conditions are established, 12 hours is allowed for completing the Surveillance if the Surveillance Frequency interval was exceeded in MODE 5 or 6. Further discussion of SR note format is found in Section 1.4, Frequency.

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.4.14.1 (continued)

The Note in the Frequency column allows for SR 3.4.14.1 nonperformance due to planned or unplanned power manipulations. This Note is not intended to allow power manipulations solely for the purpose of avoiding SR 3.4.14.1 performance. Steady state operation is required to perform a proper water inventory balance; calculations during maneuvering are not useful and a Note requires the Surveillance to be met when steady state is established. For RCS operational LEAKAGE determination by water inventory balance, steady state is defined as stable RCS pressure, temperature, power level, pressurizer and makeup tank levels, makeup and letdown, and RCP seal injection and return flows.

An early warning of pressure boundary LEAKAGE or unidentified LEAKAGE is provided by the automatic systems that monitor the containment atmosphere radioactivity and the containment sump level. These leakage detection systems are specified in LCO 3.4.15, "RCS Leakage Detection Instrumentation."

The 72 hour Frequency is a reasonable interval to trend LEAKAGE and recognizes the importance of early leakage detection in the prevention of accidents. A Note under the Frequency column states that this SR is required to be performed during steady state operation.

SR 3.4.14.2

This SR provides the means necessary to determine SG OPERABILITY in an operational MODE. The requirement to demonstrate SG tube integrity in accordance with the Steam Generator Tube Surveillance Program emphasizes the importance of SG tube integrity, even though this Surveillance cannot be performed at normal operating conditions.

REFERENCES

1. 10 CFR 50, Appendix A, GDC 30.
2. Regulatory Guide 1.45, May 1973.
3. UFSAR, Section 15.

B 3.4 REACTOR COOLANT SYSTEM (RCS)

B 3.4.15 RCS Pressure Isolation Valve (PIV) Leakage

BASES

BACKGROUND

10 CFR 50.2, 10 CFR 50.55a(c), and GDC 55 of 10 CFR 50, Appendix A (Refs. 1, 2, and 3), define RCS PIVs as any two normally closed valves in series within the RCS pressure boundary that separate the high pressure RCS from an attached low pressure system. During their lives, these valves can produce varying amounts of reactor coolant leakage through either normal operational wear or mechanical deterioration. The RCS PIV LCO allows RCS high pressure operation when leakage through these valves exists in amounts that do not compromise safety.

The PIV leakage limit applies to each individual valve. Leakage through both PIVs in series in a line must be included as part of the identified LEAKAGE, governed by LCO 3.4.14, "RCS Operational LEAKAGE." This is true during operation only when the loss of RCS mass through two valves in series is determined by a water inventory balance (SR 3.4.14.1). A known component of the identified LEAKAGE before operation begins is the least of the two individual leakage rates determined for leaking series PIVs during the required surveillance testing; leakage measured through one PIV in a line is not RCS operational LEAKAGE if the other is leaktight.

Although this specification provides a limit on allowable PIV leakage rate, its main purpose is to prevent overpressure failure of the low pressure portions of connecting systems. The leakage limit is an indication that the PIVs between the RCS and the connecting systems are degraded or degrading. PIV leakage could lead to overpressure of the low pressure piping or components. Failure consequences could be a Loss of Coolant Accident (LOCA) outside of containment, an unanalyzed condition that could degrade the ability for low pressure injection.

The basis for this LCO is the 1975 NRC "Reactor Safety Study" (Ref. 4) that identified potential intersystem LOCAs as a significant contributor to the risk of core melt. A subsequent study (Ref. 5) evaluated various PIV configurations to determine the probability of intersystem LOCAs.

(continued)

BASES

BACKGROUND (continued)

PIVs are provided to isolate the RCS from the following typically connected systems:

a. Shutdown Cooling (SDC) System; and

b. Safety Injection System;

The PIVs are listed in UFSAR section (Ref. 6).

Violation of this LCO could result in continued degradation of a PIV, which could lead to overpressurization of a low pressure system and the loss of the integrity of a fission product barrier.

APPLICABLE SAFETY ANALYSES

Reference 4 identified potential intersystem LOCAs as a significant contributor to the risk of core melt. The dominant accident sequence in the intersystem LOCA category is the failure of the low pressure portion of the SDC System outside of containment. The accident is the result of a postulated failure of the PIVs, which are part of the Reactor Coolant Pressure Boundary (RCPB), and the subsequent pressurization of the SDC System downstream of the PIVs from the RCS. Because the low pressure portion of the SDC System is typically designed for 485 psig, overpressurization failure of the SDC low pressure line would result in a LOCA outside containment and subsequent risk of core melt.

Reference 5 evaluated various PIV configurations, leakage testing of the valves, and operational changes to determine the effect on the probability of intersystem LOCAs. This study concluded that periodic leakage testing of the PIVs can substantially reduce the probability of an intersystem LOCA.

RCS PIV leakage satisfies Criterion 2 of 10 CFR 50.36 (C)(2)(ii).

LCO

RCS PIV leakage is identified LEAKAGE into closed systems connected to the RCS. Isolation valve leakage is usually on the order of drops per minute. Leakage that increases

(continued)

BASES

LCO (continued)	significantly suggests that something is operationally wrong and corrective action must be taken. The LCO PIV leakage limit is 0.5 gpm per nominal inch of valve size, with a maximum limit of 5 gpm. The previous criterion of 1 gpm for all valve sizes imposed an unjustified penalty on the larger valves without providing information on potential valve degradation and resulted in higher personnel radiation exposures. A study concluded a leakage rate limit based on valve size was superior to a single allowable value. Reference 7 permits leakage testing at a lower pressure differential than between the specified maximum RCS pressure and the normal pressure of the connected system during RCS operation (the maximum pressure differential) in those types of valves in which the higher service pressure will tend to diminish the overall leakage channel opening. In such cases, the observed rate may be adjusted to the maximum pressure differential by assuming leakage is directly proportional to the pressure differential to the one half power.
APPLICABILITY	In MODES 1, 2, 3, and 4, this LCO applies because the PIV leakage potential is greatest when the RCS is pressurized. In MODE 4, valves in the SDC flow path are not required to meet the requirements of this LCO when in, or during the transition to or from, the SDC mode of operation. In MODES 5 and 6, leakage limits are not provided because the lower reactor coolant pressure results in a reduced potential for leakage and for a LOCA outside the containment.
ACTIONS	The Actions are modified by two Notes. Note 1 is added to provide clarification that each flow path allows separate entry into a Condition. This is allowed based on the functional independence of the flow path. Note 2 requires an evaluation of affected systems if a PIV is inoperable. The leakage may have affected system operability or isolation of a leaking flow path with an alternate valve may

(continued)

BASES

ACTIONS (continued)

have degraded the ability of the interconnected system to perform its safety function.

A.1 and A.2

The flowpath must be isolated by two valves. Required Actions A.1 and A.2 are modified by a Note stating that the valves used for isolation must meet the same leakage requirements as PIVs and must be in the RCPB.

Required Action A.1 requires that the isolation with one valve must be performed within 4 hours. Four hours provides time to reduce leakage in excess of the allowable limit and to isolate if leakage cannot be reduced. The 4 hours allows the actions and restricts the operation with leaking isolation valves.

The 72 hour Completion Time after exceeding the limit allows for the restoration of the leaking PIV to OPERABLE status. This timeframe considers the time required to complete this Action and the low probability of a second valve failing during this period.

B.1 and B.2

If leakage cannot be reduced the system isolated or other Required Actions accomplished, the plant must be brought to a MODE in which the LCO does not apply. To achieve this status, the plant must be brought to MODE 3 within 6 hours and to MODE 5 within 36 hours. This Action reduces the leakage and also reduces the potential for a LOCA outside the containment. The allowed Completion Times are reasonable, based on operating experience, to reach the required plant conditions from full power conditions in an orderly manner and without challenging plant systems.

SURVEILLANCE REQUIREMENTS

SR 3.4.15.1

Performance of leakage testing on each RCS PIV or isolation valve used to satisfy Required Action A.1 or A.2 is required to verify that leakage is below the specified limit and to identify each leaking valve. The leakage limit of 0.5 gpm per inch of nominal valve diameter up to 5 gpm maximum applies to each valve. Leakage testing requires a stable pressure condition.

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.4.15.1 (continued)

For the two PIVs in series, the leakage requirement applies to each valve individually and not to the combined leakage across both valves. If the PIVs are not individually leakage tested, one valve may have failed completely and not be detected if the other valve in series meets the leakage requirement. In this situation, the protection provided by redundant valves would be lost.

Testing is to be performed every 9 months, but may be extended up to 18 months, a typical refueling cycle, if the plant does not go into MODE 5 for at least 7 days. The 18 month Frequency is consistent with 10 CFR 50.55a(g) (Ref. 8), is within frequency allowed by the American Society of Mechanical Engineers (ASME) Code, Section XI (Ref. 7), and is based on the need to perform the Surveillance under conditions that apply during a plant outage and the potential for an unplanned transient if the Surveillance were performed with the reactor at power.

In addition, testing must be performed once after the valve has been opened by flow or exercised to ensure tight reseating. PIVs disturbed in the performance of this Surveillance should also be tested unless documentation shows that an infinite testing loop cannot practically be avoided. Testing must be performed within 24 hours after the valve has been reseated. Within 24 hours is a reasonable and practical time limit for performing this test after opening or reseating a valve.

The leakage limit is to be met at the RCS pressure associated with MODES 1 and 2. This permits leakage testing at high differential pressures with stable conditions not possible in the MODES with lower pressures.

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.4.15.1 (continued)

Entry into MODES 3 and 4 is allowed to establish the necessary differential pressures and stable conditions to allow for performance of this Surveillance. The Note that allows this provision is complimentary to the Frequency of prior to entry into MODE 2 whenever the unit has been in MODE 5 for 7 days or more, if leakage testing has not been performed in the previous 9 months. In addition, this Surveillance is not required to be performed on the SDC System when the SDC System is aligned to the RCS in the shutdown cooling mode of operation. PIVs contained in the SDC shutdown cooling flow path must be leakage rate tested after SDC is secured and stable unit conditions and the necessary differential pressures are established.

SR 3.4.15.2

Verifying that the SDC open permissive interlocks are OPERABLE ensures that RCS pressure will not pressurize the SDC system beyond 125% of its design pressure of 485 psig. The interlock setpoint that prevents the valves from being opened is set so the actual RCS pressure must be 410 psia to open the valves. This setpoint ensures the SDC design pressure will not be exceeded and the SDC relief valves will not lift. The 18 month Frequency is based on the need to perform these Surveillances under conditions that apply during a plant outage. The 18 month Frequency is also acceptable based on consideration of the design reliability (and confirming operating experience) of the equipment.

(continued)

BASES (continued)

REFERENCES

1. 10 CFR 50.2.
2. 10 CFR 50.55a(c).
3. 10 CFR 50, Appendix A, Section V, GDC 55.
4. WASH-1400 (NUREG-75/014), Appendix V, October 1975.
5. NUREG-0677, May 1980.
6. UFSAR, Section 3.9.6.2
7. ASME, Boiler and Pressure Vessel Code, Section XI.
8. 10 CFR 50.55a(g).

B 3.4 REACTOR COOLANT SYSTEM (RCS)

B 3.4.16 RCS Leakage Detection Instrumentation

BASES

BACKGROUND

GDC 30 of Appendix A to 10 CFR 50 (Ref. 1) requires means for detecting and, to the extent practical, identifying the location of the source of RCS LEAKAGE. Regulatory Guide 1.45 (Ref. 2) describes acceptable methods for selecting leakage detection systems.

Leakage detection systems must have the capability to detect significant Reactor Coolant Pressure Boundary (RCPB) degradation as soon after occurrence as practical to minimize the potential for propagation to a gross failure. Thus, an early indication or warning signal is necessary to permit proper evaluation of all unidentified LEAKAGE.

Industry practice has shown that water flow changes of 0.5 gpm to 1.0 gpm can readily be detected in contained volumes by monitoring changes in water level, in flow rate, or in the operating frequency of a pump. The containment sump monitor consists of instrumentation used to monitor containment sump level and flow (pump run time). The containment sump used to collect unidentified LEAKAGE is instrumented to alarm at 1.0 gpm above normal flow for 1 hour (Ref. 3). This sensitivity is acceptable for detecting increases in unidentified LEAKAGE.

The reactor coolant contains radioactivity that, when released to the containment, can be detected by radiation monitoring instrumentation. Reactor coolant radioactivity levels will be low during initial reactor startup and for a few weeks thereafter until activated corrosion products have been formed and fission products appear from fuel element cladding contamination or cladding defects. Instrument sensitivities of 10^{-9} μCi/cc radioactivity for particulate monitoring and of 10^{-6} μCi/cc radioactivity for gaseous monitoring are practical for these leakage detection systems. Radioactivity detection systems are included for monitoring both particulate and gaseous activities, because of their sensitivities and responses to RCS LEAKAGE.

(continued)

BASES

BACKGROUND (continued)

An increase in humidity of the containment atmosphere would indicate release of water vapor to the containment. Dew point temperature measurements can thus be used to monitor humidity levels of the containment atmosphere as an indicator of potential RCS LEAKAGE. A 1°F increase in dew point is well within the sensitivity range of available instruments.

Since the humidity level is influenced by several factors, a quantitative evaluation of an indicated leakage rate by this means may be questionable and should be compared to observed increases in liquid flow into or from the containment sump. Humidity level monitoring is considered most useful as an indirect alarm or indication to alert the operator to a potential problem. Humidity monitors are not required by this LCO.

Air temperature and pressure monitoring methods may also be used to infer unidentified LEAKAGE to the containment. Containment temperature and pressure fluctuate slightly during plant operation, but a rise above the normally indicated range of values may indicate RCS LEAKAGE into the containment. The relevance of temperature and pressure measurements are affected by containment free volume and, for temperature, detector location. Alarm signals from these instruments can be valuable in recognizing a sizable leakage to the containment. Temperature and pressure monitors are not required by this LCO.

APPLICABLE SAFETY ANALYSES

The need to evaluate the severity of an alarm or an indication is important to the operators, and the ability to compare and verify with indications from other systems is necessary. The RCS leakage detection instrumentation is described in the UFSAR (Ref. 3). Multiple instrument locations are utilized, if needed, to help identify the location of the LEAKAGE source.

(continued)

BASES

APPLICABLE SAFETY ANALYSES (continued)

The safety significance of RCS LEAKAGE varies widely depending on its source, rate, and duration. Therefore, detecting and monitoring RCS LEAKAGE into the containment area are necessary. Quickly separating the identified LEAKAGE from the unidentified LEAKAGE provides quantitative information to the operators, allowing them to take corrective action should leakage occur detrimental to the safety of the facility and the public.

RCS leakage detection instrumentation satisfies Criterion 1 of 10 CFR (C)(2)(ii).

LCO

One method of protecting against large RCS LEAKAGE derives from the ability of instruments to detect extremely small leaks. This LCO requires instruments of diverse monitoring principles to be OPERABLE to provide a high degree of confidence that extremely small leaks are detected in time to allow actions to place the plant in a safe condition when RCS LEAKAGE indicates possible RCPB degradation.

The LCO is satisfied when monitors of diverse measurement means are available. Thus, the containment sump monitor, in combination with a particulate and gaseous radioactivity monitor provides an acceptable minimum. It has been determined that it is acceptable to continue to call the containment sump OPERABLE with one containment sump pump out of service.

APPLICABILITY

Because of elevated RCS temperature and pressure in MODES 1, 2, 3, and 4, RCS leakage detection instrumentation is required to be OPERABLE.

In MODE 5 or 6, the temperature is ≤ 210°F and pressure is maintained low or at atmospheric pressure. Since the temperatures and pressures are far lower than those for MODES 1, 2, 3, and 4, the likelihood of leakage and crack propagation is much smaller. Therefore, the requirements of this LCO are not applicable in MODES 5 and 6.

(continued)

BASES (continued)

ACTIONS

The Actions are modified by a Note that indicates the provisions of LCO 3.0.4 are not applicable. As a result, a MODE change is allowed when the containment sump and required containment atmosphere radioactivity monitor channels are inoperable. This allowance is provided because other means are available to monitor for RCS LEAKAGE.

A.1 and A.2

If the containment sump monitor is inoperable, no other form of sampling can provide the equivalent information.

However, the containment atmosphere radioactivity monitor will provide indications of changes in leakage. Together with the atmosphere monitor, the periodic surveillance for RCS water inventory balance, SR 3.4.14.1, must be performed at an increased frequency of 24 hours to provide information that is adequate to detect leakage.

Restoration of the sump monitor to OPERABLE status is required to regain the function in a Completion Time of 30 days after the monitor's failure. This time is acceptable considering the frequency and adequacy of the RCS water inventory balance required by Required Action A.1.

B.1.1, B.1.2, and B.2

With either gaseous or particulate containment atmosphere radioactivity monitoring instrumentation channels inoperable, alternative action is required. Either grab samples of the containment atmosphere must be taken and analyzed, or water inventory balances, in accordance with SR 3.4.14.1, must be performed to provide alternate periodic information. With a sample obtained and analyzed or an inventory balance performed every 24 hours, the reactor may be operated for up to 30 days to allow restoration of both of the radioactivity monitors.

The 24 hour interval provides periodic information that is adequate to detect leakage. The 30 day Completion Time recognizes at least one other form of leakage detection is available.

(continued)

BASES (continued)

ACTIONS (continued)

C.1

If any Required Action of Condition A or B cannot be met within the required Completion Time, the plant must be brought to a MODE in which the LCO does not apply. To achieve this status, the plant must be brought to at least MODE 3 within 6 hours and to MODE 5 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required plant conditions from full power conditions in an orderly manner and without challenging plant systems.

D.1

If all required monitors are inoperable, no automatic means of monitoring leakage are available and immediate plant shutdown in accordance with LCO 3.0.3 is required.

SURVEILLANCE REQUIREMENTS

SR 3.4.16.1

SR 3.4.16.1 requires the performance of a CHANNEL CHECK of the required containment atmosphere radioactivity monitors. The check gives reasonable confidence the channel is operating properly. The Frequency of 12 hours is based on instrument reliability and is reasonable for detecting off normal conditions.

SR 3.4.16.2

SR 3.4.16.2 requires the performance of a CHANNEL FUNCTIONAL TEST of the required containment atmosphere radioactivity monitors. The test ensures that the monitor can perform its function in the desired manner. The test verifies the alarm setpoint and relative accuracy of the instrument string. The Frequency of 92 days considers instrument reliability, and operating experience has shown it proper for detecting degradation.

(continued)

BASES (continued)

SURVEILLANCE REQUIREMENTS (continued)	SR 3.4.16.3, SR 3.4.16.4 These SRs require the performance of a CHANNEL CALIBRATION for each of the RCS leakage detection instrumentation channels. The calibration verifies the accuracy of the instrument string, including the instruments located inside containment. The Frequency of 18 months is a typical refueling cycle and considers channel reliability. Operating experience has shown this Frequency is acceptable.
REFERENCES	1. 10 CFR 50, Appendix A, Section IV, GDC 30. 2. Regulatory Guide 1.45. 3. UFSAR, Section 5.2.5.

B 3.4 REACTOR COOLANT SYSTEM (RCS)

B 3.4.17 RCS Specific Activity

BASES

BACKGROUND

The Code of Federal Regulations, 10 CFR 100 (Ref. 1) specifies the maximum dose to the whole body and the thyroid an individual at the site boundary can receive for 2 hours during an accident. The limits on specific activity ensure that the doses are held to a small fraction of the 10 CFR 100 limits during analyzed transients and accidents.

The RCS specific activity LCO limits the allowable concentration level of radionuclides in the reactor coolant. The LCO limits are established to minimize the offsite radioactivity dose consequences in the event of a steam generator tube rupture (SGTR) accident.

The LCO contains specific activity limits for both DOSE EQUIVALENT I-131 and gross specific activity. The allowable levels are intended to limit the 2 hour dose at the site boundary to a small fraction of the 10 CFR 100 dose guideline limits. The limits in the LCO are standardized based on parametric evaluations of offsite radioactivity dose consequences for typical site locations.

The parametric evaluations showed the potential offsite dose levels for an SGTR accident were an appropriately small fraction of the 10 CFR 100 dose guideline limits. Each evaluation assumes a broad range of site applicable atmospheric dispersion factors in a parametric evaluation.

APPLICABLE SAFETY ANALYSES

The LCO limits on the specific activity of the reactor coolant ensure that the resulting 2 hour doses at the site boundary will not exceed a small fraction of the 10 CFR 100 dose guideline limits following an SGTR accident. The SGTR safety analysis (Ref. 2) assumes the specific activity of the reactor coolant at the LCO limits and an existing reactor coolant steam generator (SG) tube leakage rate of 1 gpm.

The analysis for the SGTR accident establishes the acceptance limits for RCS specific activity. Reference to

(continued)

BASES

APPLICABLE SAFETY ANALYSES (continued)

this analysis is used to assess changes to the facility that could affect RCS specific activity as they relate to the acceptance limits.

The rise in pressure in the ruptured SG causes radioactively contaminated steam to discharge to the atmosphere through the atmospheric dump valves or the main steam safety valves. The atmospheric discharge stops when the turbine bypass to the condenser removes the excess energy to rapidly reduce the RCS pressure and close the valves. The unaffected SG removes core decay heat by venting steam until the cooldown ends.

The safety analysis shows the radiological consequences of an SGTR accident are within a small fraction of the Reference 1 dose guideline limits. Operation with iodine specific activity levels greater than the LCO limit is permissible, if the activity levels do not exceed the limits shown in Figure 3.4.17-1 for more than 48 hours.

The remainder of the above limit permissible iodine levels shown in Figure 3.4.17-1 are acceptable because of the low probability of an SGTR accident occurring during the established 48 hour time limit. The occurrence of an SGTR accident at these permissible levels could increase the site boundary dose levels, but still be within 10 CFR 100 dose guideline limits.

RCS specific activity satisfies Criterion 2 of 10 CFR 50.36 (c)(2)(ii).

LCO

The specific iodine activity is limited to 1.0 μCi/gm DOSE EQUIVALENT I-131, and the gross specific activity in the primary coolant is limited to the number of μCi/gm equal to 100 divided by $\bar{E}$ (average disintegration energy of the sum of the average beta and gamma energies of the coolant nuclides). The limit on DOSE EQUIVALENT I-131 ensures the 2 hour thyroid dose to an individual at the site boundary during the Design Basis Accident (DBA) will be a small fraction of the allowed thyroid dose. The limit on gross specific activity ensures the 2 hour whole body dose to an individual at the site boundary during the DBA will be a small fraction of the allowed whole body dose.

(continued)

BASES

LCO (continued)	The SGTR accident analysis (Ref. 2) shows that the 2 hour site boundary dose levels are within acceptable limits. Violation of the LCO may result in reactor coolant radioactivity levels that could, in the event of an SGTR, lead to site boundary doses that exceed the 10 CFR 100 dose guideline limits.
APPLICABILITY	In MODES 1 and 2, and in MODE 3 with RCS cold leg temperature ≥ 500°F, operation within the LCO limits for DOSE EQUIVALENT I-131 and gross specific activity is necessary to contain the potential consequences of an SGTR to within the acceptable site boundary dose values. For operation in MODE 3 with RCS cold leg temperature < 500°F, and in MODES 4 and 5, the release of radioactivity in the event of an SGTR is unlikely since the saturation pressure of the reactor coolant is below the lift pressure settings of the atmospheric dump valves and main steam safety valves.
ACTIONS	<u>A.1 and A.2</u> With the DOSE EQUIVALENT I-131 greater than the LCO limit, samples at intervals of 4 hours must be taken to demonstrate the limits of Figure 3.4.17-1 are not exceeded. The Completion Time of 4 hours is required to obtain and analyze a sample. Sampling must continue for trending. The DOSE EQUIVALENT I-131 must be restored to within limits within 48 hours. The Completion Time of 48 hours is required if the limit violation resulted from normal iodine spiking.

(continued)

BASES

ACTIONS

A.1 and A.2 (continued)

A Note to the Required Actions of Condition A excludes the MODE change restriction of LCO 3.0.4. This exception allows entry into the applicable MODE(S) while relying on the ACTIONS even though the ACTIONS may eventually require plant shutdown. This exception is acceptable due to the significant conservatism incorporated into the specific activity limit, the low probability of an event which is limiting due to exceeding this limit, and the ability to restore transient specific activity excursions while the plant remains at, or proceeds to power operation.

B.1

If a Required Action and associated Completion Time of Condition A is not met or if the DOSE EQUIVALENT I-131 is in the unacceptable region of Figure 3.4.17-1, the reactor must be brought to MODE 3 with RCS cold leg temperature < 500°F within 6 hours. The allowed Completion Time of 6 hours is required to reach MODE 3 below 500°F without challenging plant systems.

C.1 and C.2

With the gross specific activity in excess of the allowed limit, an analysis must be performed within 4 hours to determine DOSE EQUIVALENT I-131. The Completion Time of 4 hours is required to obtain and analyze a sample.

The change within 6 hours to MODE 3 and RCS cold leg temperature < 500°F lowers the saturation pressure of the reactor coolant below the setpoints of the main steam safety valves and minimizes the potential for venting the SG to the environment in an SGTR event. The allowed Completion Time of 6 hours is required to reach MODE 3 below 500°F from full power conditions and without challenging plant systems.

(continued)

BASES (continued)

SURVEILLANCE REQUIREMENTS

SR 3.4.17.1

The Surveillance requires performing a gamma isotopic analysis as a measure of the gross specific activity of the reactor coolant at least once per 7 days. While basically a quantitative measure of radionuclides with half lives longer than 15 minutes, excluding iodines, this measurement is the sum of the degassed gamma activities and the gaseous gamma activities in the sample taken. This Surveillance provides an indication of any increase in gross specific activity. Trending the results of this Surveillance allows proper remedial action to be taken before reaching the LCO limit under normal operating conditions. The Surveillance is applicable in MODES 1 and 2, and in MODE 3 with RCS cold leg temperature at least 500°F. The 7 day Frequency considers the unlikelihood of a gross fuel failure during the time.

SR 3.4.17.2

This Surveillance is performed to ensure iodine remains within limit during normal operation and following fast power changes when fuel failure is more apt to occur. The 14 day Frequency is adequate to trend changes in the iodine activity level considering gross activity is monitored every 7 days. The Frequency, between 2 hours and 6 hours after a power change of ≥ 15% RTP within a 1 hour period, is established because the iodine levels peak during this time following fuel failure; samples at other times would provide inaccurate results.

SR 3.4.17.2 14 day Frequency is modified by a Note which requires the Surveillance to only be performed in MODE 1. This is required because the level of fission products generated in other MODES is much less. Also, fuel failures associated with fast power changes is more apt to occur in MODE 1 than in MODES 2 or 3.

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.4.17.3

A radiochemical analysis for $\bar{E}$ determination is required every 184 days (6 months) with the plant operating in MODE 1 equilibrium conditions. The $\bar{E}$ determination directly relates to the LCO and is required to verify plant operation within the specified gross activity LCO limit. The analysis for $\bar{E}$ is a measurement of the average energies per disintegration for isotopes with half lives longer than 15 minutes, excluding iodines. The Frequency of 184 days recognizes $\bar{E}$ does not change rapidly.

This SR has been modified by a Note that indicates sampling is required to be performed within 31 days after 2 effective full power days and 20 days of MODE 1 operation have elapsed since the reactor was last subcritical for ≥ 48 hours should the 184 day Frequency interval be exceeded. Further discussion of SR Note format is found in Section 1.4, Frequency. This ensures the radioactive materials are at equilibrium so the analysis for $\bar{E}$ is representative and not skewed by a crud burst or other similar abnormal event.

REFERENCES

1. 10 CFR 100.11, 1973.
2. UFSAR, Section 15.6.3.

CE STS
NUREG-1432 REV. 1
SPECIFICATION 3.4.1
MARK UP

<DOC>
<CTS>

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.1 RCS Pressure, Temperature, and Flow ~~[Departure from Nucleate Boiling (DNB)]~~ Limits

LCO 3.4.1 RCS DNB parameters for pressurizer pressure, cold leg temperature, and RCS total flow rate shall be within the limits specified below:

<LCO 3.2.8> a. Pressurizer pressure ≥ ~~[2025]~~ 2130 (2) psia and ≤ ~~[2275]~~ 2295 psia; and

<LCO 3.2.6> b. RCS cold leg temperature (T_c) ~~≥ [535]°F and ≤ [558]°F for < [70]% RTP, or ≥ [544]°F and ≤ [558]°F for ≥ [70]% RTP; and~~ shall be within the Area of Acceptable Operation shown in Figure 3.4.1-1 (1)

<LCO 3.2.5> c. RCS total flow rate ≥ ~~[148]~~ 155.8 (2) E6] lb/hour ~~and ≤ [177.6 E6] lb/hour~~. (6)

APPLICABILITY: MODE 1 for RCS total flow rate, MODES 1 and 2 for pressurizer pressure, (4)

<DOC L.1>

-----NOTE-----

Pressurizer pressure limit does not apply during:

a. THERMAL POWER ramp > 5% RTP per minute; or

b. THERMAL POWER step > 10% RTP.

MODES 1 and 2 with K_{eff} ≥ 1 for RCS cold leg temperature (T_c).

ACTIONS

	CONDITION	REQUIRED ACTION	COMPLETION TIME
<3.2.5 ACT>	A. ~~Pressurizer pressure or~~ RCS flow rate not within limit~~s~~.	A.1 Restore ~~parameter(s)~~ RCS flow rate to within limit. (4)	2 hours
<3.2.5 ACT>	B. Required Action and associated Completion Time of Condition A not met.	B.1 Be in MODE 2.	6 hours

(continued)

ACTIONS (continued)

	CONDITION	REQUIRED ACTION	COMPLETION TIME
<3.2.6 ACT> <3.2.8 ACT>	C. Pressurizer pressure or RCS cold leg temperature not within limits.	C.1 Restore ~~cold leg temperature~~ parameter(s) to within limits. (B) (4)	2 hours
<3.2.6 ACT> <3.2.8 ACT>	D. Required Action and associated Completion Time of Condition C not met.	D.1 ~~Reduce THERMAL POWER to ≤ [30]% RTP.~~ Be in MODE 3. (4)	6 hours

SURVEILLANCE REQUIREMENTS

		SURVEILLANCE	FREQUENCY
<4.2.8>	SR 3.4.1.1	Verify pressurizer pressure ≥ ~~[2025]~~ 2130 psia and ≤ ~~[2275]~~ 2295 psia. (2)	12 hours
<4.2.6>	SR 3.4.1.2	Verify RCS cold leg temperature ~~≥ [535]°F and ≤ [558]°F for < [70]% RTP or ≥ [544]°F and ≤ [558]°F for ≥ [70]% RTP~~ within limits as shown in Figure 3.4.1-1. (1)	12 hours
<4.2.5>	SR 3.4.1.3	-------------------NOTE------------------- Required to be met in MODE 1 with all RCPs running. -- Verify RCS total flow rate ≥ ~~[148 E6]~~ 155.8 E6 lb/hour ~~and ≤ [177.5 E6] lb/hour~~. (2) (6)	12 hours

(continued)

SURVEILLANCE REQUIREMENTS (continued)

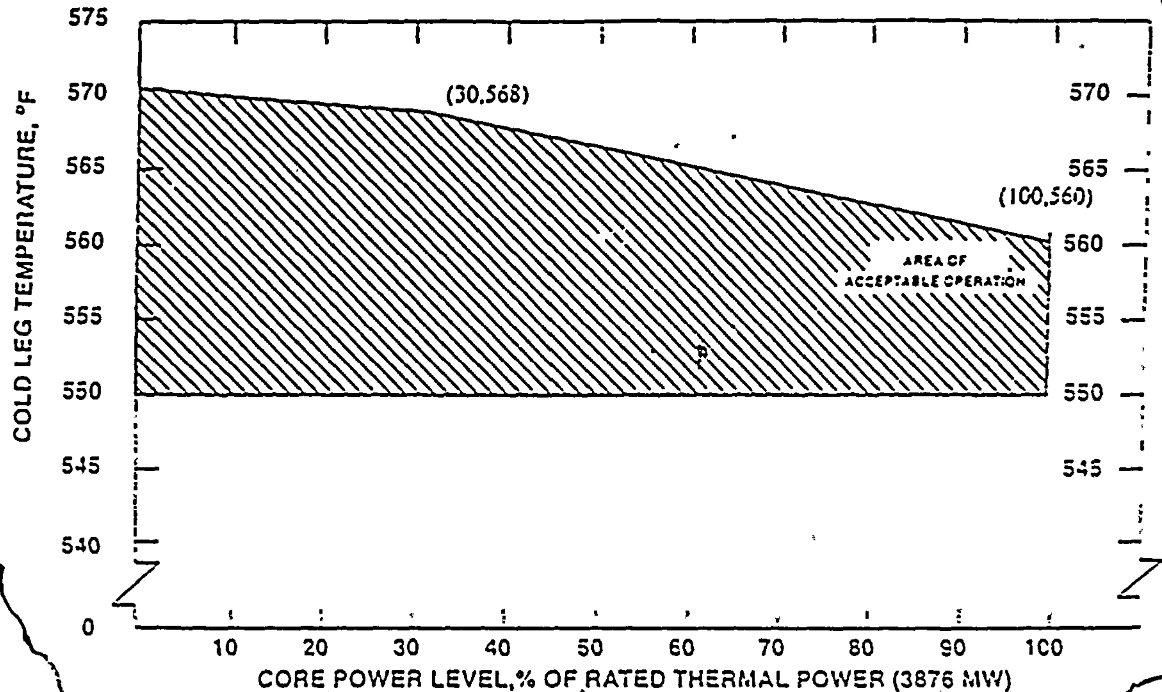
SURVEILLANCE		FREQUENCY
SR 3.4.1.4	-----------------NOTE----------------- Not required to be performed until [24] hours after ≥ [90]% RTP. --------------------------------------- Verify by precision heat balance that RCS total flow rate within limits specified in the COLR.	[18] months

3

Insert CTS Reactor Coolant Cold Leg Temperature vs. Core Power level, figure 3.2-1

1

FIGURE ~~3.2-1 (INSERT)~~ 3.4.1-1
REACTOR COOLANT COLD LEG TEMPERATURE VS. CORE POWER LEVEL



REACTOR COOLANT COLD LEG TEMPERATURE vs. CORE POWER LEVEL

Move CTS Figure 3.2-1 / ITS Figure 3.4.1-1 from CTS Page 3/4 2-8 to here

CE STS
NUREG-1432 REV. 1
SPECIFICATION 3.4.1
BASES MARK UP

B 3.4 REACTOR COOLANT SYSTEM (RCS)

B 3.4.1 RCS Pressure, Temperature, and Flow (Departure from Nucleate Boiling (DNB)) Limits

BASES

BACKGROUND

These Bases address requirements for maintaining RCS pressure, temperature, and flow rate within limits assumed in the safety analyses. The safety analyses (Ref. 1) of normal operating conditions and anticipated operational occurrences assume initial conditions within the normal steady state envelope. The limits placed on DNB related parameters ensure that these parameters will not be less conservative than were assumed in the analyses and thereby provide assurance that the minimum departure from nucleate boiling ratio (DNBR) will meet the required criteria ~~for~~ each of the transients analyzed.

8 D 8 N D r

The LCO limits for minimum and maximum RCS pressures as measured at the pressurizer are consistent with operation within the nominal operating envelope and are bounded by those used as the initial pressures in the analyses.

The LCO limits for minimum and maximum RCS cold leg temperatures are consistent with operation at the indicated power level and are bounded by those used as the initial temperatures in the analyses.

are in accordance with the Area of Acceptable Operation shown in Figure 3.4.1-1,

1

The LCO limits for minimum ~~and maximum~~ RCS flow rates ~~are~~ bounded by those used as the initial flow rates in the analyses. The RCS flow rate is not expected to vary during plant operation with all pumps running.

15 6

APPLICABLE SAFETY ANALYSES

The requirements of LCO 3.4.1 represent the initial conditions for DNB limited transients analyzed in the safety analyses (Ref. 1). The safety analyses have shown that transients initiated from the limits of this LCO will meet the DNBR criterion of ≥ [1.3]. This is the acceptance limit for the RCS DNB parameters. Changes to the facility that could impact these parameters must be assessed for their impact on the DNBR criterion. The transients analyzed for include loss of coolant flow events and dropped or stuck control element assembly (CEA) events. A key assumption for the analysis of these events is that the core power

C E A 8

(continued)

BASES

APPLICABLE SAFETY ANALYSES (continued)

distribution is within the limits of ~~[~~LCO 3.1.7, "Regulating CEA Insertion Limits"; LCO 3.1.8, "Part Length CEA Insertion Limits"; LCO 3.2.3, "AZIMUTHAL POWER TILT (T_q)"; and LCO 3.2.5, "AXIAL SHAPE INDEX (ASI) ~~(Digital)~~"; ~~[LCO 3.1.7, "Regulating Rod Insertion Limits"; LCO 3.2.4, "AZIMUTHAL POWER TILT (T_q)"; and LCO 3.2.5, "AXIAL SHAPE INDEX (Analog)"]~~. The safety analyses are performed over the following range of initial values: RCS pressure ~~[1785-2400] psia~~ 2105-2320 psia, core inlet temperature ~~[500-580]~~ 548-570 °F, and reactor vessel inlet coolant flow rate ~~[~~95 ~~[~~%.

The RCS DNB limits satisfy Criterion 2 of the ~~NRC Policy Statement~~ 10 CFR 50.36 (c)(2)(ii).

9 2 6 8

LCO

This LCO specifies limits on the monitored process variables—RCS pressurizer pressure, RCS cold leg temperature, and RCS total flow rate—to ensure that the core operates within the limits assumed for the plant safety analyses. Operating within these limits will result in meeting the DNBR criterion in the event of a DNB limited transient.

The LCO ~~numerical values~~ for pressure, temperature, and minimum flow rate ~~are~~ given for the measurement location but ~~have~~ has not been adjusted for instrument error. Plant specific limits of instrument error are established by the plant staff to meet the operational requirements of ~~this LCO~~ minimum flow rate.

5 6 8

APPLICABILITY

In MODE 1, the limits on RCS pressurizer pressure, RCS cold leg temperature, and RCS flow rate must be maintained during steady state operation in order to ensure that DNBR criteria will be met in the event of an unplanned loss of forced coolant flow or other DNB limited transient. In all other MODES, the power level is low enough so that DNBR is not a concern.

4 Insert 1

A Note has been added to indicate the limit on pressurizer pressure may be exceeded during short term operational transients such as a THERMAL POWER ramp increase of > 5% RTP per minute or a THERMAL POWER step increase of > 10% RTP. These conditions represent short term perturbations where actions to control pressure variations might be

(continued)

INSERT FOR ITS BASES 3.4.1
APPLICABILITY BASES
(Units 1, 2, and 3)
<u>INSERT 1</u>

APPLICABILITY	for RCS flow rate, MODES 1 and 2 for RCS pressurizer pressure, and MODES 1 and 2 with $K_{eff} \geq 1$ for RCS cold leg temperature, the limits

BASES

APPLICABILITY (continued)

counterproductive. Also, ~~since they represent transients initiated from power levels < 100% RTP, an increased~~ DNBR margin exists to offset the temporary pressure variations. 7

Another set of limits on DNB related parameters is provided in Safety Limit (SL) 2.1.1, "Reactor Core Safety Limits." Those limits are less restrictive than the limits of this LCO, but violation of SLs merits a stricter, more severe Required Action. Should a violation of this LCO occur, the operator should check whether or not an SL may have been exceeded.

ACTIONS

A.1

4

~~Pressurizer pressure is a controllable and measurable parameter. With this parameter not within the LCO limits, action must be taken to restore the parameter.~~

~~The 2 hour Completion Time is based on plant operating experience that shows the parameter can be restored in this time period.~~

RCS flow rate is not a controllable parameter and is not expected to vary during steady state operation. If the flow rate is not within the LCO limit, then power must be reduced, as required by Required Action B.1, to restore DNB margin and eliminate the potential for violation of the accident analysis bounds.

10 RCS flowrate

The 2 hour Completion Time for restoration of ~~the parameters~~ provides sufficient time ~~to adjust plant parameters,~~ to determine the cause of the off normal condition, and to restore the readings within limits. The Completion Time is based on plant operating experience. 8

B.1

If Required Action A.1 is not met within the associated Completion Time, the plant must be brought to a MODE in which the LCO does not apply. To achieve this status, the plant must be brought to at least MODE 2 within 6 hours. In MODE 2, the reduced power condition eliminates the potential for violation of the accident analysis bounds.

(continued)

BASES

ACTIONS

B.1 (continued)

Six hours is a reasonable time that permits the plant power to be reduced at an orderly rate in conjunction with even control of ~~S~~ s team ~~G~~ g enerator (SG) heat removal. 8 8

C.1

Pressurizer pressure and 4

~~C~~ cold leg temperature ~~is~~ are controllable and measurable ~~parameter~~ parameters. If ~~this~~ a parameter is not within the LCO limits, action must be taken to restore the parameter. 8

The 2 hour Completion Time is based on plant operating experience that shows that ~~the parameter~~ these parameters can be restored in this time period. 8

D.1

If Required Action C.1 is not met within the associated Completion Time, ~~THERMAL POWER must be reduced to ≤ [30%] RTP. Plant operation may continue for an indefinite period of time in this condition. At the reduced power level,~~ place the plant in MODE 3. In MODE 3 the potential for violation of the DNB limits is greatly reduced. 4

The 6 hour Completion Time is a reasonable time that permits power reduction at an orderly rate in conjunction with even control of SG heat removal.

SURVEILLANCE REQUIREMENTS

SR 3.4.1.1

C 10

Since Required Action ~~A~~ C.1 allows a Completion Time of 2 hours to restore parameters that are not within limits, the 12 hour Surveillance Frequency for pressurizer pressure is sufficient to ensure that the pressure can be restored to a normal operation, steady state condition following load changes and other expected transient operations. The 12 hour interval has been shown by operating practice to be sufficient to regularly assess for potential degradation and verify operation is within safety analysis assumptions.

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.4.1.2

Since Required Action ~~A~~ C.1 allows a Completion Time of 2 hours to restore parameters that are not within limits, the 12 hour Surveillance Frequency for cold leg temperature is sufficient to ensure that the RCS coolant temperature can be restored to a normal operation, steady state condition following load changes and other expected transient operations. The 12 hour interval has been shown by operating practice to be sufficient to regularly assess for potential degradation and to verify operation is within safety analysis assumptions.

(10)

SR 3.4.1.3

The 12 hour Surveillance Frequency for RCS total flow rate is performed using the installed flow instrumentation. The 12 hour Frequency has been shown by operating experience to be sufficient to assess for potential degradation and to verify operation is within safety analysis assumptions.

This SR is modified by a Note that only requires performance of this SR in MODE 1. The Note is necessary to allow measurement of RCS flow rate at normal operating conditions at power with all RCPs running.

~~SR 3.4.1.4~~

~~Measurement of RCS total flow rate by performance of a precision calorimetric heat balance once every [18] months. This allows the installed RCS flow instrumentation to be calibrated and verifies that the actual RCS flow rate is within the bounds of the analyses.~~

~~The Frequency of [18] months reflects the importance of verifying flow after a refueling outage where the core has been altered, which may have caused an alteration of flow resistance.~~

~~The SR is modified by a Note that states the SR is only required to be performed [24] hours after ≥ [90]% RTP. The Note is necessary to allow measurement of the flow rate at normal operating conditions at power in MODE 1. The~~

(3)

(continued)

BASES

SURVEILLANCE REQUIREMENTS	SR 3.4.1.4 (continued) ~~Surveillance cannot be performed in MODE 2 or below, and will not yield accurate results if performed below 90% RTP.~~ (3)
REFERENCES (2)	1. (U) FSAR, Section ~~[~~15~~]~~.

NUREG-1432 EXCEPTIONS
SPECIFICATION 3.4.1

1. ITS 3.4.1 uses a figure to stipulate area of acceptable operation for RCS cold leg temperature. NUREG-1432, 3.4.1, uses textual description to describe the area of acceptable operation for RCS cold leg temperature. Because PVNGS plant specific data concerning RCS cold leg temperature is not conducive to textual format, PVNGS will continue to apply the current licensing basis and use Figure 3.4.1-1 in ITS for RCS cold leg temperature. The Bases has also been revised to be consistent with the LCO.

2. The plant specific titles, nomenclature, number, parameter/value reference, system description, system design, operating practices or analysis description was used (additions, deletions, and/or changes are included). Plant specific parameter/values are directly transferred from the CTS to the ITS.

3. ITS eliminates the NUREG-1432, SR 3.4.1.4, requirement to perform a precision heat balance every 18 months to ensure total RCS flow rate is within limits specified in the COLR. ITS 3.3.1, Reactor Protective Instrumentation - Operating, allows the use of either calorimetric or RCP differential pressure instrumentation with ultrasonic flow meter adjusted RCP curves for flow verification. PVNGS uses the RCP differential pressure instrumentation with ultrasonic flow meter adjusted RCP curves option and will continue its use due do the additional margin it provides in the safety analyses. Use of the calorimetric method penalizes PVNGS safety analyses with less margin. RCS flow rate verification, by use of RCP differential pressure instrumentation with ultrasonic flow meter adjusted RCP curves, ensures that the actual flow rate is within the bounds of the safety analysis and the PVNGS Cycle Independent Data Assumption List. Also, ITS SRs 3.3.1.2 and 3.3.1.5 satisfy NUREG-1432 SR 3.4.1.4 on a 12 hour and 31 day Frequency, respectively, rather than an 18 month Frequency. Performing NUREG-1432 SR 3.4.1.4 precision heat balance every 18 months is not needed when CTS licensing bases allows use of the RCP differential pressure instrumentation with ultrasonic flow meter adjusted RCP curves method on a 12 hour and 31 day Frequency. This is consistent with PVNGS licensing basis.

4. NUREG-1432, 3.4.1, requires that the Unit enter MODE 2 if pressurizer pressure is not within limits for > 2 hours. Also, NUREG-1432, 3.4.1, allows a power reduction to approximately 30% when RCS cold leg temperature is not within limits for > 2 hours. ITS 3.4.1 requires that the Unit enter MODE 3 under the same circumstances for pressurizer pressure and RCS cold leg temperature. This is based on the fact that there exists safety analysis for Heat Removal Accidents, CEA Ejection, and Steam Line Break in MODES 1 and 2 that assume pressurizer pressure and RCS cold leg temperature are within expected values for initial conditions. These expected values are derived from the pressurizer pressure and RCS cold leg temperature parameter values stated in the ITS. Therefore, PVNGS will continue to use MODE 1 and 2 Applicability for pressurizer pressure and RCS cold leg temperature, and require Unit entry into MODE 3 if corrective Actions can not restore, within 2 hours, the parameter(s) to within limits. Also, pressurizer pressure is moved from Action A to Action C since RCS cold leg temperature and pressurizer pressure have the same Actions. This is consistent with PVNGS licensing basis. The Bases has also been revised to be consistent with the LCO.

5. NUREG-1432, 3.4.1 LCO Bases, makes a statement that the numerical values for pressure, temperature, and flow rate are given for the measurement location but have not been adjusted for instrument error. ITS 3.4.1 does not include this statement, as it pertains to pressurizer pressure and cold leg temperature, as part of the LCO Bases. The values for pressurizer pressure and cold leg temperature used in ITS 3.4.1 are already compensated for instrument error. This is consistent with PVNGS licensing basis.

6. NUREG-1432, LCO 3.4.1, includes a maximum RCS flow rate value. ITS LCO 3.4.1 does not use a maximum RCS flow rate value. Maximum RCS flow rate is not a parameter considered to be limiting by PVNGS safety analysis. PVNGS UFSAR clearly implies that the minimum RCS flow rate will be used for thermal margin analysis. It also clearly states that design maximum flow rate is used in the determination of design hydraulic loads, without mentioning thermal analysis. This is logical as design maximum flow rate is not a concern for thermal margin analyses, higher flow rates will only produce better (larger) margins to DNB. Since RCS flow rate is not a controllable parameter, is not expected to vary during steady state operation, and maximum flow rate is not used in thermal margin analysis, there is no reason to include RCS maximum flow rate as part of LCO 3.4.1. The removal of RCS maximum flow rate is a deviation from NUREG-1432 but is consistent with PVNGS Licensing basis. The Bases has also been revised to be consistent with the LCO.

7. NUREG-1432, 3.4.1 Applicability Bases states that since transients are initiated from power levels < 100%, an increased DNBR margin exists to offset any temporary pressure variations. This implies that the pressurizer pressure exclusion does not apply ≥ 100% RTP. This is not correct. PVNGS is digital plant with CPCs that dynamically monitor pressure, flow rate, and power to calculate DNBR. If the condition arises where high power, low flow, and low pressure cause DNBR to approach its safety limit, a reactor trip will occur. Sufficient DNBR is maintained at any power level since CPCs dynamically monitors DNBR and trips the reactor prior to challenging the DNBR safety limit. The bases has been modified so that it does not infer this exclusion only applies < 100% RTP. The bases states, "Also, DNBR margin exists to offset the temporary pressure variations." This is consistent with PVNGS licensing basis.

8. Grammar and/or editorial changes have been made to enhance clarity. No technical or intent changes to the Specification are made by this change.

9. PVNGS is not an analog plant therefore, any references to analog TSs or SRs have been deleted.

10. Bases section deleted/revised because the associated Specification/Surveillance was deleted/revised.

PVNGS CTS
SPECIFICATION 3.4.1
MARK UP

A.1

3.4 Reactor Coolant System (RCS)

~~POWER DISTRIBUTION LIMITS~~

3.4.1 ~~3/4.2.5~~ RCS ~~FLOW RATE~~ PRESSURE, TEMPERATURE, AND FLOW DEPARTURE FROM NUCLEATE BOILING (DNB) LIMITS

~~LIMITING CONDITION FOR OPERATION~~

LCO 3.4.1.c. ~~3.2.5~~ The actual Reactor Coolant System total flow rate shall be greater than or equal to 155.8 x 10^6 lbm/hr.

APPLICABILITY: MODE 1.

ACTION:

L.2 restore RCS flow rate to within limits in 2 hours or

ACT A / ACT B With the actual Reactor Coolant System total flow rate ~~determined to be~~ less than the above limit, reduce THERMAL POWER to less than 5% of RATED THERMAL POWER within the next ~~4 hours.~~ 6 hours L.2

SURVEILLANCE REQUIREMENTS

SR 3.4.1.3 ~~4.2.5~~ The actual Reactor Coolant System total flow rate shall be determined to be greater than or equal to its limit at least once per 12 hours.

SR 3.4.1.3 Note

M.1

---NOTE---
Required to be met in MODE 1 with all RCPs running.

Move CTS 3/4.2.5 from CTS page 3/4 2-6 to here.

A.1

3.4 Reactor Coolant System (RCS)

~~POWER DISTRIBUTION LIMITS~~

3.4.1 ~~3/4.2.6 REACTOR COOLANT COLD LEG~~ RCS PRESSURE, TEMPERATURE, AND FLOW DEPARTURE FROM NUCLEATE BOILING (DNB) LIMITS

~~LIMITING CONDITION FOR OPERATION~~

LCO 3.4.1.b → ~~3.2.6~~ The reactor coolant cold leg temperature (T_c) shall be within the Area of Acceptable Operation shown in Figure ~~3.2-1.~~ 3.4.1-1

APPLICABILITY: MODE 1* and 2*#.

ACTION:

ACT C → With the reactor coolant cold leg temperature exceeding its limit, restore the temperature to within its limit within 2 hours

ACT D → or be in HOT STANDBY within the next 6 hours.

SURVEILLANCE REQUIREMENTS

SR 3.4.1.2 → ~~4.2.6~~ The reactor coolant cold leg temperature shall be determined to be within its limit at least once per 12 hours.

Move CTS 3/4.2.6 from CTS page 3/4 2-7 to here

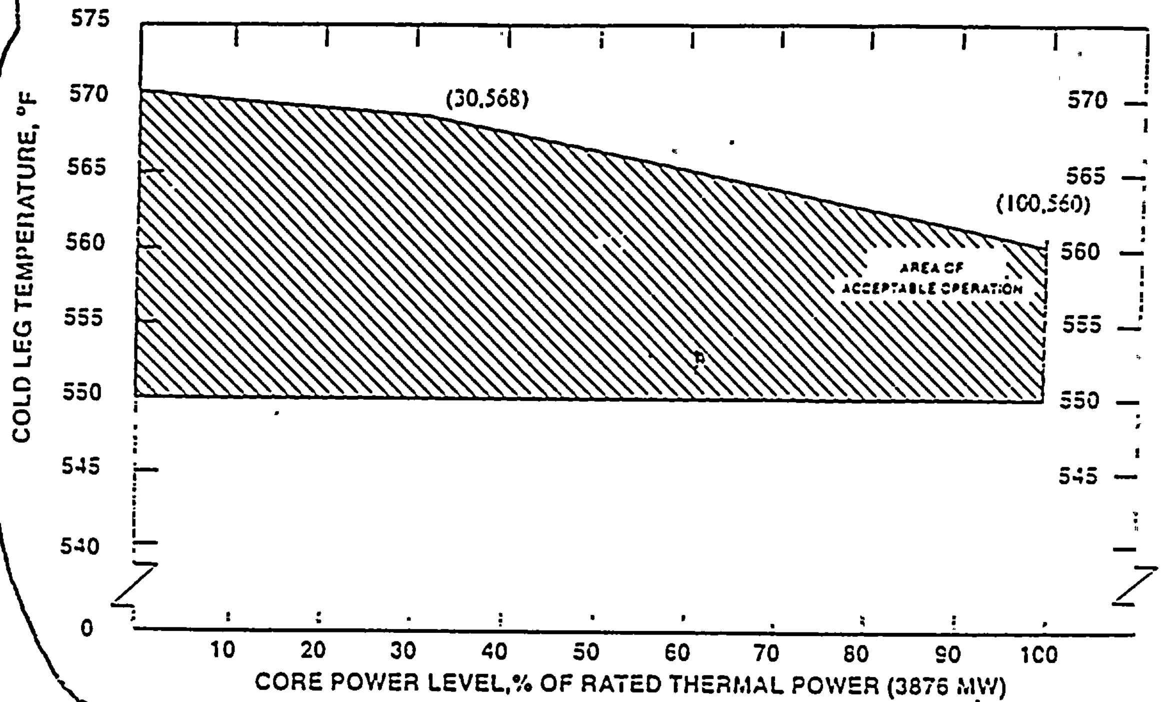
~~*See Special Test Exception 3.10.4.~~ A.2

#With K_{eff} greater than or equal to 1

Specification 3.4.1

FIGURE 3.4.1-1 ~~3.2-1 (INSERT)~~

REACTOR COOLANT COLD LEG TEMPERATURE VS. CORE POWER LEVEL



REACTOR COOLANT COLD LEG TEMPERATURE vs. CORE POWER LEVEL

A.3

CTS Figure 3.2-1 has been moved to ITS 3.4.1-1. Reference ITS 3.4.1 DOC. A.1 for discussion

Palo Verde - Units 1,2,3

A.1

3.4 REACTOR COOLANT SYSTEM
~~POWER DISTRIBUTION LIMITS~~

3.4.1 ~~3/4.2.8~~ ~~PRESSURIZER PRESSURE~~ RCS PRESSURE, TEMPERATURE, AND FLOW DEPARTING FROM NUCLEATE BOILING (DNB) LIMITS

~~LIMITING CONDITION FOR OPERATION~~

LCO 3.4.1a ~~3.2.8~~ The pressurizer pressure shall be maintained between ~~2025~~ 2130 psia and ~~2300~~ 2295 psia.

A.4

APPLICABILITY: MODES 1 and 2*.

Insert 1

L.1

ACTION:

ACT C With the pressurizer pressure outside its above limits, restore the pressure to within its limit within 2 hours

ACT D or be in at least HOT STANDBY within the next 6 hours.

SURVEILLANCE REQUIREMENTS

SR 3.4.1.1 ~~4.2.8~~ The pressurizer pressure shall be determined to be within its limit at least once per 12 hours.

(Move CTS 3/4.2.5 from CTS page 3/4 2-10 to here.)

UNIT 2 only ~~*See Special Test Exception 3.10.8~~

A.2

INSERT FOR CTS 3.2.8
APPLICABILITY NOTE A AND B
(Units 1, 2, and 3)
<u>INSERT 1</u>

--NOTE--

Pressurizer pressure limit does not apply during:

a. THERMAL POWER ramp > 5% per minute; or.

b. THERMAL POWER step > 10% RTP.

DISCUSSION OF CHANGES
SPECIFICATION 3.4.1

ADMINISTRATIVE CHANGES

A.1 All reformatting and renumbering is in accordance with Combustion Engineering Plant (CEOG) Standard Technical Specifications NUREG-1432, Rev. 1 (NUREG-1432). As a result, the Palo Verde Nuclear Generating Station (PVNGS) Improved Technical Specifications (ITS) should be more readable, and therefore understandable, by plant operators as well as other users. During the reformatting and renumbering of the ITS, no technical changes (either actual or interpretational) to the Current Technical Specifications (CTS) were made unless they were identified and justified.

Editorial rewording (either adding or deleting) is made consistent with NUREG-1432. During NUREG-1432 development, certain wording preferences or English language conventions were adopted which resulted in no technical changes (either actual or interpretational) the CTS.

Additional information has also been added to more fully describe each subsection. This wording is consistent with NUREG-1432. Since the design is already approved by the NRC, adding more detail does not result in a technical change.

A.2 CTS 3.2.6 Footnote references "See Special Test Exception 3.10.4" and CTS 3.2.8 Footnote (Unit 2 only) references "See Special Test Exception 3.10.5." Cross references are not used in the ITS or NUREG-1432. Removing cross references does not alter the requirements of the referenced Specification. Therefore, this is an administrative change with no impact on safety. This change is consistent with NUREG-1432.

A.3 CTS 3.2.6, Figure 3.2-1, for Units 1, 2, and 3 is modified per TS Amendments No. 108, 100 and 80 for PVNGS Units 1,2 and 3 respectively, related to power uprate.

A.4 CTS LCO 3.2.8, Pressurizer Pressure, is being modified to reflect the more restrictive limits specified in the proposed PVNGS license amendment submitted to the NRC in letter No. 102-03713 dated June 17, 1996.

TECHNICAL CHANGES - MORE RESTRICTIVE

M.1 CTS 3.2.5 places no requirement for the performance of SR 4.2.5. ITS SR 3.4.1.3, CTS SR 4.2.5 equivalent, requires that the Surveillance be perform in Mode 1. The addition of this requirement constitutes a more restrictive change to PVNGS operating practice. This is acceptable because this allows measurement of RCS flow rate at normal operating conditions at power with all RCPs running. This change is consistent with NUREG-1432.

TECHNICAL CHANGES - RELOCATIONS

None

TECHNICAL CHANGES - LESS RESTRICTIVE

L.1 ITS LCO 3.4.1 introduces a note that gives two specific instances when the pressurizer pressure LCO does not apply.

- THERMAL POWER ramp > 5% RTP per minute; or
- THERMAL POWER step > 10% RTP.

CTS makes no such allowance for pressurizer pressure. ITS is less restrictive since it explicitly states conditions when the Pressurizer Pressure LCO does not apply. This is acceptable because the Note represents short term perturbations where actions to control pressure variations may be counterproductive. Also, since they represent transients initiated from power levels < 100% RTP, an increased DNBR margin exists to offset the temporary pressure variations. Therefore, this change does not detrimentally affect plant safety. This change clarifies the question of applicability so that this LCO is applied as intended. This change is consistent with NUREG-1432.

L.2 CTS 3.2.5 Action Statement requires that thermal power be reduced to less than 5% within 4 hours when actual RCS flow rate is determined to be less than the limit (155.8×10^6 lbm/hr). ITS relaxes the Action requirement by allowing 2 hours to restore RCS flow plus allowing 6 hours to reach Mode 2 (which is defined as < 5% power) if flow is not restored to within limits in 2 hours. Allowing more time, an additional 4 hours, for the Completion Time is less restrictive. This is acceptable because an 8 hour Completion Time for these Actions is a reasonable time that permits plant power to be reduced at an orderly rate. This change is consistent with NUREG-1432.

NO SIGNIFICANT HAZARDS CONSIDERATION
SPECIFICATION 3.4.1

ADMINISTRATIVE CHANGES
(ITS 3.4.1 Discussion of Changes Labeled A.1, A.2, A.3 and A.4)

Arizona Public Service Company, Palo Verde Nuclear Generating Station (PVNGS), Units 1, 2, and 3, is converting to the ITS as outlined in NUREG-1432, "Standard Technical Specifications, Combustion Engineering Plants." The proposed changes involve the reformatting, renumbering, rewording of the Technical Specifications (TS) and Bases with no change in intent, and the incorporation of current operating practices consistent with NUREG-1432. These changes, since they do not involve technical changes to the Current TS (CTS), are administrative. Below are the No Significant Hazards Consideration (NSHC) for the conversion of this Section/Chapter to NUREG-1432.

The Commission has provided standards for determining whether a significant hazards consideration exists as stated in 10 CFR 50.92. A proposed amendment to an operating license for a facility involves a no significant hazards consideration if operation of the facility, in accordance with a proposed amendment, would not 1) involve a significant increase in the probability or consequences of an accident previously evaluated; 2) create the possibility of a new or different kind of accident from any accident previously evaluated; or 3) involve a significant reduction in a margin of safety. A discussion of these standards as they relate to this amendment request follows:

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

> The proposed changes involve reformatting, renumbering, and rewording of the CTS and Bases along with incorporation of PVNGS current operating practices and other changes to the CTS as discussed in the specific Discussion of Changes listed above in order to be consistent with NUREG-1432. The reformatting, renumbering, and rewording along with the other changes listed above, involves no technical changes to the CTS. Specifically, there will be no change in the requirements imposed on PVNGS due to these changes. During development of NUREG-1432, certain wording preferences or English language conventions were adopted. The proposed changes to this Section/Chapter are administrative in nature and do not impact initiators of any analyzed events. They also do not impact the assumed mitigation of accidents or transient events. Therefore, these changes do not involve a significant increase in the probability or consequences of an accident previously evaluated.

ADMINISTRATIVE CHANGES
(ITS 3.4.1 Discussion of Changes Labeled (A.1, A.2, A.3 and A.4) (continued)

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

The proposed changes involve reformatting, renumbering, and rewording of the CTS, along with the incorporation of PVNGS current operating practices and other changes, as discussed, in order to be consistent with NUREG-1432. The proposed changes do not involve a physical alteration of the plant (no new or different type of equipment will be installed) or change the methods governing normal plant operation. The proposed changes will not impose any new or different requirements or eliminate any existing requirements. Therefore, these changes do not create the possibility of a new or different kind of accident from any accident previously evaluated.

Standard 3.-- Does the proposed change involve a significant reduction in a margin of safety?

The proposed changes involve reformatting, renumbering, and rewording of the CTS, along with the incorporation of PVNGS current operating practices and other changes, as discussed, in order to be consistent with NUREG-1432. The proposed changes are administrative in nature and will not involve any technical changes. The proposed changes will not reduce a margin of safety because they have no impact on any safety analysis assumptions. Also, because these changes are administrative in nature, no question of safety is involved. Therefore, these changes do not involve a significant reduction in a margin of safety.

TECHNICAL CHANGES - MORE RESTRICTIVE
(ITS 3.4.1 Discussion of Changes Labeled M.1)

Arizona Public Service Company, Palo Verde Nuclear Generating Station (PVNGS), Units 1, 2, and 3 is converting to the ITS as outlined in NUREG-1432. This particular NSHC is for the changes labeled "Technical Changes - More Restrictive" described in the specific Discussion of Changes listed above. The proposed changes incorporate more restrictive changes into the CTS by either making current requirements more stringent or adding new requirements which currently do not exist.

The Commission has provided standards for determining whether a significant hazards consideration exists as stated in 10 CFR 50.92. A proposed amendment to an operating license for a facility involves a no significant hazards consideration if operation of the facility, in accordance with a proposed amendment, would not 1) involve a significant increase in the probability or consequences of an accident previously evaluated; 2) create the possibility of a new or different kind of accident from any accident previously evaluated; or 3) involve a significant reduction in a margin of safety. A discussion of these standards as they relate to this amendment request follows:

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

> The proposed changes provide more stringent requirements than previously existed in the CTS. The more stringent requirements will not result in operation that will increase the probability of initiating an analyzed event. If anything, the new requirements may decrease the probability or consequences of an analyzed event by incorporating the more restrictive changes discussed in the specific Discussion of Changes listed above. These changes will not alter assumptions relative to mitigation of an accident or transient event. The more restrictive requirements will not alter the operation and will continue to ensure process variables, structures, systems, or components are maintained consistent with safety analyses and licensing basis. These changes have been reviewed to ensure that no previously evaluated accident has been adversely affected. Therefore, these changes will not involve a significant increase in the probability or consequences of an accident evaluated.

TECHNICAL CHANGES - MORE RESTRICTIVE
(ITS 3.4.1 Discussion of Changes Labeled M.1) (continued)

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

Making existing requirements more restrictive and adding more restrictive requirements to the CTS will not alter the plant configuration (no new or different type of equipment will be installed) or change the methods governing normal plant operation. These changes do impose different requirements. However, they are consistent with the assumptions made in the safety analyses, licensing basis, and NUREG-1432. Therefore, these changes will not create the possibility of a new or different kind of accident from any accident previously evaluated.

Standard 3.-- Does the proposed change involve a significant reduction in a margin of safety?

The proposed changes provide more stringent requirements than previously existed in the CTS. An evaluation of these changes concluded that adding these more restrictive requirements either increases or has no impact on the margin of safety. The changes provide additional restrictions which may enhance plant safety. These changes maintain requirements of the safety analysis, licensing basis, and NUREG-1432. As such, no question of safety is involved. Therefore, these changes will not involve a significant reduction in a margin of safety.

TECHNICAL CHANGES - LESS RESTRICTIVE
(ITS 3.4.1 Discussion of Changes Labeled L.1)

Arizona Public Service Company, Palo Verde Nuclear Generating Station (PVNGS), Units 1, 2, and 3 is converting to the ITS as outlined in NUREG-1432. The proposed change involves making the CTS less restrictive. Below is the description of this less restrictive change and the NSHC for the conversion to NUREG 1432.

L.1 ITS LCO 3.4.1 introduces a note that gives two specific instances when the pressurizer pressure LCO does not apply.

- THERMAL POWER ramp > 5% RTP per minute; or
- THERMAL POWER step > 10% RTP.

CTS makes no such allowance for pressurizer pressure. ITS is less restrictive since it explicitly states conditions when the Pressurizer Pressure LCO does not apply. This is acceptable because the Note represents short term perturbations where actions to control pressure variations may be counterproductive. Also, since they represent transients initiated from power levels < 100% RTP , an increased DNBR margin exists to offset the temporary pressure variations. Therefore, this change does not detrimentally affect plant safety. This change clarifies the question of applicability so that this LCO is applied as intended. This change is consistent with NUREG-1432.

The Commission has provided standards for determining whether a significant hazards consideration exists as stated in 10 CFR 50.92. A proposed amendment to an operating license for a facility involves a no significant hazards consideration if operation of the facility, in accordance with a proposed amendment, would not 1) involve a significant increase in the probability or consequences of an accident previously evaluated; 2) create the possibility of a new or different kind of accident from any accident previously evaluated; or 3) involve a significant reduction in a margin of safety. A discussion of these standards as they relate to this amendment request follows:

TECHNICAL CHANGES - LESS RESTRICTIVE
(ITS 3.4.1 Discussion of Changes Labeled L.1) (continued)

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

The proposed change adds a Note to indicate the limit on pressurizer pressure may be exceeded during short term operational transients such as a THERMAL POWER ramp increase of > 5% per minute or a THERMAL POWER step increase of > 10%. These conditions represent short term perturbations where actions to control pressure variations might be counterproductive. In addition, since they represent transients initiated from power levels < 100% RTP, an increased DNBR margin exists to offset the temporary pressure variations. These changes will not result in operation that will increase the probability of initiating an analyzed event. These changes will not alter assumptions relative to mitigation of an accident or transient event. The proposed changes have been reviewed to ensure that no previously evaluated accident has been adversely affected, therefore, these changes will not involve a significant increase in the probability or consequences of an accident previously evaluated.

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

The proposed change adds a Note to indicate the limit on pressurizer pressure may be exceeded for a short period of time. The CTS does not provide this guidance. This change will not alter the plant configuration (no new or different type of equipment will be installed) or change the methods governing normal plant operation. These changes do relax CTS requirements, however they are consistent with the assumptions made in the safety analyses, NUREG-1432, and licensing basis. Therefore, they will not create the possibility of a new or different kind of accident from any accident previously evaluated.

TECHNICAL CHANGES - LESS RESTRICTIVE
(ITS 3.4.1 Discussion of Changes Labeled L.1) (continued)

Standard 3.-- Does the proposed change involve a significant reduction in a margin of safety?

The proposed changes provide additional guidance and flexibility indicating that the limit on pressurizer pressure may be exceeded during short term operational transients. An evaluation of these changes concluded that relaxing these requirements has no impact on the margin of safety. The changes maintain requirements of the safety analysis, consistent with NUREG-1432, and licensing basis. As such, no question of safety is involved. Therefore, these changes will not involve a significant reduction in a margin of safety.

TECHNICAL CHANGES - LESS RESTRICTIVE
(ITS 3.4.1 Discussion of Changes Labeled L.2)

Arizona Public Service Company, Palo Verde Nuclear Generating Station (PVNGS), Units 1, 2, and 3 is converting to the ITS as outlined in NUREG-1432. The proposed change involves making the CTS less restrictive. Below is the description of this less restrictive change and the NSHC for conversion to NUREG-1432.

L.2 CTS 3.2.5 Action Statement requires that thermal power be reduced to less than 5% within 4 hours when actual RCS flow rate is determined to be less than the limit (155.8 x 10^6 lbm/hr). ITS relaxes the Action requirement by allowing 2 hours to restore RCS flow rate plus allowing 6 hours to reach Mode 2 (which is defined as < 5% power) if flow is not restored to within limits in 2 hours. Allowing more time, an additional 4 hours, for the Completion Time is less restrictive. This is acceptable because an 8 hour Completion Time for these Actions is a reasonable time that permits plant power to be reduced at an orderly rate. This change is consistent with NUREG-1432.

The Commission has provided standards for determining whether a significant hazards consideration exists as stated in 10 CFR 50.92. A proposed amendment to an operating license for a facility involves a no significant hazards consideration if operation of the facility, in accordance with a proposed amendment, would not 1) involve a significant increase in the probability or consequences of an accident previously evaluated; 2) create the possibility of a new or different kind of accident from any accident previously evaluated; or 3) involve a significant reduction in a margin of safety. A discussion of these standards as they relate to this amendment request follows:

TECHNICAL CHANGES - LESS RESTRICTIVE
(ITS 3.4.1 Discussion of Changes Labeled L.2) (continued)

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

The proposed change increases the time from 4 hours to 8 hours to reduce reactor power to less that 5% (Mode 2) in the event that RCS flow rate is below LCO limits. The plant must be brought to a MODE in which the LCO does not apply. To achieve this status, the plant must be brought to at least Mode 2 within 8 hours. In Mode 2, the reduced power condition eliminates the potential for violation of the accident analysis bounds. The 8 hours is a reasonable time that permits the plant power to be reduced at an orderly rate. This change will not result in operation that will increase the probability of initiating an analyzed event. These changes will not alter assumptions relative to mitigation of an accident or transient event. The proposed changes have been reviewed to ensure that no previously evaluated accident has been adversely affected. Therefore, these changes will not involve a significant increase in the probability or consequences of an accident previously evaluated.

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

Relaxing the total Completion Time to reach Mode 2 from 4 hours to 8 hours does not introduce any new mode of plant operation, does not alter the plant configuration (no new or different equipment will be installed) or change the method governing normal plant operation. These changes do relax requirements in the CTS, however, they are consistent with the assumptions made in the safety analyses, licensing basis, and consistent with NUREG-1432. Therefore, these changes will not create the possibility of a new or different kind of accident from any accident previously evaluated.

TECHNICAL CHANGES - LESS RESTRICTIVE
(ITS 3.4.1 Discussion of Changes Labeled L.2) (continued)

Standard 3.-- Does the proposed change involve a significant reduction in a margin of safety?

The proposed change relaxes the total Completion Time for placing the reactor in Mode 2 in the event that RCS flow rate is below LCO limits. An evaluation of the change concluded that this change has no impact on the margin of safety. The change maintains requirements of the safety analysis, licensing basis, and is consistent with NUREG-1432. As such, no question of safety is involved. Therefore, these changes will not involve a significant reduction in a margin of safety.